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Section One
INERT MATTER

Inert matter is a cosmological value indicating the initial state of matter and field, as the two main forms of matter that have arisen as assumed in the Big Bang.The symmetry of a molecular structure of the internal material-power environment, convertibility of processes, as well as variety of building mixes of isotopes are characteristic for inert matter. Inert substance is a set of inorganic and organic combinations expressed in an elementary chemical compound, weight and energy. The field of inert matter is a kind of matter having zero weight of rest, or otherwise, it is a geometrical space with infinite number of degrees of freedom. Inert matter in the Universe is represented by forms of various combinations: from space vacuum to planets, stars, galaxies, etc., in various states: solid, liquid, gaseous, etc. By and large, the system of inert matter is the Universe in all the variety structure.

The Philosophy of the Cosmos as the New Universal Philosophical Teaching about Being

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The authors' understanding of neuro-programming is the result of the impact on the human brain of information and communication technology (including educational one), through which in the human brain the programs of manifestation in the ontogenesis of internal creative potentials are written. This article summarizes the history of the formation of key neuro-programming technologies of the human brain as well as proves that the changes in the society's worldview are caused by the possibilities and quality of neuro-programming technologies that society uses. Having influence over worldview stereotypes and behaviour set by the society, neuro-programming technologies essentially ensure the national security of any state and the peaceful coexistence of states in the regions and on the planet as a whole. Using historical and philosophical methods, methods of conceptualization, systematization, modeling, etc., the authors have come to the conclusion that the modern world lies in a confrontation of security strategies, in which neuro-programming technologies play a key role.

Keywords: technologies of neuro-programming, educational technologies, Plato, national security, human brain, the state

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Introduction

In the theory "Evolving Matter," Oleg Bazaluk postulated two basic provisions:[1]

1. Evolution is complication of the structure of matter, the types of interaction and the environments, though in the unity and struggle of opposites. Speaking about evolution as complication of the Universe, the author means complication of three components of physical reality: 1) the structure of matter; 2) the types of interaction (relations) between the structures of matter; 3) the environments, in which complication of these structures and interactions are carried out, and which, to a varying degree, determine environmental characteristics [Bazaluk, 2016: 35].

2. The complication of any state of matter is based on three factors and two causes of evolution. To the factors of evolution as the complication, the author assigns:

a) Continuity of self-complication of the structure, the types of interaction and the environments of any state of matter, supplemented by blocks of continuous self-complication and the principle of dominance of continuous block self-complication.
b) Nonlinear complication of the structure, the types of interaction and the environments of any state of matter, which is added by the factors: hierarchical nonlinear complication and direction of nonlinear hierarchical complication.
c) Isolation of complication (or, Plotinus' setup for "self-assembly").[2]

Oleg Bazaluk attributes the causes of evolution as complication to [Bazaluk, 2016: 136]:

a) Active principle, which is inherently the basis for the initial elements of any state of matter and forms self-complication.
b) Natural selection as the impact of the external environment.

Interaction of the active internal principle of any state of matter with natural selection as the impact of the external environment forms a regulatory compromise [Bazaluk, 2016: 136].

On the basis of the proposed postulates, Bazaluk systematized the accumulated knowledge about the evolution of the Universe, biological life and human and came to the conclusions [Bazaluk, 2016: 129-130]:

1. Complications of the structure of matter, the types of interaction and the environments in our Universe have been carried out by hotbeds, continuously and nonlinearly, over proximately 13.7 billion years. Complication of the structure and functions of the Universe happens under the influence of the same (Universal) factors and causes of evolution. Thus, in the course of evolution, complication of the very factors and causes of evolution themselves happened, which led to the formation and development of the nth number of *states* of matter.

2. Each state of matter is a new level of complication of the structure of matter, the types of interaction and the environments. In consequence of the complication of each new state of matter comes the formation of invariant hierarchies, providing fixation of the state of matter in the structure of the Universe and its co-evolution with other states of matter. Each new state of matter brings new opportunities for the organization of the circulation of substances, energy and information, as well as ways of moving in space.

3. Studying the modern scientific and philosophical theories of evolution, the author discovered the unity of micro and macroevolutionary processes. The basis of this unity is the variability of the factors and causes of evolution. The transition from the Microcosm to the Macrocosm in Inert Matter, Living Matter, Intelligent Matter and any other states of

[1] We shall consider only those provisions of the theory "Evolving matter," which are necessary for building the theory of education. The arguments of these provisions, as well as the theory of evolution itself, can be found in the book [Bazaluk, 2016].

[2] See [Plotinus, 1952].

matter is a consequence of the impact of regulatory compromise and variability of the factors and causes of evolution, which are complicated during time, complicating the structure and functions of the Universe.

4. During the work on the evolution models of three states of matter that are known to modern science: Inert Matter, Living Matter and Intelligent Matter, the author discovered and considered the so-called "transition" states of matter. The author defined them by the terms "Bioinert" and "BioIntelligent" matter [Bazaluk, 2016]. Namely, the "transition" states of matter complicate the systematization of knowledge, because, on the one hand, they are structurally and functionally the highest structures of the "mother" state of matter, on the other hand, they are included in the more perfect blocks of the "daughter" state of matter. "Transition" states of matter are the maximum possible limit of continuous and nonlinear complication of the "mother" state of matter. Modern science does not know of any examples when in the "mother" state of matter, complication of the structure, the types of interactions and the environments went beyond the hierarchy of a transition state of matter.

5. On the example of the Solar System, only one sequence of complication of the structure of the Universe can be seen: Inert Matter → Living Matter → Intelligent Matter, or alternatively, taking into account "transition" states of matter: Inert Matter → Bioinert Matter → Living Matter → BioIntelligent Matter → Intelligent Matter. The modern understanding of evolution and co-evolution of these states of matter is considered in the standard model of the Universe, the synthetic theory of evolution and the concepts of noogenesis.

6. At the scale of the Solar System, the states of matter have been formed sequentially, at intervals of approximately 3 billion years:

a) Approximately 6 (5.5) billion years ago, in the Milky Way Galaxy, the Solar System was formed — one more hotbed in uneven, continuous and nonlinear block complication of the Universe. Vladimir Vernadsky denoted the richness of the structure and the manifest functions of our Universe by the term of "system of Inert Matter."[3]
b) Approximately 3.5 billion years ago, as a result of geological evolution, on the Earth, the first biological organisms emerged and gained a foothold. Over 3 billion years they formed the system of Living Matter, which in science was denoted by the term "biosphere".
c) Approximately 6-7 million years ago, as a result of neuroevolution, on the basis of the highly developed biosphere of Earth, the first structures of Intelligent Matter emerged. This started the formation of the noosphere.

Extrapolating the results of studies of the Solar System on the structure of the Universe, Oleg Bazaluk came to a whole series of conclusions. Let us consider the following [Bazaluk, 2016]:

At the scale of the Universe, five states of matter are evolving as a minimum. One of the unknown states of matter to modern science is the "mother" state for our own Universe. The Universe is developing within it, and probably separate features, which are ascribed by humanity to the Universe (e.g. gravitation) are actually manifestations of states of Matter Y. The second unidentified state of matter by humanity emerged on the basis of highly developed Intelligent Matter. In the model, it is indicated as the state X_1. The model admits the state X_2, from which is probably formed the state Y and the so-called "new Universe" emerged. These successive stages of complication of the states of matter can include an nth number of chain links, but the result is the birth of a "new Universe" when saving an "old Universe".

[3] To be precise, Vernadsky used the concept "Inert Substance." In the works, we gave arguments for the advisability of replacing the term "Inert Substance" with "Inert Matter" [Bazaluk, 2016].

1. The complication is happening uneven and through "hotbeds." If we suppose that the Universe perceived by humanity is a fragment of space in which continuous and nonlinear complication of the structure of matter, the types of interaction and the environments are happening, then it is possible that "Our Universe" is nothing other than a plurality of Universes which are observed by us in one or other state of complication.
2. The earth's noosphere in the modern state is only the beginning of noogenesis. In future, a minimum of 3 billion years of continuous and nonlinear complication are to be expected. Humanity will expect a lot of changes. For the scale of these changes, we can judge from the example of the complication of Inert Matter and Living Matter at the scale of the Solar System. Inert Matter had been complicated for 3 billion years from quarks to polymers, Living Matter from RNA molecules to mammals. The complication of the Earth's Intelligent Matter began with neural ensembles of subconsciousness that separated out the family of the most progressive primates (hominid) from the animal world. For 6-7 million years neuroevolution, sociocultural evolution and the evolution of the technologies of the most ancient hominids have brought us to the exploration near-Earth space. Taking into account that in 1 billion years the condition of Earth will be unsuitable for biological life due to physical changes in the sun, a strategy of the evolution of Intelligent Matter becomes clearer: a) as much as possible, to obtain full liberation from factors of the biological environment; substituting them with more reliable and controlled artificial constructs; b) the exploration near and far space; c) the complication of the sociocultural environment and technologies to a level, which provides the noosphere relief from the destructive influence of the cosmos.

The theory "Evolving matter" allows the possibility of a simultaneous presence of a certain number of states of matter in the Universe, at different stages of their complication. We can speak of the five states of matter with the greatest probability:

1. Matter Y is substance, the types of interaction and the environments, which preceded Inert Matter, and at the scale of which Inert Matter arose and continues to become more complicated. Matter Y is not recognized and is not studied by modern science.
2. Inert Matter is ours and other Universes. At present, the Standard Cosmological Model gives the most complete understanding of continuous and nonlinear complication of Inert Matter.
3. Living matter is the biosphere, which naturally arises in various parts of the expanding Universes, on space objects with a certain range of physicochemical characteristics. The synthetic theory of evolution provides the most complete understanding of the continuous and nonlinear complication of the biosphere in individual cosmic object.
4. Intelligent Matter is noospheres, which naturally arise on the basis of highly developed biospheres. Unlike Living Matter, Intelligent Matter is neither structurally nor functionally connected to cosmic objects. In modern science, the cosmic significance of Intelligent Matter is not recognized. The theory that explains the evolution of Intelligent Matter does not exist.
5. Matter X_1 is a state of matter which naturally arise in highly developed noospheres. Modern science does not recognize and research this state of matter.

The states of matter listed above are formed sequentially, through "hotbeds," with a certain range of physicochemical characteristics, and at intervals of approximately 3 billion years. The totality of states of matter forms continuous and nonlinear complication, which is

denoted by the term "Universe" in modern science. The theory "Evolving matter" allows the existence of a certain set of Universes and, accordingly, cosmic biospheres, noospheres, etc.

The way to achieve philosophical knowledge

The fundamental difference between the philosophers' desire for wisdom and the scientists for erudition is hidden in their relation to knowledge. Modern knowledge of cosmologists, biologists, anthropologists or scientists from any other scientific disciplines, Plato would compare the specialized knowledge of tradesmen, which were valuable only in their branch of knowledge but were less useful in the others.[4] The undervaluing of philosophy and philosophical knowledge has led to the fact that modern research in cosmology, biology and neuroscience is completely unrelated and does not enrich each other through explorations.

In the philosophical tradition, knowledge is the way to the Divine, or, in the terminology of Modern philosophy, it is the way to the ontology of the cosmos. Philosophical knowledge is a universal culture that goes back to the aristocratic ideal of early Greece, which can only be understood in the context of the history of Antiquity. The recognized authorities in this field research Werner Jaeger and Pierre Hadot proved that the stages of the development of philosophical knowledge, in essence, determined the stages of the development of ancient culture.[5] Philosophical knowledge was the basis on which the Greeks built a holistic understanding of the world, embracing the unity of the ontology of human being, the state, and the cosmos.[6]

The way to achieve philosophical knowledge lies in "the search of wisdom."[7] If we take into account that in Plato's view only God was wise, then "the search of wisdom" gave the possibility for philosophers to cognize the ontology of the cosmos through the synthesis of scientific knowledge in the universal (all-encompassing) philosophical understanding of the world. The teachings of Aristotle, Plotinus, Porphyry, and others enriched Plato's ideas about knowledge. For example, Aristotle defined scientific knowledge as "second philosophy" in philosophical knowledge as "first philosophy" and emphasized its crucial importance in the formation of philosophy as universal science. In Aristotle's view, philosophy as a way of life allowed a philosopher to concentrate on a more detailed study of nature, or in modern terminology, *on applied and fundamental scientific research*.[8] Only in the 19th century, William Whewell, a theologian and philosopher, coined the term "scientist,"[9] by which he designated philosophers specializing in the detailed study of some phenomena of nature, including physical, mathematical and social realms.

If we follow the philosophical tradition, then the modern, completely new and impressive level of scientific argumentation, which was accumulated in numerous branches of knowledge, cannot a priori deny philosophy. On the contrary, it should be united through a universal philosophical theory and brought the modern culture to new levels of perfection.

[4] See "Laws" [Plato, 1994].

[5] See [Jaeger, 1946, 1947; Hadot, 2005].

[6] Initially, "Hellenic cosmos", which subsequently expanded to understanding the Universe, was identified with the terms "humanitas," "human being," "with the life in the early polis" "...for his citizens held their communal existence to be the sum of all the higher things of life — in fact to be something divine" [Jaeger, 1946: 113]. See [Afonasin et al, 2016].

[7] See "Simposium" [Plato, 1993].

[8] See [Aristotle, 1983; Afonasin, 2017].

[9] Along with other terms: ion, dielectric, anode, cathode, etc.

The new universal philosophical teaching about being

The theory "Evolving matter" is the scientific and philosophical theory that in a certain way systematizes the scientific knowledge of the last four centuries and enriches the ontology of the cosmos with new meanings. It gives the possibility of creating *the philosophy of the Cosmos*, that is a new universal philosophical teaching about being, which unites the disparate scientific knowledge of cosmology, biology and neuroscience through the general philosophical idea "Those Who Transform the Universe." It follows from the theory "Evolving matter" that each state of matter is a part of the whole, which, by its appearance and complication, causes the complication of the whole. The cosmos in the philosophical understanding is the absolute One[10] that is much wider than the scientific understanding of the cosmos as the Universe. In the cosmos as the One, the idea "Those Who Transform the Universe" is already present as the cause of all that is happening in the world. The cosmos as the One is the absolute unity of the human ontology (Intelligent Matter) and any other state of matter in the ontology of the cosmos. It is not in the meaning of unification, but in the meaning of the common initial principle, the primogeniture. In fact, Plotinus' understanding of the One, which in the Middle Ages was transformed into the understanding of the Triune God, is the principle of being, that is what was, is and will be in the Universe.[11]

The philosophy of the cosmos, as the modern philosophical teaching about the being of Dasein-the One, allows us to consider the Universe not as a narrowly specialized cosmological model, the Lambda-CDM model, but as the synthesis of knowledge in cosmology, biology and neurobiology through common fundamental philosophical ideas. In the philosophy of the cosmos, the Universe is continuously and nonlinearly complicating order inside and between a certain numbers of states of matter. Each state of matter has a certain degree of freedom, which allows to appear and become fixed in the system of the "mother" state of matter. The key meanings of any state of matter are in the term Dasein. Dasein of any state of matter is a certain way of presence in being. This is adjoint presence to oneself, to the complication of one's structure, functions and manifestations, as well as to "mother" and other states of matter. It is a concentration of the experience of being of the previous states of matter in the newly emerged state of matter. The complication of the being of Dasein of each new state of matter alters the existing order in the being of Dasein-the One. Martin Heidegger revealed to a certain extent the meanings of the being of Dasein of Intelligent Matter. However, these meanings are even deeper, because man is present not only in himself and for himself. The complication of man, like a certain way of being, occurs in the complication of the being of the "mother" state of matter and leads to nonlinear complication of the entire order of Dasein of previous states of matter in our Universe. The being of Dasein's Man concentrates in itself the experience of being Dasein of Living, Inert and Y-matter, which gives it the power of cosmic one and transforms it into the potential of the being of Dasein-the One.

The Dasein of "daughter" state of matter is a new level of complication of the structure of matter, the types of interactions and the environments, which gives new possibilities for continuous and nonlinear block complication of the Universe. This is a new way of life: being-there for oneself, that is for the complication of the Earth's noosphere and, at the same time, being-there for others, that is for the complication of the Earth's biosphere and the Universe. To become part of the "mother" state of matter and eventually to create its own system in it means to make certain changes in the complication of the "mother" system and,

[10] We use Plotinus' terminology that contains the important meanings of the teachings of Plato and Aristotle for our research [Plotinus, 1952].

[11] See [Plotinus, 1952].

consequently, in the complication of the Universe. Each new state of matter *transforms the Universe by the fact of its appearance and fixation*, i.e. its Dasein.

The number of *appearance* of new states of matter in the "mother" system does not correspond to the number of *fixed* states of matter. To become part and to create a system in the "mother" state of matter, each new state of matter should possess two basic qualities:

1. The possibilities to make full use of the material, energy and information resources of the "mother" state of matter.

2. The possibilities to transform the "mother" system in order to create conditions for continuous and nonlinear block complication of its own structure and functions, i.e. to create the "daughter" system.

It follows from the theory "Evolving matter" that each new state of matter, after about 2 billion years of continuous and nonlinear block complication, reaches a certain perfection in the organization of its system, and turns into the "mother" system. That is, the "daughter" state of matter reaches such a level of internal complication that allows the appearance of new qualitative structures and functions in the system, which can overcome the boundaries of the "mother" system to become part in being of Dasein-the One and to create its own being of Dasein in it. We called these structures "transitional" states of matter. From a certain set of continuously and nonlinearly emerging transitional states of matter, in the "mother" system only one state of matter is fixed, whose structure and functions use the resources of the "mother" system most effectively to create its own being of Dasein.

The "daughter" system occupies an "insignificant" place at the scale of the "mother" system. However, despite the fact that the scale of the presence of each new state of matter in the already existing hierarchy of the Universe is significantly reduced, its ability *to transform the Universe*, on the contrary, is increasing. The reason lies in the being of Dasein of a new state of matter, in which the experience of the being of the previous states of matter is concentrated. In the being of Dasein of each new state of matter, the Dasein-the One finds new ways of presence for itself and *taking care* of its being. For the being of Dasein-the One, the being of Dasein-the Universe, as well as the being of Dasein of any other state of matter, is the necessity of being, that is, to embody the power of its Dasein in continuously and nonlinearly complicating ways of presence. Therefore, each new state of matter, as a new manifestation of Dasein-the One, not only complicates the structure, functions and manifestations of the already existing order of the previous states of matter, as the earlier manifestations of Dasein-the One but also concentrates the experience of being of their Dasein in itself. Owing to the concentration of the experience of being in the being of Dasein of a new state of matter, Dasein-the One preserves the possibility of taking care of its being and ensuring the unity of the varieties of its manifestations.[12]

Conclusion

The theory "Evolving matter" gave the possibility of creating *the philosophy of the cosmos*, which is a new universal philosophical teaching about being. The new teaching united the disparate scientific knowledge of cosmology, biology and neuroscience through the general philosophical idea "Those Who Transform the Universe." In the philosophy of cosmos, the Universe is regarded as an absolute unity of the ontology of Intelligent Matter and any other state of matter in the ontology of the cosmos, or as the being of Dasein-the One. The being of Dasein-the One finds new ways of presence for itself and taking care of its presence in the being of Dasein of each new state of matter. For the being of Dasein-the One, the being

[12] See [Bazaluk, 2017].

of Dasein-the Universe, as well as the being of Dasein of any other state of matter, is the necessity of being, that is, to embody the power of its Dasein in continuously and nonlinearly complicating ways of presence. Therefore, each new state of matter, as a new manifestation of Dasein-the One, not only complicates the structure, functions and manifestations of the already existing order of the previous states of matter, as the earlier manifestations of Dasein-the One but also concentrates the experience of being of their Dasein in itself.

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Contemporary Cosmological Paradigms and their Impact on Educational Research

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Three modern cosmological models are considered in the article: the Standard Cosmological Model, the theory "Evolving Matter" and the Mental Universe, which, according to the authors, clearly demonstrate the change of the worldview paradigm in modern society: a rational worldview gives way to an irrational world view, or a new form of idealism. In the article, the authors answer the question: how the change of cosmological paradigms affects the educational research. As a result of the study, the authors come to the conclusion that under the influence of the modern hypothesis of the Intelligent Matter and the Mental Universe rethinking of the subject and object of the educational research takes place. The subject of the educational research is the neural structure of the brain and the peculiarities of impact on it in ontogenesis, and the object of the educational research becomes the involvement of a neural structure in cosmic processes and the features of its development under the influence of the cosmos.

Keywords: cosmological paradigms, educational research, Mental Universe, Standard Cosmological Model, theory "Evolving Matter", Intelligent Matter

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Introduction

Considering the strategies of systematization of the theories of education in the history of culture, Oleg Bazaluk established that, in principle, the diversity of the theories of education in histories of culture can be divided according to the two lines of development:

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Plato and Isocrates. The theories of education of Plato's line set the ideal of form building, answering the question: "Who should be educated in the younger generations?" The theories of education of Isocrates' line by daily educational practices ensure the achievement of the designated ideal, i.e. focus more on finding answers to the question "How to educate the younger generation?" [Bazaluk, 2017: 22-23].

One of the criteria according to which Bazaluk has systematized the educational research in the history of culture is the cosmological paradigm dominating in society. Since the time of Plato, it has been established that the features of human ideas about the Universe have a direct effect on the educational research. Let us consider briefly the contemporary cosmological paradigms and evaluate their impact on the educational research.

The Standard Cosmological Model

The Standard Cosmological Model, in particular a cosmological chaotic inflationary model, is the basic model in the modern cosmology. The first version of the inflationary theory was presented in 1981 by the American physicist and cosmologist Alan Guth Harvey. According to the inflationary theory, in the Universe, at different spatial and temporal intervals, spontaneous breakings occur. At each point where the breaking occurs, the Universe starts expanding, and new areas arise. Most of the time, the expansion is negligible. As the process is chaotic, at one point a bubble appeared, the expansion of which lasted long enough to create the Universe, structurally resembling our Universe. Expansion is eternal, big explosions happen constantly; some Universes branch off from other Universes. Under this scenario, these Universes can "blossom out" with other Universes, thus creating a "Multiverse". According to the theory of inflation, spontaneous breakages can occur anywhere, even in our Universe, meaning that, from our Universe another one could branch off. It also means that our Universe itself could also branch off from another Universe. According to the chaotic inflationary model, the Multiverse is eternal, even if separate Universes are not eternal. In some Universes, the value of φ can be very large, and then they immediately cease to exist as a result of the Big Crunch after the Big Bang. In other Universes, this value can be very close to zero, with the result that they will expand eternally [Bazaluk, 2016].

The modern researches of the standard cosmological model are shown, for example, in the article "A Macroscopic View of the Standard Cosmological Model" by Yury Ignat'ev et al. [Ignat'ev et al., 2018] or "A Cosmological Inflationary Model Using Optimal Control" by Salah Haggag et al. [Haggag et al., 2017].

The standard cosmological model regards exclusively only the structure of the Universe. It does not consider the origin of life and man; therefore, its influence on the educational research is minimized. A number of scientists are trying to explain the origin of man within the boundaries of the standard cosmological model. For example, Ward Blondé in the article "Can an Eternal Life Start from the Minimal Fine-Tuning for Intelligence?" based on the standard cosmological model tries to answer a question "How nature's constants are fine-tuned for the emergence of life?" Blondé answers this question in the following way, "First, universes in the multiverse acquire an unlimited amount of additional fine-tuning for intelligent life over the course of many universe generations. Such additional fine-tuning may consist of travelling between universes and an afterlife on a distant planet. Second, evolutionary conservation in the evolution of universes in the multiverse provides a declaration why we observe a universe that roughly has the minimal fine-tuning to support intelligent life" [Blondé, 2016: 26].

The theory "Evolving Matter"

In 2000, Oleg Bazaluk proposed a new understanding of the evolution of our Universe, which he represented in the model "Evolving Matter". Subsequently, he improved the argumentation of his theory continuously [Bazaluk, 2009]. The final version of the theory "Evolving Matter" is presented in the monograph "The Theory of Evolution: From a Space Vacuum to Neural Ensembles and Moving Forward" [Bazaluk, 2016]. In the theory "Evolving Matter" the standard cosmological model is not denied. Bazaluk tries to unite the Standard cosmological model, the synthetic theory of evolution and the theory of noogenesis, i.e. the evolution of the Universe, life and mind.

In the theory "Evolving Matter," the author postulated two basic provisions:

1. Evolution is complication of the structure of matter, the types of interaction and the environments, though in the unity and struggle of opposites. Speaking about evolution as complication of the Universe, the author means complication of three components of physical reality: 1) the structure of matter; 2) the types of interaction (relations) between the structures of matter; 3) the environments, in which complication of these structures and interactions are carried out, and which, to a varying degree, determine environmental characteristics [Bazaluk, 2016: 35].
2. The complication of any state of matter is based on three factors and two causes of evolution. To the factors of evolution as the complication, Bazaluk assigns: a) Continuity of self-complication of the structure, the types of interaction and the environments of any state of matter, supplemented by blocks of continuous self-complication and the principle of dominance of continuous block self-complication. b) Nonlinear complication of the structure, the types of interaction and the environments of any state of matter, which is added by the factors: hierarchical nonlinear complication and direction of nonlinear hierarchical complication. c) Isolation of complication. Bazaluk attributes the causes of evolution as complication to: a) Active principle, which is inherently the basis for the initial elements of any state of matter and forms self-complication. b) Natural selection as the impact of the external environment. Interaction of the active internal principle of any state of matter with natural selection as the impact of the external environment forms a regulatory compromise [Bazaluk, 2016: 136].

On the basis of the proposed postulates, Bazaluk systematized the accumulated knowledge about the evolution of the Universe, biological life and human and came to the conclusions [Bazaluk, 2016: 129-130]:

1. Complications of the structure of matter, the types of interaction and the environments in our Universe have been carried out by hotbeds, continuously and nonlinearly, over proximately 13.7 billion years. Complication of the structure and functions of the Universe happens under the influence of the same (Universal) factors and causes of evolution. Thus, in the course of evolution, complication of the very factors and causes of evolution themselves happened, which led to the formation and development of the nth number of states of matter.
2. Each state of matter is a new level of complication of the structure of matter, the types of interaction and the environments. In consequence of the complication of each new state of matter comes the formation of invariant hierarchies, providing fixation of the state of matter in the structure of the Universe and its co-evolution with other states of matter. Each new state of matter brings new opportunities for the organization of the circulation of substances, energy and information, as well as ways of moving in space.

3. Studying the modern scientific and philosophical theories of evolution, Bazaluk discovered the unity of micro and macroevolutionary processes. The basis of this unity is the variability of the factors and causes of evolution.
4. During the work on the evolution models of three states of matter that are known to modern science: Inert Matter, Living Matter and Intelligent Matter, the author discovered and considered the so-called "transition" states of matter. Bazaluk defined them by the terms "Bioinert" and "BioIntelligent" matter.
5. On the example of the Solar System, only one sequence of complication of the structure of the Universe can be seen: Inert Matter → Living Matter → Intelligent Matter, or alternatively, taking into account "transition" states of matter: Inert Matter → Bioinert Matter → Living Matter → BioIntelligent Matter → Intelligent Matter. The modern understanding of evolution and co-evolution of these states of matter is considered in the standard model of the Universe, the synthetic theory of evolution and the concepts of noogenesis.

In the theory "Evolving Matter" the place of Man in scales of the Earth and the Universe as well as prospects of his development are considered. The theory has a direct impact on the educational research, up to the creation of a new theory of education [Bazaluk, 2017a].

The hypothesis of the Mental Universe

In 2005, Richard Henry gave a strong argument for the lack of an objective physical world that exists independently of being observed. According to Henry, the physical world is contextual: its measurable physical properties do not exist before being observed [Henry, 2005]. Contextuality is a formidable challenge to the viability of realism, especially if we consider that contextuality is predicted by quantum mechanics, and it is not a consequence of philosophical reflections.

The hypothesis of the Mental Universe, suggested by Richard Henry, is confirmed by the studies of Bernardo Kastrup. By combining a modern formulation of the ontology of idealism with the relational interpretation of quantum mechanics, Kastrup proves the main theses of the hypothesis, as well as he considers the key philosophical qualms of the relational interpretation [Kastrup, 2017]. According Kastrup, in a mental universe observation necessarily boils down to perceptual experience and the physical properties of the world exist only insofar as they are perceptually experienced. There is no ontological ground outside mind where these properties could otherwise reside before being represented in mind [Kastrup, 2017: 33]. As a result of work on the hypothesis of the Mental Universe, Kastrup has come to the conclusion that our society stands on the border of a paradigm shift: the materialist worldview gives way to a new form of idealism. He writes: "Idealism can not only accommodate all anomalies amassed to date, but also make sense of all other relevant empirical facts. It is a more parsimonious, empirically robust and explanatorily powerful worldview than materialism" [Kastrup, 2018: 49-50].

The basis of the paradigm of the Mental Universe Kastrup sees in the universal mind, which "is nature's sole fundamental entity, everything else being reducible to excitations of universal mind" [Kastrup, 2018: 49]. The new paradigm should accommodate the kinship and continuity between mind and world. "In other worlds, materialism will be replaced by a form of idealism: the view that a transpersonal mind is the sole fundamental aspect of reality, everything else being reduced to excitations of this mind" [Kastrup, 2018: 47].

Marvin E. Kirsh writes about the impossibility of considering many modern phenomena by rational methods in his article "What in the World is Universe? : A Prime Example" [Kirsh,

2015; Kirsh, 2016]. However, in order to avoid emerging paradoxes, he suggests another way out: to consider a world constituted of shapes. “Shapes introduced include the three dimensional egg shape, the triangle, pentagon, cube, the helix of DNA, the screw shaped void in the crystal used to investigate Planks constant” [Kirsh, 2016: 115].

The hypothesis of the Mental Universe has a direct impact on the educational research and sets rethinking the role of rational cognition methods that dominate in modern education.

Impact of Cosmological Paradigms on Educational Research

We reviewed briefly three current ideas about the Universe. In fact, there are many more. We picked up cosmological paradigms in such a way as to emphasize the obvious trend. The authors completely agree with the conclusions reached by Bernardo Kastrup [Kastrup, 2018]. Indeed, our society passes to the new dominant cosmological paradigm, according to which to talk about anthropocentrism, as it was said about geo- and heliocentrism at the time, is incorrectly. The society returns to the Idea of Universe Soul, which is rooted in the philosophy of Antiquity. The history of the Idea of Universe Soul is considered in the article of Igor Goian and Gennadii Aliaiev [Goian & Aliaiev, 2015]. Rationalism and the values of the Age of Enlightenment, lose their relevance, because Man perceives the Universe depending on the perfection of his brain. This perception is objective and it does not mean at all that outside of it, the Universe is different and it lives its own life. The change of cosmological paradigm has a direct impact on the educational research. Scientific knowledge, like rational thinking, is no longer able to disclose completely the true place of man in the cosmos. The usual technologies of education are replaced by new ones, which try to convey to students the meanings of Intelligent Matter, or the Universe Soul, or the Mental Universe. A new philosophy of education is being formed, which takes into account the tendency of changing the cosmological paradigm and, accordingly, understanding the place of Man in the Universe. In the article “The Theory of Education: “Those Who Transform the Universe”” Oleg Bazaluk announced a new theory of education, built on the basis of contemporary cosmological paradigms [Bazaluk, 2017a]. Continuing his early studies, he insists on the need to build an educational research taking into account the discoveries in neurosciences and cognitive psychology [Bazaluk & Blazhevych, 2015].

Educational research acquires an obvious structure, which is based on the features of the human brain development in ontogenesis. Moreover, the brain is considered not only and not so much as a neurobiological structure, but as a neural organization involved in the cosmic processes. The hypothesis of the Intelligent Matter and the Mental Universe set rethinking the emphasis in the educational research. The subject of research is the neural structure of the brain and the features of its impact in ontogeny. The object of the researches is the involvement of the neural structure in the cosmic processes and the features of its development under the influence of the cosmos. Quite differently, the scale of man is seen in the educational research. Contemporary cosmological paradigms force one to view man in the educational research beyond the common framework of society. They urge to explore man in the scales of the space, as the planetary-cosmic force, which due to the natural development of brain, with each generation becomes more and more independent and self-sufficient. Knowing the world and improving technology, man becomes part of the cosmic processes that influence the development of the Universe.

Conclusions

In the article "Homo Economicus as the Basis of "Asgardia" Nation State in Space: Perspective of Educational Technologies" Roman Oleksenko and Lidia Fedorova write about the creation of the "the Asgardia" nation state in space on the basis of new interpretations of Homo economicus as a cultural ideal for educational technologies [Oleksenko & Fedorova, 2017]. In the light of current trends in the educational research, their ideas can no longer be perceived as utopias. Contemporary cosmological paradigms push educational research to overcome the limits of consideration of man on the scale of society. Man is more than a society; man is even greater than the planetary force. In the theory "Evolving Matter" and the Mental Universe, man is seen as a cosmic phenomenon, as the Intelligent Matter. In order, the identity of man corresponds to the Intelligent Matter not only the subject and the object of the educational research should be rethought, the educational technologies and understanding of the educational research in human life should be changed. Man as the Intelligent Matter should have the entirely different competencies than those ones he is provided with the modern education. Man as Intelligent Matter will have to solve problems going far beyond the current concepts. For example, research and exploration of the Moon's gas deposits, which were described as an obvious fact by Evgeniy Slyuta [Slyuta, 2017]. Finally, for man like Intelligent Matter, education is not a service, which can be purchased for money, like any material thing on the market. The Platonic senses, as *a way of life*, should be given back to education. Only in this case, the educational research will be able to convey the meanings of the modern cosmological paradigms to younger generations, namely, *the involvement of man in the cosmic processes and consideration of man as the cosmic force*.

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Controllability of Technosphere and Paradigm of Global Evolutionism

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The article analyzes the modern philosophical view of technique as the next step in the self-development of the universe, and shows its relevance for the analysis of problem of the controllability of technosphere. The applicability of various philosophical approaches to the analysis of technique for examining contemporary global problems is considered. Philosophy of technique, analyzing technogenic processes in nature and in society, offers various philosophical approaches, on the basis of which programs are developed to overcome the current civilizational crisis. It is shown that there are different views on its nature: the theoretical models obtained and the practical recommendations depend on the understanding of the technique. The traditional view of technique as a passive tool is not effective enough as a basis for philosophical analysis. An alternative concept is disclosed that understands technical progress as a stage of global evolution; its advantages and disadvantages are analyzed. Developed by modern science, the concept of global evolutionism allows us to see the similarity between the processes of nature change, characteristic for living matter and for technical reality. If we consider, as an evolutionary criterion, the scale of processing information or the ability to adapt, then technique stands at a higher stage of development than biological life. The self-organization of the global technical system has not yet been achieved and the formation of the artificial intelligence controlling it has not been completed, but humanity is actively working in this direction, confident that the emerging technosphere is just a tool for improving its well-being. The development of the evolutionary approach to technique leads to the conclusion that the problems of modern humanity are signs of the beginning of his involution, caused by the transition of evolutionary leadership to technical reality. The technique is already emerging from the power of man: perhaps attempts to preserve the former person or nature are opposed to the vector of evolution leading them to become elements of the technosphere. Although this approach does not take into account a number of modern concepts (sustainable development, controlled evolution, etc.), evolutionary approach to technique requires further analysis and development of a methodology for its verification and the derivation of possible recommendations for environmental performance. It is concluded that further philosophical search is necessary, since different views on technique serve as a basis for opposing programs to exit from the current environmental crisis. Change of ideas about the essence of technique leads to new, unexpected prognosis of the development of technogenic society and helps to take a fresh look at the prospects of achievement of the controllability of technosphere.

Keywords: technique, technosphere, evolution, nature, humanity, management, philosophy, Universal (global) evolutionism

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Introduction

For several decades the scientific community proposes the programs of nature protection, despite it there are no significant results in the sphere of the prevention of the negative results of the industrial growth, which is explained by the fact the programs are not substantiated enough theoretically. The majority of the researchers explain the modern global problems by the acceleration of the technical progress and the uncontrollable growth of the technosphere created by it [Bazaluk, 2014; 2016; Krichevsky, 2016; Nazaretyan, 2015; Ursul, 2015; Yablokov et al., 2015; 2016; 2017].

There is stated the controllability of technosphere lack and concluded that it is the cause of man-caused crises; there are offered various concepts explaining the necessity and possibility of control over the technical reality evolution [Krichevsky, 2015], but they are all criticized. There is observed, that although the technosphere is the society material basis, it is controlled not so much by people's will, but, according to Vadim Rozin by "the internal logic of the technology development itself" [Rozin, 2017: 110]. Therefore, as Sergey Krichevsky states, "in the 21st century the priority and key issue is the controllability of technosphere evolution, which is a part of the evolution control overall problem" [Krichevsky, 2017a: 155].

Problem Statement

Technosphere is an artificial environment created by the society; in recent centuries, according to Sergey Krichevsky, "the process of its evolution has been accelerating and expanding the Earth and space" [Krichevsky, 2017a: 156]. Technosphere is "a supercomplex, global, rapidly and nonlinearly developing object with contradictory properties, including self-development, self-regulation and the properties of a powerful generator and civilization development multiplier." We have to admit that "at the present time there is the lack of necessary knowledge, technology and material resources for the full-scale effective technosphere control" [Krichevsky, 2017a: 158-159]. It "also objectively exists and develops as an artificial autonomous global system of technical reality beyond the Earth biosphere" [Krichevsky, 2017a: 156]. As a rule, modern technogenic problems are explained by the fact that the technosphere formation "continues in the unstable mode of accelerating nonlinear development and spatial expansion". In this artificial environment "there is the lack of internal and external communication, including feedback, which is necessary for the balanced development": in Sergey Krichevsky's opinion, "these are the main causes of technosphere "uncontrollability" [Krichevsky, 2017a: 157]. To solve modern problems, to ensure the mankind's sustainable development, it is necessary "to create a balanced and stable biotechnosphere/technobiosphere in the socio-techno-natural paradigm" [Krichevsky, 2017a: 157]. The possibility of returning the controllability of technosphere is justified "with the application of the anthropic principle and its "active" super (post) anthropic supplement": "The space humanity has the evolutionary purpose to actively control the evolution: to change the person, mankind and the Universe" [Krichevsky, 2017b: 51]. This controllability is necessary to prevent human civilization global catastrophe, to take control of the technical reality and technical development" and in particular, "to preserve the Earth biosphere, its biodiversity and sustainability as a single global ecosystem" [Krichevsky, 2017a: 157].

Any specific historical technical complex, although determined by the economic norms and socio-cultural rules, is not given by them unambiguously. In particular, natural environment degradation and the instrumental rationality expansion were hardly the goals of anyone's technical activities: but, since these processes take place, there is logically presented their interpretation as the self-developed technosphere. Thus, there is the following insufficient controllability of technosphere:

1. Technological process incomplete controllability (not always people manage to achieve the desired change of technical systems);
2. Incompleteness of forecasting the consequences of introducing technical innovations (in addition to positive results there are always negative, they can be reduced, but it is impossible to eliminate them);
3. The need for sociocultural support for implementing technological processes, which leads to the social environment change.

It is necessary to find the cause of our inability to control the technical reality to understand the way to return to its controllability. The philosophy of technique can assist in this study.

Philosophical reflection can help during the methodological analysis of the proposed ways of surmounting the civilization crisis in particular, clearing out and articulating the unperceived principles and values put in them [Popkova, 2010: 7-38]. Among the problems demanding methodological working out a significant place is occupied by the clearing out of the terminology, in particular, the central term of this sphere "technique" as it is possible to see does not have a conventional meaning and different philosophical approaches input different content in it [Popkova, 2014c: 7-21]. The traditional view on technique, which is in the basis of the majority present conceptions, does not take into consideration the observed aspects of the technical activity, which causes practical difficulties.

The usual (based on common sense) understanding of technique:

1. Understands as technique the unity of devices and technologies created by people to make easier the processes of converting nature and satisfying their needs (man is the final result of the evolution, the only sentient being on the Earth having the opportunity of self-development and creating artificial environment, because of it man uses and converts other natural objects);
2. Thinks that the sentient influence of the people is possible on all the parameters of technical reality (nature is subordinate to the laws that can be discovered by people and used for improving the quality of their life);
3. States that the difference between natural and technical objects is apparent (for example, natural systems can develop themselves on account of the substance and energy from the environment and technical devices can only ruin without the influence of man);
4. Dually evaluates the influence of technique on the environment (on the one hand man has the right to influence and to change nature because as the possessor of mind he is the superior creature on the earth, on the other hand the uncontrollable consumption of natural resources and the pollution of the environment incurs harm to humanity);
5. Arrives at the conclusion that technical and cultural forms of activity are a breach of the natural order of things, a distortion of biological processes (saying nature we mean the pre-human step of development of the biosphere including the forms of life and perception, which do not have any mind).

Purpose of the Study

So technique and nature are opposed by the traditional conception, man is declared to be the only creator of technique and it is the obedient instrument of a man, the continuation and supplement of his organism. So, man is the active subject, nature is the passive object, technique is an instrument (an intermediary active with respect to nature and passive with respect to man): here there are the main theses of the traditional understanding of technique. Upon the whole the growth of technosphere is perceived positively as the aspect of the united process of overcoming of the spontaneity of nature and the human soul — the change of the spontaneous processes of self-regulation by the system of efficient, rationally created practices [Popkova, 2014c: 311-312].

The nature-protection activity is justified here by the interests of people but not of nature and other living creatures. The mistakes of man exploiting nature for direct mercenary interests and depriving the future generations of the favourable environment are considered to be the reason of the modern technogenic crisis. Therefore, it is necessary to restore the control of economic and ecological processes by planning scientifically the technological activity [Popkova, 2014c: 299-302].

What are the flaws of this conception? First, it uses the ideas created within the framework of the mechanistic picture of the world and it does not take into consideration the theory of complicated systems worked out in the 20th century. Second, it cannot find the objective reasons of technological problems and give the global program of their overcoming. Therefore, the naturalist or instrumental conception of technique is unacceptable, as Vadim Rozin states correctly: after the scientific and technological revolution, it is necessary to understand technique not as the means of production but as the manifestation of intellectual and sociocultural processes [Rozin, 2012: 180].

Therefore, the habitual ways of categorizing technique require rethinking and the creation of concepts revealing its essence. Unfortunately trying to overcome the limitation of the traditional model many defenders of nature prefer to criticize technique and technogenic transformations of nature and technical attitude to the world, they see in technical reality something unnatural, the distortion of nature and the changes introduced by technique are declared inadmissible and harmful in advance [Popkova, 2014a: 250-260]. At that, philosophical analysis of technique finishes and publicist literature begins — the denouncement of modern civilization. Some investigators pay attention to categorical and methodological analysis of this multiple phenomenon: but following the opinion of Vadim Rozin, the generally accepted definitions of technique are “mechanistic if not contradictory with respect to ideas” giving only some illusion of the explanation. To get a multiple idea of it is necessary to analyze the proposed discourses and conceptions namely “disputes about technique and its essence” [Rozin, 2006: 7-8].

Discussion

Philosophy offers non-traditional interpretations of the technique essence, which claim to identify the causes of its controllability lack. For example, the technosphere is analyzed as the society subsystem, in the context of its evolutionary potential: in this case, the person’s inability to predict the technical development results is a particular manifestation of our inability to control our social development.

For example, Vadim Rozin considers the technical reality to be the type of social reality including social machines “created by civilization designed for solving certain conflicts and

for organizing social processes". The term "machine" must emphasize that social institutes are "special technique" for providing the organization conditions of "technological means" of solving social problems [Rozin, 2012: 186]. This view on technique is opposed by Vadim Rozin to traditional "scientific-engineering" picture of the world, in which it was considered that the technique "does not influence man because it is the means of man and nature (is written using the language of mathematics) and contains the laws on the basis of which technique can function". Now we can acknowledge that this idea does not correspond to reality: technique changes both nature and man. But it is not easy to change the obsolete picture of the world because behind it there are social institutes and the cultural type of the modern man, for whom all the processes are "realized, manifested and articulated with the framework of technogenic discourse" [Rozin, 2012: 192-194]. Not only "the average man" who as "a social individual is completely caused by the images and values of technogenic civilization" shares the standard attitude "but also those, from whom the development of modern technology depends including authorities, specialists and experts", they do not try to reverse the course of the events and "think within the framework of technogenic civilization" [Rozin, 2006: 223-226]. So, Vadim Rozin arrives at the conclusion that it is possible to change the character of the development of technique but it "will require from a man such big changes (in the sphere of his values, way of living, in his practices), that will mean the gradual departure from the modern civilization and practically an attempt to create a new civilization". This new civilization will also be based on technique but of another type "more safe for life and development of humanity" [Rozin, 2006: 248-249]. People of the future will have to create new morals and to change the character of their activity changing the habitual scientific and engineering picture of the world with "new ideas of nature, technique, ways of solving tasks, worthy life of a man" [Rozin, 2006: 246].

Technique can be characterized as "natural-artificial" reality, depending on the human activity but which is not its product. On the one hand, activity is the condition of the existence of technical reality providing its reproduction and development. On the other hand, technical reality precedes the activity of each man being its condition (together with social institutes). The main problem is that studying technique is not objective and disinterested, it is done with a concrete purpose when the researchers want to get not only the laws of the technical reality but the possibility to effect its development to solve the "crisis caused not only by technique but by technique too." Studying technique, as Vadim Rozin considers, demands to understand it "as the moment of this ill-being" and to remember about the main purpose — the development of the methods of solving the crisis so "the idea of limiting the extensive development of technique… the concept of creating principally new technique, so such one, with which both man and society can agree, which provides their safe development and existence" [Rozin, 2006: 6-7].

As we can see within the framework of one of the new models technique as a type of social practices is regarded and the overcoming of the technogenic problems requires the improvement of society in the direction of its humanization. Other philosophical conceptions are worked out proposing different understanding of the essence of technique. In connection with modern scientific tendencies, the philosophical approach is formed considering equipment as natural, intrinsic phenomenon: the result of the regular self-development of the Universe.

Now the conception of the global evolutionism dominates in science postulating natural appearance and emerging of all the objects and systems, from the Universe to human society [Bazaluk, 2014, 2016; Ursul, 2014, 2018; Yablokov, 2016: 166-169]. The ideas about the succession of the origin of the Solar system and the Earth, the origin of the biological species and the formation of biological species were developed by many scientists who were able to see the complication of those systems, so the increase in the level of their organization. Now

from the description of the facts science switched to a single theoretical model acknowledging the presence of the evolution process of the cosmic scale: successively the generation of one structural level (having principally new characteristics) from another one takes place [Popkova, 2010: 71]. However, the intuitive supposition about the existence of this model became a scientific paradigm only when the methods of studying evolving objects were developed. The attempt to comprehend the evolution process was finished by the understanding of the development of the Universe as the self-organization of complicated systems: the formation of each new type of stable structures is understood as a stage of evolution. Within the framework of post-non-classic science, the principle of evolution becomes the basic one: uniting the processes of movement and changing characterizing the processes of birth and creation the unitary global evolution process correlates between each other the fundamental levels of the substance organization as the elements of unity of the Universe [Popkova, 2010: 119-134]. Post-non-classic science declares: "Evolution has a through character, it passes on all the hierarchical levels of the world organization: cosmic evolution, prebiotic evolution, the evolution of wildlife, anthropogenesis, human history…" [Knyazeva, 2015: 92]. In particular, within the framework of this conception it is clear while local ecological measures do not solve the global problem of preserving nature: to improve the state of the environment locally it is inevitably necessary to take resources again from a wider system– the biosphere.

For the modern evolution paradigm [Popkova, 2014c: 315-317]:

1. The universe is a self-developing system, in which there is a vector of growth and complication (the development of nature is self-organization or evolution, an increase of the degree of organization of the Universe and its parts);
2. The ability of man to change the world rationally and technologically appeared during the self-organization of the cosmic system and therefore also has some evolution potential because of it his technical activity is approved (it is considered that man as the creator of the artificial world is not an exception among the living creatures but a continuator of the global tendency of the perfection of biosphere transforming the inanimate substance of the planet);
3. The paradigm of the self-organization excludes such a category as "artificial" (everything in the Universe is caused by the united process of the complication of the system even if living creatures are the intermediate reason) and it sees in the technical change of nature the increasing speed and the scales of some type of the biogenic flow of atoms, and the man is an intermediary through whom this natural change of rates happened;
4. Together with consciousness and mind people develop during evolution the possibility to do things which on the lower levels of evolution happened due to blind laws or instincts — to realize the new states of material objects (changing nature using technical means);
5. Technique (created on the basis of that ability) does only what man requires from it, and the absence of its control now is the result of the gap between the intellectual development of the people and the technical one (now there is a gap between the material rapidly developing technologies and culture, which remains on the previous level).

The representation of the technical reality as a stage of self-development of the Universe has some heuristic potential. Technical reality is considered as a complicated self-organizing system, in which the main role is played not by the external influences (including the purposeful activity of man) but by the adaptive processes (having the purpose of solving

problems, which appear during the interaction of the elements of the system) [Popkova, 2014c: 218-230]. Here saying "technique", we understand the means and methods created by man for converting material objects and of getting substance, which cannot be reproduced extra-technically. Technical progress is presented as techno-evolution controlled by laws of nature relatively autonomous from the will of man and social factors [Popkova, 2014c: 136-138]. So, the universal conception of an evolving system can be made on the basis of the analysis of technique.

As we can see, the new philosophical models of technique and technical development claim to identify the causes of the technosphere low controllability: unlike traditional understanding, they point to the evolutionary potential of technique development, going beyond the limits of human goal-setting.

The advent of new theoretical models of technique has not only philosophical interest: by the words of Vadim Rozin, "conceptualization is the essential characteristic of the idea of technology" [Rozin, 2017:137], because it is the basis for creating practical programs.

As the sociological dependency of technique is discussed in detail in Vadim Rozin's publication [Rozin, 2017], let us pay attention to the techno-evolution vision and consider the resultant practical guidelines. They have already been formulated by the philosophy of technique and met with mixed reactions. They were even condemned for technical expansion justification. We will outline the main principles of the evolutionary understanding of technique.

The tradition going back to Russian cosmism treats the human mind as the new leading factor of the evolution of the Universe and the technique as an obedient instrument for realizing this purpose [Moiseev, 1999; Vernadsky, 1997]. This tradition states that people (and sentient beings) are the future leaders of the evolution, the saviours of the biosphere from its imminent extinction. The mind will help to overcome the destruction of the outer space (cosmos) because of entropy and to bring life to the borders of the Universe. Because of its people must not be subordinate to nature (doomed to die because of natural laws) but they must improve it prolonging its existence. Technical progress is seen here not as a mistake of historical development but as an instrument of evolution. However, man despite the fact that he became the main geological force does not understand his planetary responsibility, as the result of which ecological difficulties appeared; when the conscience of people reaches the level necessary to control their own technique they will begin to perfect nature. The progressist optimism of this conception is deservedly criticized [Popkova, 2014a: 71-82]. Some philosophers suspect this idea of justifying predatory nature using. Therefore, Vladimir Kutyrev warns that "universal evolutionism, which is the paradigm of fundamental science… deprives of any independent status any existing form of life. They are considered as some means and a factor of the further development… The present is only "the spring-board" for the future" [Kutyrev, 1998: 11].

However, this concept can be followed by other conclusions, pessimistic, denying the opportunity to return the controllability of technosphere.

Considering the techno-evolution as a natural process and proclaiming technical reality as the new level of the self-organization of the Universe it is possible to continue the chain of the discourse and to put forward a hypothesis that technical reality is a higher evolution level than the biological one and the modern civilization crisis is accompanied by the technical progress not by chance. First, the provision typical for modern natural science that "any form of life including the social one will finish once giving birth to other forms of life" [Rozin, 2017: 139] is perceived in a new way. Probably the essence of the crisis is that man (and broader the biological world) has lost the evolution leadership and begins its involution

and the modern problems are the sign of it. The tendency of the evolution naturally causes the advent of new, more complicated objects and systems (cosmogenesis, biogenesis, sociogenesis); probably the following one, on which the preservation and the increment of information will take place non-biologically. Does this model reflect the reality? It correctly notes some of the current trends, but ignores the processes of ecological technologies and activities (clean, environmentally friendly and «green» technologies) and does not take into account their potential for harmonizing human relations with the biosphere [Krichevsky, 2015, 2018; Ursul, 2017; Yablokov, 2015: 110-114; Yablokov, 2017: 74-78].

Results

Therefore, the conclusions from the evolutionary concept of technique are as follows. Humanity (as the subsystem of biosphere) has achieved such a progressive (for evolution) characteristics as self-organization, self-regulation, self-renovation. Apparently, the new, higher level of life must have not lower degree of them having at the same time the ability for self-reproduction. What existing thing can perform the role of reality, which is more complicated and performs the conversion of the outer environment into the internal one, "artificial"? Only technical reality! In modern world, only technique can have all the features of a developing subsystem: it increases its interconnection and interrelationship increasing the speed of converting information and its autonomy from the environment. Only the degree of the self-organization achieved by technique can give rise to doubts. However, naïve understanding of technique as an obedient mechanism forces people to perfect it making closer the transition from biological evolution to spontaneous technical one. Probably man is not only the possessor of mind who appeared as the result of biological processes on the biological basis but the means for achieving a higher level of space, the creator of the new level of reality — the technical one? The technical activity of man can be evaluated as the perfection of the biogenic flow of atoms which in the framework of the self-development of the Universe (the acceleration of the conversion of natural resources and the increasing of its scale). Probably man not only uses nature, but also nature uses him for another step of evolution? The globalization of the government of the humanity forms the structural analogy of the brain missing in the technosphere and the central nervous system: the power of the connections between the local technical complexes overbalances the contradictions between them. Therefore, the well-formed new understanding of technique as the new step of self-organization of the Universe requires to acknowledge that biological life and human mind functioning on its basis is a parting step, which has used up its evolution potential. This conclusion seems to be shocking but the logic development of the theses of global evolutionism.

According to this concept, the development of one of the subsystems of the biosphere happens on account of the degradation of other subsystems: the development of humanity on account of nature and the development of the technique on account of humanity. The evolution in nature is connected with involution: if the system upon the whole increases the degree of its being organized increasing its variety then some of its subsystems regress — become more simple decreasing the degree of their organization. The involution of the system, the process of its simplification and of the return to simpler forms is the logical result of the self-regulation of a bigger system, the mechanism of its conversion into a new regime of functioning. There are several global problems for modern humanity: many changes of social, economic, spiritual bases of the life of people can be interpreted as the signs of degradation. The variety of social and cultural models is disappearing: mass culture is a powerful means of uniting behaviour. Probably the modern epoch is the transition from the

evolution potential of humanity to technique. It is not the biosphere that develops but the system of a higher level — Universe and the biosphere, and humanity have fulfilled their task and they are passing away.

So the evolution approach to the analysis of technique

1. Considers the modern epoch as another regular stage of the global evolution within the scale of the planet it consists in the concentration of the evolution potential on the level of the technical reality on account of the involution of the objects of the previous levels — biological and social ones (evolution progress does not stay at the same place and after the most developed level now it prepares the advent of another level of the organization of substance — more capable for expansion and the increased conversion of information, which will make the other ones subordinate to itself).
2. Sees in it an objective process, the tempos of which are subjective (because the self-organization of the technical system has not been achieved yet and the creation of the artificial intelligence controlling it has not been finished).
3. Considers the ecological and social and cultural crisis to be natural (the universalization and standartization of the individual and national being, the levelling of the personal element and the suppression of it by social and cultural processes — it all can be evaluated as the sign that the self-development of the humanity is not maintained by the laws of evolution).
4. Rejects as fruitless the dreams of man about the eternal domination over nature based on the acknowledgement of his "perfection" (technique are quitting the power of man — he is loosing physically and mentally the ability to control technological processes and therefore to control them).
5. Makes the conclusion that the preservation of the former man contradicts the vector of evolution bringing him to the conversion in an element of the technosphere (social progress has become the means for deploying technologies — the technological renovation is done automatically, but the cultural and moral norms remain behind the accelerating transformations).

Conclusion

Therefore, the analysis of the concept under consideration allows us to draw a number of practical conclusions. Probably man will be able to prevent this future if he does not rely on natural processes (that "play" now against people and that aim not at the creation of new forms of social-and-cultural life but at their levelling) but will remember that social systems differ from other ones (nonorganic ones and organic ones) because they include people having consciousness and will and because of it, the self-organization in them is supplemented with a voluntary organization. If the processes destructive for humanity become natural, it is necessary to interfere in them actively. Co-evolution with biosphere advertised by the followers of nature protection will result in the extinction of it and of humanity. It is necessary to develop the plans of slowing down "natural" processes [Popkova 2014b: 294-299]. There is a variability of development: the evolution vector in some spheres of space (cosmos) can become slower, asymptotically tending to zero (for example, living substance appeared not in all the Universe). The concept of controlled evolution of biosphere is being developed [Yablokov, 2017: 64-73]. Monitoring the alarming tendencies, we can realize undesirable processes for us and act on them in some points.

It is necessary to remember about the relative precision of any theoretical model: "Principally any system can be described both as natural and as artificial. A system from the natural point of

view is considered as a self-moving mechanism developing following its internal laws… From the artificial point of view a system is considered as a mechanism constructed from outside" [Gorokhov, 2007: 125]. We have the right to consider technique in its interaction with nature as an artificial phenomenon and in its contact with a man as natural: but far reaching predictions will be a useful abstractions like many mathematical models.

Therefore, modern philosophy of technique proposes different variants of its understanding on the basis of which philosophical approaches are worked out.

The philosophical study of the technosphere controllability problem allows making the following conclusions. Because the traditional instrumental understanding of technique has shown its insufficient efficiency while analyzing global problems, conceptions considering equipment from the side of its social causality or its position in the evolution picture of the world have the biggest potential. If the traditional understanding of the technique essence does not even allow raising the question of the evolution control lack, the new approaches proposed by the philosophy of technique show the inevitable problems. Whether the uncontrollability of technosphere is explained by its social dependence or evolutionary potential, in any case there is required serious sociocultural transformation from the mankind to take their own development and evolution of technical reality under control. At the modern level of ideological and social development this problem solution unfortunately seems unattainable.

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Are We Really Going to Have an Eschatological Future?

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The article analyzes the interpretation of the future, in which the person either does not have a place or is expected by a sad fate. Other past religious interpretations of the future are also being considered. The problem arose only in the culture of the new time, when faith and reason were contrasted and understood as opposing realities, and the universe was interpreted in the spirit of natural sciences, that is, as a physical reality. There were various paradoxes. A vivid example of such paradoxes the author sees in the works of Vadim Kazyutinsky, who studied the concepts of the universe and galaxies. In particular, his research allows us to assert that cosmology by basic parameters should be attributed to a scientific discipline of the humanitarian type, which does not exclude the presence in it of various physical and other natural sciences disciplines. The position of the well-known Russian philosopher Alexey Losev, who points to the boundaries of explanation in the spirit of the natural sciences, is also analyzed. In the second half of the article, alternative scenarios (Vadim Kazyutinsky, Hannah Arendt and the author) are discussed to overcome the pessimistic understanding of the future. For the author it is humanitarian nature of philosophy. For Kazyutinsky, the worldview that the Stoics professed, as well as faith man and humanity. For Hannah Arendt — the clarification of the crisis of our thought and civilization. The conclusion is drawn that the considered vision of reality, characteristic of rationalism and natural sciences, is an alternative, and not one.

Keywords: future, man, universe, galaxies, scenarios, alternative

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Recently I watched on TV a series of amazing films about origin of planets, galaxies and the evolution of the Universe. The films bewitched, it seemed to me that I was on a building site or in the theatre of "creation of the Universe" and lived through the conception, formation and death of space worlds; but at the same time something discomposed me, though I could not understand what exactly. Then I realised: the filmmakers, relying on modern astronomical researches, depictured the future where either there was no place for humans at all, or a sad fate awaited them. The mankind may perish at any time for various reasons: the Earth may collide with another celestial body (a comet, a huge asteroid), or lose son magnetic field

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due to an internal magma movement, or this field may be destroyed by a flash of a supernova (moreover, the authors of the program claim that one of the nearest stars will blow up just in a little while, will become a supernova, and immense flows of its radiation, according to the estimates of the astronomers, will rush off directly to our Earth). There are also other scenarios of the Earth and mankind death as a result of natural evolution of the Universe, for example, metamorphoses at dispersal of galaxies or, on the contrary, their collapse in a superdense and extremely small kernel; and all this is not an imagination, but rigorous calculations based on astronomical observations and laws of the nature. There is no reason to disbelieve them, they should be trusted — and as a result an alarm and so-called eschatological expectations appear.

Of course, it is not for the first time that the mankind expects a doomsday, for example, at the turn of the 15th century Russia prepared for the doomsday, and everything confirmed the approach of this terrible event: calculations of the Church, natural signs (a comet passed, an earthquake occurred, the country was captured by a drought), terrible events mentioned in the Apocalypse (wars, civil strifes, people running wild); but the doomsday still does not come, though each next time eschatological expectations do not become less sharp and more usual.

It is the same situation nowadays. Modern people, trusting natural scientists, have a presentiment of a close end of the world, and do not see an alternative: after all what can be done if, for example, the magnetic field of the Earth disappears or a giant asteroid crashes against our planet. However, eschatological expectations amplify and even are provoked by fantasies of a human himself: movies and books about off-worlders, terrible technogenic accidents, world wars, etc. became very popular. There is a feeling that people strike fear in themselves. Is not it because scientists deprived them involuntarily of the future?

However, why do we trust scientists so much? Because they — together with engineers — continuously certify technogenic civilization. In fact, the reality of culture needs to be certified (new generations come, conditions and customs change, but the culture is alive so long as its reality is maintained and renewed). For instance, we certify the belief in existence of the nature and its laws that forms an essential factor of our technogenic civilization by creating machines and other technical structures that operate efficiently, thereby confirming the laws of the nature disclosed by the man.

In the very first, archaic culture, souls and spirits (demons) were part of reality and have to be certified too. This still may be seen in Tibet during a magic "chod" (derived from a verb meaning "to cut off, to destroy") ceremony. This ceremony is based on belief in existence of demons. "Tibet, — writes David Neal, — is the country of demons", which, according to beliefs and legends, are more numerous than the population of the country; they hunt for people and animals, stealing from them the "breath of life" that demons consume as food. "The functions of official Lamaism include subordination of demons, their re-education, converting them into obedient servants, and in case they do not obey — their neutralization or destruction" [David-Neel, 1992: 99]. Probably, one of objectives of the "chod" ritual is to train young monks ("trapa") communicating with demons, but in an extremely peculiar form, putting themselves at the mercy of demons. In doing so, the victim, addressing to demons, cries out the following spells:

"Throughout a boundless number of centuries, in the course of repeating existences, I borrowed from uncountable beings on account of their lives my food, my clothes and various benefits to contain my body in good health, in pleasure and to protect it from death. Now I am paying the debts, offering for destruction my body which I loved and cherished so. I give my flesh to the thirsty and blood eager ones, my skin to those who are nude; I throw my bones

into the fire for those who suffer from cold. I give my happiness to unfortunate and my breath of life to those dying."[1] In doing so, the trapa imagines that his will in an image of a female deity comes out through the top of the head, in one stroke cuts off its head, then hands and feet with a hatchet, skins and disembowels it. Demons fly together from all directions for this "entertainment" and, champing savourily, suck flowing blood, tear meat, and crack bones. "The performance, — writes David-Nil, — is intended to intimidate the performer, and is so skilful that during the ceremony some trapas suddenly go crazy and even fall dead."[2]

In the culture of ancient kingdoms (Ancient Egypt, Babylon, and early antiquity), the belief in gods was confirmed by means of numerous sacral practices. They included regular offices in temples devoted to various gods, mystery plays like Orphic-Dionysian ones and the life of esoteric communities, for example, Pythagorean ones. It should be taken into account that during these practices people not only met gods or tried on their clothes, or prepared themselves for divine life, but each time were convinced of existence of respective reality. I think my thought is clear, and there is no need to give more examples.

So, why a modern person should not trust astronomers who study planets, galaxies and the Universe using the most sophisticated equipment (telescopes, satellites, various devices) created on the basis of laws of the nature? Besides, they reveal characteristics of space within the framework of these laws, using mathematics, computers, and natural sciences. In this, context scientists (astronomers) persuade us of such future where mankind may expect at any time a cataclysm and the Doomsday. It seems that there is no alternative to such future. However, let us not hurry and consider some arguments in favour of such an alternative. We may call the first argument *cultural and historical*.

It is known that for many millennia people thought that the Universe is not a physical world, but rather either gods (the sun, the moon, the stars — all these were gods) or, as in the Middle Ages, a world created for a human by the God. In fact, the Universe was turned towards the man. For example, the sun understood by Sumerian as god, warmed the Earth, lit, and gave life. From the point of view of an antique or medieval person, the Universe, the life on the Earth and the reason were conceived simultaneously as they had to serve each other. Platon's Demiurg through his omnibenevolence, almost love to humans, conceives and creates Space and at the same time, the man. Aristotle's Reason — a live conceiving and reflexing deity coinciding with the sky and the space moves planets by the power of its thought. A person thinks correctly, believes the Stagirite, if it imitates the Reason. The God of the Middle Ages created a man in his own image; and, having created the world, intended it for the man. "The fire by its nature, — wrote John Chrysostom, — strives upwards, rushes and flies skywards..., but with the Sun the God made absolutely opposite: he turned its beams to the Earth and made the light fall down, as if speaking to it: look down and shine people: you have been created for them."[3]

The problem arose only during modern times when the belief and the reason were brought apart, the Universe was interpreted in the spirit of natural sciences, which is as a physical reality, and it turned out, as Pascal said, that a human is a miserable reed, and its place in the Universe is unclear and insignificant. From the point of view of such Universe, there is no sense of existence of a human. At the suggestion of Francis Bacon and Galilee, the nature began to be understood as "constrained by art" (in experiment and in mechanism). A man turned everything that he could reach in the nature into equipment. Today — in the same vein — he wants to master the Solar system.

[1] Ibid. Pages 105-106.

[2] Ibid. Page 100.

[3] Writings of John Chrysostom, Archbishop Constantinople. SPb., 1896, Vol. 2, Book 1, page 394.

Yet, he cannot reach the Universe. It seems so easy: to build spaceships, to fly and to study all corners of the Universe; but after all, it is only our intentions, pure speculations. Today and in a relatively long term people will not fly anywhere, they even do not know whether it is practicable in principle[4]. Besides, there is one more important difficulty that is the second argument: *our knowledge of the Universe changes all the time*. In the ancient world, the Universe was understood as the world of gods; in the Middle Ages, this pagan understanding was rejected; in modern times, people scarified also the Christian understanding of the world. Since the second half of the 19th century, our ideas of the Universe change almost every 50 years. Given current development of science and equipment, our ideas of the Universe are likely to change drastically more than once in the centuries to come.

However, knowledge methods and knowledge itself change also. Currently, many physicists agree that a humanitarian approach is not contraindicated to them. A humanitarian discriminates and studies his/her object from the point of view of his/her own interest, his/her research unfolds, according to Gadamer, within a hermeneutic circle; and there are as much circles as traditions and significant approaches. Then maybe the Universe is an object of human sciences? In other words, I begin discussion of the third argument, from *knowledge and methodology*.

In fact, a long-term research of Vadim Kazyutinsky who has always believed that the Universe is a physical object, showed absolutely other things.[5] It showed that at the level of metagalaxies and the Universe it is not possible to carry out the main procedures of certification of physical reality. One cannot set up a decisive experiment. It is impossible to stop at one true interpretation of the observed phenomena; on the contrary, in the field of the Universe studies many different, quite reasonable theories and concepts have been developed and compete on equal terms.[6] An "anthropic principle" (Brandon Kartor) has been introduced into cosmology according to which "phenomena that we expect to observe, have to be limited by conditions necessary for our existence as observers."[7]

[4] Cf. "Of course, — Hannah Arendt notices, — our current plans do not go beyond investigation of the immediately surrounding part of the Universe, that infinitesimal area that the mankind is able to reach, even moving with velocity of light. Given the duration of a human life — the only absolute restriction which remained at the moment — it is very improbable that we will ever reach much further" [Arendt, 2014: 403].

[5] "According to Abram Zelmanov's definition, — Vadim Kazyutinsky writes, — cosmology is "a physical doctrine about the Universe as a whole, including the theory of the whole world covered by astronomical observations as a part of the Universe". Kazyutinsky esteems in the same way, saying that "despite singularity of the object of cosmology it nevertheless represents a physical object" (Vadim Kazyutinsky. Traditions and revolution in modern astronomy. (Doctoral dissertation). Institute of philosophy of the Russian Academy of Sciences. M, 1999. Pages 10, 32).

[6] "The problem in this case, — Hannah Arendt writes, — is that apparently almost any axiom allows a coordinated justification, and to such an extent that there is an impression that people may prove eventually any hypothesis that they want to be accepted, and this applies not only to purely cogitative structures like comprehensive interpretations of the history supported well with facts but also to natural sciences" [Arendt, 2014: 131-132].

[7] "Observed properties, — Kazyutinsky explains, — are rigidly connected with numerical values of some fundamental physical constants. If these constants were just a little different, the existence of atoms, stars, galaxies in the Universe would be impossible, same as the emergence of conditions which led to the appearance of the man, the observer" (Ibid. Page 49). Herefrom, one theological explanation: "the man is the purpose of evolution of the Universe defined by transcendental conditions" (Ibid. Page 50). However, if the Universe defines the sense and the purpose of existence of the human, then a cosmologist, studying it, thereby cognizes himself and human nature (a spirit cognizes the spiritual?). Aren't we here in the territory of human sciences?

Polemizing with Joseph Shklovsky claiming in 1979 that though "A lot of things are not clear yet and has to be learned, but the "master plan", the interrelation of objects, and, above all — the history development (of the Universe) — are understood and passed into category of absolute truth", Kazyutinsky writes the following. "Doubts are generated by three circumstances. First, modern evolutionary theories in astrophysics have not yet a sufficient number of predictions confirmed on their basis, i.e. is fail to fully satisfy to the criterion of substantiality adopted in the science. On the contrary, some predictions do not come true (for example, the flow of solar neutrinos turned out to be much less than the one predicted by the theory). Secondly, despite almost semicentennial researches of active processes in galaxies, many of them have no quite a reliable explanation yet. In fact, we do not know still what happens in kernels of galaxies. Thirdly, numerous and very sophisticated attempts to resolve "paradox of weight" were not crowned with success so far. According to the contemporary view, accumulations of galaxies have to be stationary; but for this purpose, it is necessary to assume that 95-98% of the mass of the Universe substance are in an invisible state ("hidden mass, dark matter"). All attempts to understand the physical nature of hidden masses failed so far.[8] Well, this is some kind of a natural science where only 2-5% are explained and the main mechanisms are not clear!

The "singularity issue" was especially intolerant: in compliance with it, moving back to the beginning of dispersal of galaxies, we shall come to the zero point where many physical parameters (the mass of substance, radiuses of particles and others) gain infinite or zero values, losing thereby a physical meaning. Then such a fundamental question arises as "What was "prior" to singularity?" Some researchers "carefully express their opinion in the sense that currently, there is no reasonable physical answer to this question."[9] If it is not present in physical reality, perhaps, this problem can be solved within the framework of human sciences? How else answers given by many cosmologists may be interpreted: this question is senseless because already Augustine stated, "the time had to appear together with the Universe."[10]

To sum up, in cosmology everything is approximately the same as in human sciences. Analyzing Kazyutinsky's works, I even formulated a paradox: within our Solar system, we deal with physical reality since, nevertheless, an experiment and real technical practice is possible (say, have the rocket reached Mars or Saturn or not?), but outside the Solar system, especially in the Universe, we may speak only about humanitarian reality.

Cosmology in all respects has to be referred to a scientific discipline of humanitarian type that does not exclude availability therein of various physical and other natural-science disciplines. The object of cosmology (similar to the objects of biology, cultural science, sociology) cannot be described by one scientific discipline. The "cosmological reality" is multilevel with specific objective laws acting on each level, which laws have to be described by various cosmological theories. From the point of view of science philosophy, the Universe as an object of studying of cosmology, represents ideal objects of humanitarian theories which are created based on facts (astronomical observations and their interpretation), in the process of implementation of cosmologists' values and approach, carrying out a humanitarian discourse (for example, treatment of astronomical observations as peculiar texts and activity of Space), taking into consideration humanitarian nature of the Universe (plurality of cosmological theories, anthropic principle, etc.).

[8] Ibid. Pages 26, 27, 30, 31.

[9] Ibid. Page 33.

[10] Ibid. Page 34.

Then again, if the Universe studies are referred to human sciences, then first, forecasts of astrophysicists about the death of our Earth — *it not an exact calculation, but a hypothetical knowledge reflecting rather current state of cosmology than reality*, and secondly, as a humanitarian knowledge it is also incorrect as it *works not for the benefit of humans*. Orientation towards a human is one of particularities of human sciences: humanitarian knowledge — as Michael Bakhtin noted — not only helps to understand cultural texts, but also constitutes reality-creating conditions (meanings and vision) for a human life.

Now, the fourth argument. Usually natural sciences make it possible to gain knowledge providing for forecasting, calculation and management of natural phenomena thereby enabling us to create modern sophisticated machines. That is, eventually, *natural sciences work for the benefit of people, enabling them to master the nature*. However, there are also challenges here: engineering based on natural sciences, initiates processes which were not conceived and calculated and objectively are often negative for a man. For example, mastering nuclear energy, on the one hand, of course, is a source of many benefits, but on the other, it is a threat to the existence of the mankind (given that we still do not know what to do with nuclear waste which constantly increases, and we have not managed yet to create nuclear power plants that would be reliable enough to exclude probability of nuclear disasters).

Incidentally, studying of the Universe gives absolutely another picture. Something, in fact, becomes clear and can be calculated (for example how one stars die, but from the matter ejected as a result of this process new planets, stars and galaxies gradually are born). Though in general, studying the Universe, on the one hand, generates full misunderstanding of the events (why at first all matter was concentrated in a midget volume, why there was the "Big Bang", why the dispersal of galaxies accelerates, etc.), and on the other hand, it leaves no room to the future (not to the future of stars and planets, but to the future of the humankind).

Pondering over this circumstance, Kazyutinsky in conversation with the author said that there is a certain contradiction between the grandness of the Universe, and processes that occur there (their scale and character blow the mind) and the role of the man in the Universe. Let us take, for example, he said, the dispersal of galaxies or huge emissions, discharges, absorption of matter and energy observed in supernovas, black holes or quasars. And let us compare them with short duration and negligibility of human life. How all this may be reconciled? Can it be true that we shall disappear forever if any asteroid collides with the Earth, or we shall gradually die out during the next implosion of galaxies?

However, already Isaac Newton answered such doubts. When its theory did not match perfectly the observed reality, he told: "And what is the God for? He is putting everything in order". We may find a similar discourse with Alexey Losev, explaining to Vladimir Bibikhin, why he is a believer. Losev said, "It struck me. I lived my life, could not, and cannot understand. I know for sure — I cannot understand. Eventually, everything comes to the question of the good and the evil. The God is the creator; he is all-powerful — and what happens here? Cannot he eliminate all this disgrace with one movement of his little finger? However, yes, he can. Then why he does not want to? It is a secret... Angels have fallen. The devil, a fallen angel — accepts everything, except absolute existence of the God. Cannot God prevent him from doing evil? Ha-ha! And why God does not do it? A secret.

Anyway, the believer is the one who managed to see clearly this secret. The others say that there is no God; but this is rationalism, and tomfoolery... While the belief begins when the God is crucified. The GOD is crucified!!! When you try to understand this, you see: it is a secret. Of course both ancient and new ones new this secret. Aristotle naively in one place of "Metaphysics" says one thing and in another place, a different thing. The ideas seem to be

correct in both places; but if you had asked him: how so, in one place you have an absolute mind, the prime mover which manages everything, and in the other — some gobbledygook, he would have run away as a bug from a finger; and if he were a believer, he would tell: it is a secret. Therefore I did not want to make an absolute of "Metaphysics". They also know the evil! So why does not it come to their mind to ask what is happening: the eternal prime mover on the one hand, and such a disgrace on the other hand? How so? If they had asked this, question and had answered: it is a secret, and then they would have become believers.

Some say: make the sign of the Cross and your illness will pass. Nonsense! On the contrary, the one who crosses himself risks to face a bigger evil. This association of the good and the evil is inexplicable — an honest, good person suddenly finds himself in an unpleasant situation, in a stalemate. He may be even killed, a noble man, the best of all. So what does the God think? A secret. This is a secret; and when a person comprehended this secret, he/she does not need any cross or other symbols... Of course, maybe there are some sacraments, which alleviate the situation; but what if after a chrismation a person got sick and died? I will not be surprised — it means that it had to be this way. It means that such was the God's will.

Therefore, without belief there is nothing but vulgar optimism and rationalism. Of course, often you pray, recompose yourself and the illness passes, and if on the contrary, the illness aggravates and the person dies — then thy will be done! This is an inconceivable and inexplicable mystery!

Therefore, stating the tiresome, boring metaphysics claiming absoluteness (a strong, divine peace arrangement) — I think that the relativity is right there. The sky, of course, moves for ages. This god, at least the lower one, moves through the whole movement of the heavenly arch. — However, if just for one second it turns out that this arch is not there, if for some one moment all this heavenly arch drops out, blows up, breaks, disappeared — I will not be surprised. Because I am a believer; and if I were a pagan — then yes, of course, I would tell that we have chaos here on the Earth, through tranquil stars move constantly, eternally, steadily, etc. From the Christian point of view, this is relative, but paganism is an absolutization of the whole world. Well, let Platon and Aristotle believe that this arrangement is indestructible — let them trust. Although if suddenly there is an accident, they would not know what to do — but I will say: the God's secret came true; let it be."[11]

Vadim Kazyutinsky, who for many years have been dealing with the "contact issue", in fact, also adopted the viewpoint of belief, however not religious one, but that of "stoical belief" in selectness and uniqueness of the mankind. All observations, he told me in a personal conversation, show that we are alone in the Universe; and it should be recognized that it is the most adequate — I would even say courageous — position. Yes, the life and the reason are unique and, we are alone in the Universe. Of course, science fiction writers write all the time about other planets and forms of life; but they simply do not understand what life is, and do not know researches of astrophysicists. It is really amazing how the Earth was adapted for emergence of life. It is located neither too close to the Sun and nor too far from it. In the first case, it would be too hot on the Earth, as on Venus, therefore life would be impossible, and in the second case — eternal cold and ice as on Pluto, and certainly, protein-based life would never appear here. It turns out that it is some kind of preset harmony, or, more exactly, a priori orientation towards life. Our sun is neither too young nor too old; in both opposite cases, life would be impossible. Our planet is surrounded with an atmosphere and a magnetic field that reliably protect the life from ultraviolet light and pernicious space beams. We are located

[11] Vladimir Bibikhin. From Alexey Losev's stories. The Siberian orthodox newspaper. 2005. No.1. http://www.ihtus.ru/012005/c1.shtml

in an ideally quiet place of the galaxy. The more I think of this, Kazyutinsky told, the more I m convinced that the Earth is a unique place for emergence of life. There is a feeling that the Universe has been created just for us as though it is a specially designed test tube and a laboratory for life. If I were a believer, Vadim concluded, and then it was exactly on the basis of data of modern astronomy that I would come to a conclusion about divine creation of life on the Earth, and in this context the Universe was conceived by the God as a maternal bosom.

I did not want to adopt such nevertheless religious version; at the same time, I tried to overcome a physicalistic representation of the Universe embraced by Kazyutinsky. However, why we have to think, I retorted, that the Solar system is only a physical object. Maybe, at the same time it is some other organism, say cosmic, vital, and sacral. I do not know. A physical aspect does not deny other aspects. For example, mentality and thinking are not reduced to physiology and brain, but the latter are one of prerequisites of the former. It would be strange to deny availability of mentality or to reduce it to the brain on the basis of the fact that the brain is a substrate of thinking and other mental processes. By the way, the brain is only one of substrates of mentality, but the other are not less essential — signs, activity, communication; and it is the same in the Universe: there are both physical and nonphysical aspects. Rather, the question is what we shall consider as basic at solution of certain tasks. For instance if I want to understand the place of the man in the Universe so as to inspire him. What in that case I have to take as a basis of the thought — physical or nonphysical reality?

Kazyutinsky reflected and after a while answered, "It seems, I devised one scenario. Once a human came out of the nature. Now he changes it. However, inaptly so far, often to the detriment of himself; but I am sure that he will learn, and will change the nature, taking into consideration that he is its organic element. Yet sooner or later, let it be through one thousand years though, seemingly, much earlier, the man will completely change the appearance and the structure of the Earth. Arguing the same way, it is possible to assume the mankind will not stop there: it will start "customising" the Solar system at first, then the Galaxy, and at last there will be the turn of the Universe. The result of these titanic efforts that will stretch over millions and billions of years will be transformation of the Universe into a living being combining the nature and the mankind at the same time. Of course, I understand that you will accuse me right there of arrogance: not only that the man destroys the nature on the Earth, but I aim the Universe already. Nevertheless I solved the task set by you: I created a scenario of the Universe — meaningful and optimistic for the human".

I agreed but noticed that, perhaps, I would try to build another scenario. It is difficult to assume, I told, that on such a long way (millions and billions of years) the mankind will keep its purpose, that it will not change drastically and that the issue of "customisation" of the Universe will still interest it. Besides, I have already paid your attention to the fact that our idea of the Universe will change more than one time. I would also add that, most probably, we would not be able to understand the Universe nature for a long time. That is we see something, some formation, maybe organic, but not live, maybe this is some form of life, or perhaps something else that does not come to our mind simply due to our backwardness.

In this case, it is more reasonable to act carefully, following the principle of establishment of "contact", somewhat in the way as characters of "Solaris" acted; but here the case is much more difficult. With Stanislaw Lem it was at least clear where is the whole and where are the borders: the planet and Ocean-Solaris thereon. Although in case with the Universe, everything is unclear: where is the whole, whether it is the only or not, where are the borders, what do they represent, etc. All this shall be borne in mind and we shall act accordingly: try to listen to the Universe in all possible ways, address it, tell about ourselves, be ready to any

answer, the most unexpected one, study and think all the time, trying not to lose sight of all uncertainty and limitation of our knowledge of the Universe. Perhaps, this scenario is not the most optimistic, of course yours, Vadim, is more inspiring, but the mine, agree, is more realistic and reasonable from the point of view of the knowledge and opportunities available to us. Such was our conversation somewhere at the very end of the 90ies.

The same year, as though on purpose, the book "Between the Past and the Future" was published, where Hannah Arend as early as in the 60ies of the last century discussed in fact our subject. In particular, she demonstrated that such a strange representation of the Universe were instilled to us by scientists (physics and astrophysics) who began to take somewhat detached view of the man and the Earth — from space, and with the use of tools[12] based on mathematics, replacing sensory perception and traditional categories (reason, law, etc.) by a new reality. "Data, Arendt writes, investigated by modern physics, flash as "mysterious envoys from the real world" … Addington without slightest doubts assumes that these physical data arise from "the real world", i.e. by default more real than the world in which we live …

It is known how strongly Einstein was reluctant to sacrifice the principle of causality that was demanded by the Planck quantum theory; his main objection, certainly, was that if it carries on like this, the Universe will lose any regularity as though God managed the world by "playing dice."[13]

Arendt also analysed the position of scientists who, for the sake of beauty and search of truth, i.e. esoteric thoughts, rather than for the sake of public benefit, insist on a new picture of the world. However, Arendt shows that the result of these titanic esoteric searches was paradoxical and sad for scientists themselves: in the world opened by them not beauty and harmony, but accidentally, chaos and nonsense reigned. "According to Schrödinger, the new Universe that we try to "subdue", it is not just "inaccessible in practice, but even inconceivable" because "try as we may, our thought is wrong; perhaps it is not so senseless as a 'triangular circle', but much more senseless than a 'winged lion.'"

Least of all scientists wanted to "conquer space", to fly to the Moon or something like that … Actually nothing else than the search of "true reality" forced them to lose faith in phenomena, in phenomena in the aspect in which they are disclosed to human feelings and reason. They were inspired by an extreme love to harmony and regularity which learned them that if they wanted to open comprehensive beauty and the order of the whole (Universe), they to go beyond any given sequence or series of events. This may explain why they seem not so much to be tormented with the fact that their discoveries served the invention of the most deadly devices, as worry because of the crash of all the most cherished ideals of regularity and need. These ideals were lost when scientists found out that there were no any indivisible matter, any a-tomos, that we live in an extending, unlimited Universe and that randomness, seemingly, predominates everywhere where there is a "true reality"; the physical world completely goes beyond the area accessible to human feelings or any devices which leveled down their gawkiness."[14]

At last, Arendt concludes that, moving in the said direction, the man meet only himself ("the things that are made by the man and is his next mask"), but such succession of events threatens with death to the man. "The situation as it appears today, oddly resembles a careful-

[12] "The modern science started from thoughts inconceivable earlier (Copernicus imagined himself "standing on the Sun … examining planets") and from things unprecedented before (the Galilee's telescope pierced the space separating the Earth from the sky, and "with all reliability of sensory perception" presented to the human knowledge secrets of stars)" [Arend, 2014: 401-402].

[13] Hannah Arendt. Cit. Writings, pages 392, 398.

[14] Ibid. Pages 395, 400-401.

ly thought over confirmation of the remark made by Franz Kafka at the dawn of these changes: the man, he told, "found an Archimedean point, but used it against himself; probably, only on these conditions he was allowed to find it." After all the conquest of space, the search of a point beyond the Earth using which the planet could be moved, as if "unhinged", — it not an accidental result of science. From the very beginning it was not a science "about the nature", but a science about the Universe: not physics, but astrophysics … The conquest of space and the science which made it possible brought us too close to this point. If they once really reach it, the status of the man will not only become lower by all criteria known to us, but will cease to exist"[15]. Let us recapitulate what was said.

How it is possible to understand reflections of Losev, Kazyutinsky, Hannah Arendt and my own? The point is that there is an alternative, and not the only one, to the vision of reality set by rationalism and natural science. For Losev it is a peculiar belief. For the author it is a humanitarian philosophy. For Kazyutinsky it is a stoical mental outlook, belief in the man and the Mankind. For Hannah Arendt it is an awareness of the crisis of our thought and our civilization. "Christians, she writes, considered as immortal only a certain person and anything else in this world: neither mankind in general, nor even Earth … The modern times opened potential immortality of the mankind … The history, stretching infinitely both in the past and in the future, it is capable to provide immortality on Earth almost as a Greek polis or the Roman Republic provided to human life and acts — to the extent those revealed or created something essential and great — a specific human and terrestrial imperishability in this world."[16] "Speaking about earthly history, we live within a process which does not have neither the beginning, nor the end and thereby not allowing us to cherish eschatological expectations."[17]

Yet, Arendt notices, when it became clear that "all processes on the Earth and in the Universe are either man-made, or potentially man-made"[18], it became impossible to comprehend this process giving a meaning to the life of a new European man and a hope for immortality. Nevertheless, Arendt believes — probably following the ideas of her teacher, Martin Heidegger — that if the man thinks over his critically activity, including his own thinking, and realises that "it is the Earth, but not the Universe, which is the house and the center of dwelling of mortal people"[19], in this case, there is a hope.

However, the alternatives are not limited to these views.

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Limits to Growth and Achievement of Global Sustainability[1]

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In the work notes that the preservation of the planet's biosphere and its ecosystems (especially mountain) is one of the main goals of the transition to such a global process as sustainable development. Moreover, not only the goal, but also with the condition of its realization, is the natural foundation on which sustainable development should be realized as a successively unfolding new socio-natural process. The concept of planetary boundaries is discussed, which concretizes the concept of "the carrying capacity of the biosphere" and defines "a safe working space for humanity", that allows it to survive and further develop progressively. The concept of planetary boundaries establishes a corridor of global environmental security, within which the biosphere is minimally destroyed by anthropogenic activities.

Keywords: biosphere, carrying capacity of ecosystems, mountain sustainable development, natural security, planetary boundaries, safety, social constraints, sustainable development

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Introduction

Reports of the club of Rome, or otherwise associated with the development of the idea of limits to growth, has contributed to the development of global studies and the formation of the concept of sustainable development (SD). SD model must first be created with the help of science and then implemented by managerial decisions and actions at the local, regional, national, supra-national and planetary levels. The role of science should be significantly strengthened in the process of movement towards a sustainable future, but science should "turn" to the problem of global transition to sustainable development.

The concept of SD was emerged and actively developed through the last decades. The necessity of introducing of this new concept is primarily associated with the need to study the negative effects of global processes and growing global problems, especially environmental problems. The global ecological crisis of anthropogenic origin takes on a planetary scale and threaten the existence of humanity and life on the Earth. Modern humanity lives now in the status and in process of the so-called unsustainable development — historically a type of evolution of civilization and its interactions with nature leads not only to the prosperity and progress, but also to the multiplication of the dangers of anthropogenic global disaster and even the destruction of civilization. Moreover, negative trends have begun to dominate over the positive and alternative way of civilization evolution, reducing the probability of the risk of global catastrophe, is seen only in the transition to a sustainable development path.

In terms of the multiplying of global challenges and threats it is necessary to move from emergency and other negative consequences of anthropogenic activities to prevent disasters and for preventive and proactive measures, and suggests further movement toward global sustainability. When negative impacts were local (or, in some cases, even regional in nature), it was possible to eliminate their effects, albeit with huge economic losses. However, in the case of the global scale of possible disasters, they should only be prevented, which leads to a different view on the temporal characteristics of the activities of all civilization.

In case of ecological or other planetary catastrophe, its consequences will be impossible to repair for no one [Bostrom, 2008]. The larger the disaster, the harder the struggle with its negative effects on humanity and therefore a means of global problemssolving, reducing the negatives of globalization, global crises and cataclysms, in principle, should be preventive and not "left behind" — as practiced at the local scale liquidation of consequences of emergencies and disasters at the present time. The international community is obliged to foresee the limits of evolution, threats and challenges and proactively create models and scenarios of possible future using different methods of the priority activities for its sustainable development.

After the UN Conference on Environment and Development (UNCED) in 1992 in Rio de Janeiro, the world community has set a goal of transition from natural to sustainable development as the fundamental way to the survival of civilization. Under sustainable development, which should be rationally managed on a planetary scale, is understood to be the most appropriate and safe type of social and socio-natural evolution, aimed at the preservation of civilization and biosphere, their coexistence and coevolution.

The book "Our Common Future", known as the report of Gro Harlem Brundtland, substantiates the necessity of transition to SD that was the definition of the concept of SD. It

was addressed to the future: "Sustainable development is development that meets the needs of the present, does not compromise the ability of future generations to meet their own needs" [Our common future, 1987: 59]. Here, in fact, formulated the main goal of the transition to sustainability — survival and the survival of mankind on the uncertain future for a long time.

The preservation of the biosphere and coevolution with her civilization will create the basic conditions and perspectives that will lead to a completely new system "society — nature" that implements sustainable development strategy that will ensure our common future on the planet, and a cosmic perspective — and beyond. Preservation of the biosphere of planet Earth is one of the main goals of transition to sustainable development. Not only purpose. Its implementation is the foundation on which sustainable development should be established as sequentially unfolding new global process. The most acceptable scenario for the future of our planet and living of mankind on it involves the preservation of the biosphere as the natural basis of existence of all life and intelligent.

It includes further strategy of evolution of intelligent matter, including further neuroevolution and wide development of extraterrestrial space [Bazaluk, 2013, 2015, 2016].

Limits to growth and sustainable development

The concept of limits to growth have been put forward in the reports of the club of Rome in the early 70-ies, although it in one form or another, thought Montesquieu, Condorcet, Malthus, etc. This concept is even considered one of the basic concepts of globalistics, because it gives an idea of the finiteness of the size of the planet, its resources and conditions for the existence and future evolution of all mankind.

The concept of limits to growth have been put forward in the reports of the club of Rome in the early 70-ies. According to this concept, the finite size of the Earth and the limitations of its natural resources with fatal inevitability leads to the existence of the limits or the borders of a future socio-economic development. For the first time this concept was formulated in 1971 by George Forrester in "World Dynamics" [Forrester, 2003] and in the next year publication "Limits to growth" [Meadows et al., 1991] prepared by the group of scientists headed by Dennis Meadows. It became clear that if current trends of socio-economic development will continue in the 21st century it will be a global human crisis, and may be even planetary catastrophe. These and other reports (forty) of the club of Rome has contributed to the development of global studies and the formation of the concept of sustainable development. After these reports, it became clear that the vulnerability of ecological conditions and the finite size of the planet Earth, its limited natural resources will inevitably lead to the existence of the limit of growth of material production and population.

Project prepared under the supervision of Meadows, was highly appreciated and attracted wide attention to the activities of the club of Rome and initiated the study and awareness of the need for solutions to global problems, their causes and possible consequences. In result was created and adopted by the UN strategy for sustainable development (SD), which should implement the global community. It was to some extent an adequate response to the old concept of limits to growth.

The existence of certain "limits to growth" is not only a limitation of extensive growth, but also a prerequisite for further progress in a new direction. The limits to the progressive evolution of civilization is often caused by restrictions determined by the fundamental laws of nature and other factors, for example, the limitations of our biosphere and the planet as a whole. In addition, this is the achievement of a world community for socio-economic development on a global scale. This leads to aggravation of the socio-natural contradiction

between the growing needs of humanity, the limitations, and even the inability of the biosphere to provide these needs, especially for future generations.

It is important to identify the most significant constraints and limits to growth and development, to find out what restrictions lead to new paths of progress in general and which significantly inhibit lead to degradation and disasters. In many cases, implemented a variety of development paths, stopping in one direction, a progressive development can continue in a different "dimension". History of anthropo-societal genes confirms that the emergence of certain "limits" for extensive growth served as a pretext and the reason for the transition to new ways of evolution. If there were no limits (which are extensive) for appropriating economy, humanity is likely to be degraded in the same form as the existing tribes "sympoliteia Paleolithic". The output of the food and the demographic crisis of the upper Paleolithic were found in the transition to a producing economy.

Sustainable development is viewed as a new form of a global civilizing process, enabling the resolution referred to socio-natural contradiction between the growing needs of humanity and the limitations, or even the inability of the biosphere to provide these needs. The global transition to SD is now recognized not only as a new form and strategy of the development of mankind to ensure its permanent evolution, but as a new co-evolution method of interaction between society and nature. The establishment of a global sustainable world is seen in the context of achieving such a state (and process) of civilization and its interaction with nature, which is realized in such a planetary scale and in the longer term will be related to space exploration.

That is why the concept of SD in the preservation of the biosphere has become the critical goal, the implementation of which depends the success in the transition to this type of development. In this regard, SD is largely associated with biospherically development of mankind (and to a certain extent, low-carbon and low-emission, bearing in mind the terminology of the new climate agreement reached in Paris).

Reports of the club of Rome, or otherwise associated with the development of the idea of limits to growth, has contributed to the development of global studies and the formation of the concept of sustainable development. In this direction abroad, work is continuing to identify or limits in nature and in society.

Socio-natural limits: planetary boundaries and social restrictions

In 2009 there was proposed the concept of planetary boundaries (planetary boundaries) by the Swedish scientist Johan Rockstrom and Australian Will Steffen with cooperation with more than two dozen scientists [Rockström et al., 2009]. The concept is concretized the already mentioned concept of "carrying capacity of the biosphere". It appeared on the crossroads of research from the perspective of the idea of "limits to growth" club of Rome and the planetary ecological capacity of human activities (carrying capacity of the biosphere).

The mentioned authors identified nine planetary boundaries, although other scientists say several more such boundaries, for example, ten or eleven, and has clearly traced the tendency to increase their number. Nine planetary boundaries that are dependent on human activities, include: climate change, extinction of species, the cycles of nitrogen and phosphorus, chemical pollution, acidification of the oceans, ozone depletion, global freshwater use, the ratio of acreage to total land area, the concentration of particulates in the atmosphere. A number of these indicators have already received preliminary quantitative expression, whereas the remaining due to lack of reliable information is determined only qualitatively.

Planetary boundaries, in fact, is a biosphere restriction of economic and other activities of mankind, who will give it the opportunity to prosper and grow for centuries, and even millennia. Identified nine socio-natural processes, which have boundaries until they are crossed, be a safe space for human development. The concept of planetary boundaries establishes a corridor (area) of global environmental safety, within which the biosphere is minimally destroyed by anthropogenic activities.

For some of them (loss of biodiversity, climate change, and human interference in the nitrogen cycle) level of safety significantly exceeded. It turned out that by these parameters greatly civilization went beyond the safe zone, so it is urgent to begin to move in the opposite direction. Other remaining "planetary boundaries" of humanity is still kept within permissible values, but fast approaching it. The violation of one or more planetary boundaries may be harmful or even catastrophic due to the risk of crossing thresholds. They can cause non-linear, can be very sharp change in environmental systems on a planetary scale. Therefore, crossing these boundaries does not pose quite predictable, but almost certainly unpleasant consequences that could threaten the future of civilization.

It is important to pay attention to the rate of change of these indicators: so the decline of biodiversity is a hundred or even a thousand times faster than, for example, during the last mass extinction, the disappearance of the giant reptiles. So, increasingly, is about a new — the sixth mass extinction of biota are influenced by anthropogenic activities. Assessing the speed of development of modern civilization and the evolution of the biosphere information on the characteristics, some scholars emphasize that the speed of this latest seven orders of magnitude slower than the rate of accumulation of socio-cultural information [Arsky et al., 2003].

The international organization Oxfam rightly proposes to add the concept of social boundaries to the concept of planetary boundaries [Raworth, 2012]. As it is noted in this work, today the main reason for negative changes of the planetary boundaries is excessive consumption of goods and services by 10% of the wealthiest people in the world. Their needs are provided by companies manufacturing all sorts of benefits for this population. 10 % of the richest people in the world accounted for 57% of world income. At the same time, the poorest 20 percent is only 2%. The huge gap in income levels, lack of gender equality, and the difference in the rights of citizens means that millions of people live at the lower boundary of social indicators. Almost 900 million people are hungry; and 1.4 billion people live on less than $ 1.25 a day, and 2.7 billion people do not have the ability to cook food in normal conditions. Excessive consumption of resources by 10% of the richest people in the world deprives billions of people with more modest requests, and the reserves of such resources are not limitless. It is necessary to stop the hardships of the people, but stay within reasonable limits when using natural resources.

Conceptual-symbolic modelling of limitations achieving global sustainability

The formation of the new strategy of SD means a gradual connection in a single self-organizing system of economic, environmental and social spheres (sometimes referred to as the "SD-triad" or the triangle). Probably, with the formation of the "SD-triad" it was necessary to start; these three areas of global activities are important as their relationship, but now it became apparent that this was no longer enough. The need to expand the subject field of motion study to global sustainability and vision of the concept of SD fully integrated and thus more effective in its implementation are appeared.

The concept of SD cannot and should not be limited to "SD–triad" relationship of ecology, economy and social sphere, at least in its current format. These three "target of measurement" of a future transition to SD should be significantly expanded, making the global "space of movement to SD" in the evolutionary-branching n-dimensional phase space, where they will receive additional directions and dimensions, involving the development of new models for the future of civilization process. We have to make model of SD based on a virtual theoretical view of the future of the global world and to go towards the inclusion of other visions of the future, which has not yet received such wide recognition and official registration with the UN.

The transition from a model of unsustainable development (USD) to the model of SD as an overarching management process can be symbolically represented as the imposition of major restrictions on naturally (spontaneously) occurring socio-economic process, which should reduce its negative impact on society and nature [Ursul, 2006]. Kind of restrictions are placed on economic development, which cannot and should not mainly be deployed for extensive trajectory. In order to organically fit in SD, the economy should move to intense and biospherically path of development, when the growth of efficiency will not be at the expense of the quantitative factors and the expansion of space activities, but at the expense of qualitative factors and sources.

Modern economo-centric model USD substantially symbolizes the concept of economic efficiency, expressing the ratio of performance (R) to the cost (C) that determines economic efficiency (E):

$$E = R/C. \tag{1}$$

Moreover, the increase of economic efficiency in the forms of profit, productivity, profitability, and other related concepts of economy expresses the motive and interest of activity of subjects of market relations.

The transition from NSD to the model of SD as an overarching global managed process symbolically can be represented as a superposition of the basic restrictions naturally (spontaneously) occurring in market process. Such restrictions are necessary to overcome emerging of social and socio-natural limits and boundaries to continue the safe prosecution of the progressive development of civilization. This implies a decrease in relevant negative consequences for society and the biosphere. Using further the expression of economic efficiency (E), we note that the methods of achieving it does not remain the same as in the current model of development.

Moreover, certain restrictions are imposed on process of economic dynamics as overcoming the historical stereotypes of exponential growth, leading to the "limits to growth". For organic adaptation in a future model of SD, the economy needs to shift from extensive to intensive way of evolution. In other words, the efficiency gains will not go through the quantitative factors and the expansion of space — field activities, but at the expense of qualitative factors and sources. "Sustainable economy" is not just "biospherical economy", but also the economy that have fallen on the path of intense innovative development that significantly reduces the quantitative parameters as the master of natural resources and waste, contributing to a more organic introduction of other management constraints, both in environmental and social spheres.

Therefore, ecologically safe intensive economy is the economy in conditions of global and other constraints and maximize the use of qualitative factors and sources of development

(which corresponds to the imperatives of SD). Greatly simplifying, it can be expressed as follows:

$$SD = E \cdot B \cdot S, \quad (2)$$

where B — natural-biosphere limits of the human impact on the environment (which creates the possibility of preserving the biosphere), S — the aforementioned "planetary boundaries" and social limitations that need to be implemented in the global system "man — society" and other internal social relations. Introduction of symbols B and S tells about going beyond of economic relations in the wider (institutional) space — environmental and social, i.e. socio-natural system. Biosphere constraints in the process of interaction between nature and society, we put first in the formula (2), since it is through their awareness and the concept of SD, although the role of social factors (especially social justice) were identified much earlier.

Social limitations arise from the necessity of survival and preservation of humanity (anthropocentric factor of socio-natural systems) as a whole and only apply to the system "man — society", "society — humanity". Among the social (intra — and inter-social) relationship the first place belongs to social (distributive) justice (J) as the consistency (ratio) of contribution of human activities (CH) to the received benefits (BF) in combination with an equal distribution of basic goods (e.g., rights and freedoms of the individual, environmental living conditions, etc.):

$$J = BF/CH. \quad (3)$$

Equal treatment of all members of society, the distribution of basic goods that meet vital human needs, must from the point of view of SD spread to all of the community of people now and in the future (for an indefinitely long time).

Biosphere limits (B) shall be determined based on the need to ensure the sustainability of the biosphere and its natural ecosystems functions regulation and stabilization of the environment (i.e. the biosphere is accepted, not the resource model of the world). These constraints consist of environmental and natural resources components as the imperatives of "sustainable" activities. Natural resource imperatives are in environmental sustainability (ES), which is achieved in the way of gradual replacement of the use of non-reproducible resources (NR) to repeatable resources (RR). This can be symbolically expressed their attitude, expressing the degree of sustainability of environmental management:

$$ES = RR/NR. \quad (4)$$

With the help of coefficient (4) can be measured by the percentage of replacement of non-reproducible resources reproducible (the degree of adaptability of the strategy of intensification of economic activities).

Ecological component in the interaction of society and the biosphere expresses the function of environmental protection and presented in the formulas explicated to ensure environmental safety (although this significantly reduces the environmental component in the concept of SD). Because the environment (in this case the social environment) encompasses a variety of aspects of the relationship between society and nature; and in this sense, environmental management is also included in environmental attitudes as a socio-natural interaction.

However, the management expresses in the most part an attitude that is directed away from nature to society, since natural resources are taken from ecosystems and are involved in the economic sphere. In the social ecology (and other environmental disciplines where the central member (subject) of interaction of a person and humanity) focuses on the problems of environmental security as social actors, and ecosystems. In this sense, the concept of bearing (economic) capacity of the ecosystems formulates the permissible limit human impacts and focuses (though not explicitly) in search of more rational ways of nature as a stable (and thus more rational) management of natural resources.

Environmental safety can be symbolically presented in the form of the law of requisite variety (W. R. Ashby). In accordance with this law, the ecosystem will be ensured environmental safety, if the interaction of the central member with the external environment (or external environment) will appear the mediator (regulator), a variety of which can handle a variety of disturbing (negative) impacts (e.g. wastewater treatment plants).

Symbolically this can be written as follows:

$$ES = MS / DT, \tag{5}$$

where DT — the degree of threat, which can be expressed in one way or another measurable unit (for example, a variety of negative impacts), and MS — a measure of safety of the object, expressed in the same units. The degree of safety may be identified by the appropriate factor, without which equal to one if all threats protection (which correspond to the controller of W. R. Ashby) is verified and will be less if the negative effects are held to an object of environmental safety (which may be nature and people, society). Thus, biospheric constraints are expressed using the ratio of environmental safety, without the factor of sustainable nature management.

So environmental safety is a shared security as a central member of the ecosystem and its environment, suggesting their co-evolution relationship. Priority is given internally to the central member of the ecosystem (human, society) that exists at the expense of the environment, determining to some extent the degree of its degradation. Therefore, in accordance with the principles of synergetics, we can speak only about the reduction in the degree of degradation, not a complete cessation, as it will lead to a degradation of the central member of the ecosystem.

Moreover, it should be in mind to provident only ecological but any other kinds of safety, since the SD should be safe in all respects and activities; otherwise, it will not be a safely-stable. This is an acceptable degree of protection or other methods of conservation of nature (quality) of the object, which reduces the negative (harmful) impacts to acceptable to continue the development of the level. As a result, "SD formula" in our simplified case looks like the following:

$$SD = R/C \cdot BF/CH \cdot RR/NR \cdot MS/DT \tag{6}$$

This expression shows that the transition from NSD (R/C) to the model of SD associated with the inclusion of means to ensure social justice (BF/CH), sustainable management (RR/NR) and safety (MS/DT), which includes ecological safety.

The presence of those or other components in the "SD formula" (6) would show "weak" or "strong" sustainability in the course of movement from the model of the NSD to the model of SD. The "weak" sustainability means the connection to the economic efficiency of any one

of the other model components SD, or the inclusion of all these components, but each of them in varying degrees. Most "strong" sustainability involves the inclusion of all components with the maximum possible values of their variables, which is real only in the distant future (at the level of the future of the noosphere). The transition from "weak" to a "strong" global sustainability — this is the real process of transition to SD, which combines at the same time as components of model of NSD (which dominate) as SD model (components and their value should increase over time).

One of the major problems that connects the unsustainable present and a sustainable future is understanding that they need to unite into a single unified system, overcoming the civilizational gap in time. The essence of the transition from unsustainable to sustainable development — in the dominant trend of a decrease in the degree of restrictions and limits, challenges and dangers, including socio-environmental nature, threatening the positive dynamism of civilization.

Conclusion

At the 70th General Assembly of the UN Summit on sustainable development in September 2015, we adopted a new Agenda for sustainable development, which includes 17 global sustainable development goals (SDG). According to the former leadership of the UN, the adoption of an official document "Transforming of our world: an Agenda for sustainable development for the period till 2030" [Transforming of our world, 2015], marks a new historical stage of transition entire world community to the SD. The SDG continued as the targets of all previous UN documents for study, and the Millennium development goals (MDG), which has been identified as a priority of eight international development goals that were adopted by the States members of the United Nations in 2000 and was mostly completed by 2015.

The transition to sustainable development in its target form will contribute to the resolution of the main socio-natural contradiction between the growing needs of the world community and the inability of the biosphere to provide these needs [Ursul & Ursul, 2017]. Sustainable socio-natural development will become more comprehensive, global and the safest type of socio-economic development.

The development of civilization will be safer in all respects if it is implemented in the form of a broad understanding of SD, which implements safety on the necessary and sufficient level for the further preservation of mankind. This provision focuses not only on protection but also on the forms of security that are associated with a faster action, with the formation of development in the most safe (safety is provided through pregressive development). Of particular importance is the preservation of the biosphere, which recently found its expression and concretization of the concept of planetary boundaries.

Now it is important to transfer the idea of seeking limits to growth already in the concept and strategy of sustainable development, to see what prevents its implementation, present the obstacles and difficulties as the new limits for the progressive evolution of humanity in a "sustainable direction". It concerns not only and not so much to finding of new limits to current patterns of unsustainable development, and to a large extent and the formed model of sustainable development. Meadows has already paid attention to it in the book "The limits to growth. 30 years later", and believed that it is not too late to go on the path of sustainable development by formulating a number of limitations for this type of development [Meadows et al., 2008].

In the future, we may talking about "transformation" in the interpretation of global sustainability. It is, in fact, a new stage of vision of "sustainable revolution", since the first can be considered as the adoption of the concept and the strategy of transition from the current development of civilization to the future of global sustainability. This is a permanent problem and the incompleteness of the concept of SD it is important to recognize and account for in the further practical activities. Significant adjustments will have to be already formed in the narrow concept of SD and expand it, primarily through the priorities of most important to implementation of a more systemic conception of SD.

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Section Two
LIVING MATTER

Intelligent matter (Bazaluk's definition) is the third (after inert and living) state of a matter of our Universe, known to a modern science. The evolution of intelligent matter is carried out in three complementary and specifying directions: continuous and nonlinear complication of neural network of subconsciousness and consciousness (neuroevolution), 2) continuous and nonlinear complication of means and methods of communication, 3) continuous and nonlinear complication of sociocultural environments (sociocultural evolution). Abilities to capture, process, store and transmit to future generations environmental conditions as well as manage internal creative potentials in artificial products activities have revealed as a result of regular planetary and cosmic processes in the structures of intelligent matter. The structures of intelligent matter are distinguished by ability to designing (creation, transformation and destruction) environment conditions. Intelligent matter on the Earth is represented by the form of the human society (civilization), whose representatives difffer by the level of mental development (neural networks of subconsciousness and consciousness) and, consequenty, the ability to unconscious and conscious activity. The evolution of intelligent matter (noogenesis) gives rise to continuous and nonlinear complication of cosmic noospheres which pass from the local planetary organization to the level of cosmic force and have influence on the cosmic processes.

Section Three
INTELLIGENT MATTER

Living matter (Bazaluk's definition) is the second (after inert) state of matter of our Universe, known to a modern science. The evolution of living matter is carried out in three complementary and specifying directions: 1) continuous and nonlinear complication of biopolymers and gene mechanisms (molecular evolution), 2) continuousandnonlinearcomplicationoftypesofinteractions (development of functions), and both continuous and nonlinear complication of environments of existence (evolution of ecosystem). Abilities to selfreproduction (self-replication), self-organising and self-control have opened as a result of natural planetary and cosmic processes in structures of living matter. Structures of living matter are distinguished by ability of the active (continuous) and nonlinear (versatile) adaptation to environment conditions, both in the near and distant future, at the molecular- genetic, cellular, organismal and population-species level. Living matter on the Earth is represented by the form of the biological organisms that difffer from the degree of complexity of the internal organization. The evolution of living matter (biological evolution) forwards continuous and nonlinear complication of cosmic biospheres which of the local planetary organizations pass to level of cosmic force and influence on the cosmic processes.

A Look into the Future: Cyber-aggression as the Problem of Interaction in Space Exploration

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In the article, the authors broadened on the definition and concept of cyber-aggression. The authors have carried out their inquiry on the cyber-aggression in terms of the possibility of broadening of human potential by using the high-tech devices. Such inquiry was built upon the "The theory of war and peace" by Oleg Bazaluk. The authors came to the conclusion that cyber-aggression appears to be a typical form of struggle for existence, which is inherent in man, the state and civilization. Cyber-aggression, considered as a "natural way of human intelligent activity broadening by using the high-tech devices" provides the following: a) the transformation of civilization into a planetary force; b) exploration of cislunar and deep outer space; c) Universe-wide competition. The authors proposed a behavior model, specially developed for the contacts with extraterrestrial civilizations, which stipulates the transparency of intentions and proves: a) that terrestrial civilization's cyber-aggression is a method of space exploration, rather than a desire for war and violence; b) that the Earthly civilization's technologies are determined by its cultural history and manifest peace and benevolence.

Keywords: cyber-aggression, space exploration, extraterrestrial civilizations, theory of war and peace, interstate relations

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Introduction

In the recent article "Cyber-Aggression: Definition and Concept of Cyberbullying", Dr Dorothy Wunmi Grigg showed that the concept of cyber-aggression is "used to describe a wide range of behaviours other than cyberbullying" [Grigg, 2010: 143]. In Grigg's opinion, cyber-aggression includes "a broader definition in line with the current trend of a range of behaviours that are common with internet and mobile phone usage" [Grigg, 2010].

Peter Smith in the particular chapter "Cyberbullying and Cyber Aggression" outlines the history of research in cyberbullying and cyber-aggression and some major publications. He observes types of cyber-aggression and cyberbullying, and features that tend to make it distinctive from "traditional" (noncyber) forms; and considers essential issues that arise. Smith found out a number of facts crucial for cyberbullying and cyber-aggression: "incidence, who does it and where it happens, age and gender differences, other predictors of involvement in cyberbullying, the impact of cyberbullying, coping strategies, prevention and intervention procedures, and concluding with implications for research and practice" [Smith, 2012].

The article "The Association Between Cyber Victimization and Subsequent Cyber Aggression: The Moderating Effect of Peer Rejection" by Michelle F. Wright and Yan Li observes the relationship between cyber victimization and the subsequent cyber aggression of adolescents 6th, 7th, and 8th-graders [Wright & Li, 2013].

Analyzing previous works on cyber-aggression, Matthew W. Savage and Robert S. Tokunaga attempt to utilize general aggression theory to contribute to a better theoretical understanding of the confluence of inputs that goes into the decision-making involving cyberbullying perpetration [Savage & Tokunaga, 2013].

The inquiries analysis in this field showed that the manifestations of cyber-aggression are mainly researched in adolescents: incidence, who does it and where it happens, age and gender differences, etc. We consider the all achieved in this field results to be an important stage in the study of cyber-aggression, but our research provides a look into the future. In the article, we are going to broaden a comprehension of cyber-aggression phenomenon and to observe its manifestations in other areas such as war and peace, interstate relations, and human space exploration.

Aggression in the theory of war and peace

In the article "Moving toward a Theory: Testing an Integrated Model of Cyberbullying Perpetration, Aggression, Social Skills, and Internet Self-efficacy" authors utilized general aggression theory to systematize modern consideration of cyberbullying and cyber-aggression [Savage & Tokunaga, 2013]. This makes sense because cyberbullying and cyber-aggression are manifestations of the psyche and, can be explained by general aggression theory. However, for the basis of our research on cyber-aggression, we propose "The theory of war and peace", proposed by Oleg Bazaluk in 2015 [Bazaluk & Blazhevych, 2016; Bazaluk, 2017; Bazaluk & Svyrydenko, 2017]. The following features of the theory of war and peace, crucial for cyber-aggression consideration specified our decision.

1. This theory dates back to Plato's and Aristotle's studies and the majority of well known key philosophers made a contribution to it [Fatkhutdinov & Bazaluk, 2018].
2. It involves modern neuroscience achievements, systematized by Neurophilosophy [Bazaluk, 2017].
3. The theory includes the main provisions of general aggression theory and essentially broadens its theoretical justification and practical use [Bazaluk, 2017].

4. The theory of war and peace explains the peculiarities of states evolution and interstate relations development, the reasons for wars and peace in the history of culture [Bazaluk & Blazhevych, 2016; Bazaluk & Svyrydenko, 2017].
5. The theory of war and peace was also created in order to explain the peculiarities of possible communication with extraterrestrial civilizations [Bazaluk, 2017].

Consequently, "The theory of war and peace" by Bazaluk provides theoretical and practical conditions for an essential extension of the definition and concept of cyber-aggression. Basing on this theory, we are going to prove that cyber-aggression is natural not only for the planetary and cosmic human activity but is the manifestation of any other extraterrestrial civilization. Accordingly, cooperating with extraterrestrial civilizations mankind should be prepared and able to identify the possible manifestations of cyberbullying and cyber-aggression. This means to be able to distinguish within the extraterrestrial cyber-aggression the elements of violent aggression, and natural aggression, as a manifestation of the rational activity provided in unknown or not accepted by earthly civilization way.

The theory of war and peace in interstate relations

The practical application of the Bazaluk's "theory of war and peace" in interstate relations appears as the second crucial point in order to explore the concept of cyber-aggression in various models of interactions between extraterrestrial civilizations. In Bazaluk's "theory of war and peace", aggression phenomenon is considered as 1) a regular function of the brain, due to the peculiarities of its structure; 2) as a result of the informational, communicative and educational technologies impact [Bazaluk, 2017]. Bazaluk writes: "According to Dinesh Bhugra, as a result of 132 pieces of international research, it was found that the median prevalence of schizophrenia was 4.6 per 1,000 persons, and morbid risk of disease was 7.2 per 1,000 persons during a lifetime. If the other pathologies in the neurobiology of the brain are added to these results, then the percentage spread of mentalities that are apt to aggression becomes higher than 1 percent of the total number of a mental space" [Bazaluk, 2017: 77]. With the age and especially under the influence of informational, communicative and educational technologies, the percentage of people prone to manifest an aggression increases from 4 up to 10% of the whole state population.

A high percentage of people prone to aggression basically explains some peculiarities of the internal and foreign policies of states, as well as the reasons for the manifestation of aggression and peace in interstate relations. Bazaluk proved the provisions of his theory on the instances of the geophilosophy of Europe, in which the policy of the leading European states: Germany, France, Russia and Great Britain plays an important role [Bazaluk, 2017]. We will consider the effect of the mentioned theory on the instance of Slovakia, a small state located in Central Europe. Slovakia became an independent state on 1 January 1993. The domestic and foreign policies of Slovakia are aimed not only at economic integration into the European and world community but also at ensuring their own security. The following issues are relevant for Slovakia:

1. Identities, Democracy, Borders [Rouet & Ušiak, 2017];
2. Contemporary Global Terrorist Movement [Kosárová & Ušiak, 2017];
3. Military Recruitment Model for Armed Forces of Small States and Middle Power [Ušiak & Gorner, 2018];
4. Slovakia's perspective on NATO [Ušiak, 2018].

Slovakian instance shows that different forms of aggression are present not only in the policies of large and high-populated states but small ones as well. Each state is compelled to use

some forms of aggression in its domestic and foreign policy in order to defend its independence and the identity of its culture. We came to the conclusion that *aggression appears as a typical form of struggle for existence, which is inherent in both the single person and the policy of any state*. In interstate relations, aggression 1) appears as a necessary condition for the development of intelligent matter; 2) it can be stimulated with informational, communicative and educational technologies; 3) aggression is also a way of preserving the identity of a person as well as state and civilization.

Definition and Concept of Cyber-Aggression

Due to the provided analysis now is possible to clarify the definition and concept of cyber-aggression. Main clarification is not related to the aggression as a term (most of the scholars are on the same page about its meaning and sense) it concerns the first part of the concept of cyber-aggression, namely the term "cyber".

The reason why the concept of cyber-aggression is limited to the Internet and mobile phones is not clear. In terms of the Transhumanist Declaration and "transhumanism" as a direction of scientific and philosophical research, the significance of cyber-organism and cyber-culture is much wider. Let us highlight the first and last points of the Transhumanist Declaration 1) "Humanity stands to be profoundly affected by science and technology in the future. We envision the possibility of broadening human potential by overcoming aging, cognitive shortcomings, involuntary suffering, and our confinement to planet Earth;" 2) "We favour allowing individuals wide personal choice over how they enable their lives. This includes use of techniques that may be developed to assist memory, concentration, and mental energy; life extension therapies; reproductive choice technologies; cryonics procedures; and many other possible human modification and enhancement technologies" [The Transhumanist Declaration, 2009]. When we are talking about cyber-organism and its manifestations, we mean the possibility of broadening human potential by using the high-tech devices. And this is not only the Internet and mobile devices; these are informational, communicative and educational technologies that broaden the manifestations of the human brain.

Consequently, the cyber-aggression appears to be a natural manifestation of human activity. This statement is sensible because it is evidenced by the history of culture where we can find *the instances of the possibility of broadening human potential by using the high-tech devices*. Moreover, if cyber-aggression is considered as a broadening of the activity boundaries based on Bazaluk's "theory of war and peace", we would find that cyber-aggression is not only a natural manifestation of the individual activity but a planetary and even cosmic manifestation as well. *Cyber-aggression, as an opportunity to broaden the boundaries of the manifestation of the psyche by using the high-tech devices, is available to any intelligent organism located anywhere in the Universe*. Trough cyber-aggression, a sensible organism, manifests its identity and protects it.

Cyber-aggression as a prerequisite for a space exploration

Consideration of a cyber-aggression, as a broadening of the sensible organism's activity boundaries by using the high-tech devices allows us to provide a series of important revisions.

Firstly, cyber-aggression becomes a necessary condition for the transformation of human activity into a planetary force. Broadening individual and collective capabilities by using the high-tech devices, the society eventually might be united into a planetary force. Being in a permanent state of war and peace, solving problems by force and compromises, society is

guided by one goal — self-preservation. The reasonable manifestation of the cyber-aggression is the main way to represent and conserve the identity of national cultures. Cyber-aggression is the natural aspiration of the organism, society and civilization to survive in a competing environment, which means to manifest oneself and protect the products of its activity. Cyber-aggression is a way to civilization-wide compromise and to resolving the conflicts by planetary-wide conscious actions.

Secondly, cyber-aggression, considered as a way of sensible organisms' survival, appears as the driving force that directs planetary force to the exploration of the space and the Universe as well. War and peace within a separate civilization, eventually lead to an understanding of the secondary effects of planetary activities. The results of interstate or state coalitions wars appear meaningless in comparison with space safety. Using cyber-aggression as a struggle-for-existence method, society will come to the necessity of the Earth's security strategy development. The problem of human civilization protection from destructive cosmic phenomena will become prior, thereby emphasizing the minor importance of state and regional security strategies. Society will learn how to use cyber-aggression for daring space exploration projects, rather than for planet-wide conflicts and wars.

Thirdly, the Earth's safety strategy does not proclaim any isolation of the planet from space. The safety of the Earth's civilization is related to its involvement in space processes, on a deeper exploration of the Universe and the technologies development, which allow us to adapt to the space phenomena. Cyber-aggression appears as the important factor of space exploration and the usage of the resources of the Universe. Cyber-aggression phenomenon contributes to the development of the technologies, which are able to provide the involvement of terrestrial civilization in space processes: to broaden its manifestations in space, and to protect these manifestations from the destructive influence of the Universe.

Thus, Cyber-aggression, as a natural extension of the possible human activity boundaries by using the high-tech devices, provides the man's overcoming of the boundaries of the planet and the exploration of the capabilities of near space, and later, the Universe. Roman Oleksenko and Lidia Fedorova in the paper "Homo Economicus as the Basis of "Asgardia" Nation State in Space: Perspective of Educational Technologies" proposed a new interpretation of the concept of Homo economicus, in which cyber-aggression is a necessary condition for human space exploration. Oleksenko and Fedorova proposed to consider the concept of Homo economicus as the cultural ideal for educational technologies when creating the "Asgardia" nation state in space [Oleksenko & Fedorova, 2017].

Cyber-aggression forms the basis for the exploration of the Universe resources in order to create the new technologies. Knowledge of the Universe and technologies for its resources exploration appears as the basis of the Earth's civilization safety strategy. The same knowledge might be considered as a starting point in interaction with extraterrestrial civilizations.

Cyberbullying and cyber-aggression in relations with extraterrestrial civilizations

The exploration of the Universe and its resources usage in the struggle for existence will eventually involve the terrestrial civilization in competition with extraterrestrial civilizations. There are numerous studies on the existence of extraterrestrial civilizations, for instance, "Life in the Universe: The Abundance of Extraterrestrial Civilizations" by James Newsome Pierce [Pierce, 2008]. Moreover, Bernardo Kastrup offers a new paradigm in which the reason and its carriers occupy an important place in the structure of the Universe [Kastrup, 2018]. We consider extraterrestrial civilizations as an obvious fact that terrestrial civilization will face

in the short term. For this reason, we propose to consider the model of the behaviour of the Earthly and any other civilization in which cyber-aggression appears as a natural manifestation of Universe-wide competition.

The model of interaction with extraterrestrial civilizations proposes to take into account the historical and cultural context, which is highly important for an intelligent matter. Each civilization has its own history and culture of technics and technology. Therefore, technologies and peculiarities of their usage by terrestrial civilization can be considered as cyberbullying and cyber-aggression by any other civilization. Similarly, the Earth's civilization can consider the extraterrestrial technologies as manifestations of cyber-aggression. However, these technologies might be the representation of extraterrestrial civilization's culture and manifest friendship and peace.

For this reason, cyber-aggression in relations with extraterrestrial civilizations should be considered in the context of their history of the culture. It should not be considered as the manifestation of aggressiveness and malevolence due to the history of Earthly culture. Cyber-aggression should not be used as a form of equal response. It is necessary to develop a model of relations with extraterrestrial civilizations taking into account the agreements; it is necessary to gain time, in order to identify the culture of extraterrestrial cyber-aggression and the true reasons for its manifestation. Firstly, it is necessary to show that Earth's civilization technologies are no more than an extension of psyche capabilities by using the high-tech devices and they cannot be dangerous for another civilization. It is crucial to be the first to show benevolence, peace and interest in partnership with an extraterrestrial civilization. The first step towards peace and mutual understanding is not the manifestation of weakness, but of the high level of civilization development.

It has to be also considered that Earth civilization technologies, as well as its cyber-aggression, might not be safe for extraterrestrial civilization. Intending peace, Earth civilization may unintentionally harm the extraterrestrial civilization by its high technologies and vice versa. The ideals and values of different civilizations may not be similar as well as the actions evaluation scale. Therefore, the relations with extraterrestrial civilizations should be started as tolerantly and transparently as possible, with a clarification of possible mutual technological harm, explanation of the cultural context of dominant ideals and values. The forms of cyber-aggression are a manifestation of activity, friendliness and interest in relationships. However, it is necessary to make sure that the interest in the relationship may not cause any harmful unforeseen consequences, which the other side will consider as a threat or violence.

Conclusion

Interacting with extraterrestrial civilizations, mankind will face manifestations of cyberbullying and cyber-aggression. However, it may not be always considered a destructive action: hostility manifestation, conflicts or reluctance to interact. Mostly the cyber-aggression appears as the natural activity caused by the intention of self-preservation, as well as the expansion of the psyche capabilities by using the high-tech devices. That is why it is important to be prepared for cyber-aggression and be able to identify it correctly. It is a mistake to consider all possible forms of cyber-aggression as cyberbullying or even cyber-victimization. In most cases, it is a natural activity based on the history of culture, technology, ideals and values of civilization.

Earthly civilization has to develop a behavior model, specially for the contacts with extraterrestrial civilizations, which stipulates the transparency of intentions and proves that terrestrial civilization's cyber-aggression is nothing more than a method of space exploration;

that the Earthly civilization's technologies are determined by its cultural history and manifest peace, benevolence and partnership interest. Contacting with extraterrestrial civilizations, it is important to be the first who discovers the senses of cyber-aggression, in order to enjoy the cooperation and mutual understanding.

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The Universal Self and the Individual self in Vedanta

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In the ancient Hindu philosophy known as Vedanta, the mind — understood as an accumulation of memories, desires, emotions, thoughts, etc., including the self, that is, the 'I'-thought present in every conscious experience — is said to be a sense like any other physical sense: see, hear, touch, taste, or smell. The implication is that mind is also instrumental in creating our conscious experiences but it is not awareness itself. One may ask: if mind is also a sense, then similarly to a sensory experience which need not involve all the five physical senses, do we ever have a conscious experience with no 'I' in it? Indeed, Vedanta elaborately describes such a state of consciousness called Samadhi, which lies beyond waking, dreaming, or deep sleep. Vedanta also affirms the existence of a state in which one's self does not see itself as belonging to only one's own body/brain and mind but one sees nobody and nothing in the universe as different from oneself; in other words, this awareness (called Universal Self) identifies itself with everything in the universe, whether living or lifeless. Vedanta claims that in our ordinary lives, in those moments when we express love and sympathy towards others, we are indeed in that state of infinite oneness whether we know it or not, and that the expression of love is a manifestation of nothing but the Universal Self. We will attempt in this article, to examine the rationale for this claim using the notion of an ever-widening circle of identification. We will describe a simple analogy used by Vedanta in its analysis of consciousness, mind, and body relations, to explain how the individual self associated with one's body and mind arises from the Universal Self. We will also summarize Vedanta's theory of mind-body interactions and suggest that it offers solution to the 'hard problem' of today's consciousness researches in a way compatible with modern science.

Keywords: self, Universal Self, consciousness, hard problem, Vedanta, mind-body interaction

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Introduction

In this article, by the word 'mind' we will mean the accumulation of the information content of an individual's experiences, desires, emotions, thoughts, etc. Clearly, the contents of a mind so defined, are all inaccessible to physical senses and not known to others in normal circumstances (not paranormal phenomena) unless one conveys them verbally or by other

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physical means (making it very tempting to lie!). An individual mind (at least in the case of human beings) includes the 'I' thought/feeling because as long as we are awake and even while dreaming, the 'I' seems to be present in any conscious experience: "I see", "I hear", "I remember", "I know ", or "I want this" and so on. Both Hindu and Buddhist philosophies describe mind as the sixth sense (or as the eleventh sense sometimes) and assert that the 'I'/ego/self is part of mind. The implication is: like the physical senses, see, hear, touch, taste, and smell, mind's contents are also instrumental in creating our conscious experiences but not awareness itself (obviously, not an easy proposition to comprehend). One may ask: if so, similarly to a sensory experience which need not involve all the five physical senses, do we ever have a conscious experience with no 'I' in it? Indeed, both philosophies extensively analyze such a state of consciousness called Samadhi. They also talk about a state in which one's awareness does not see itself as belonging to only one's own body/brain and mind but sees nobody and nothing in the Universe as different from oneself. This awareness, which identifies itself with everything in the Universe whether living or lifeless, is called the Universal Self in Vedanta. The individual self/'I' which is associated with one individual body/brain and assumes an identity distinct from everything else (living or lifeless) in the world, is called "Ahamkara" in Vedanta. This philosophy emphasizes two notions of self: individual self and Universal Self (*paramatma* in Sanskrit). Hereafter, for brevity, we may refer to the Universal Self as Self (with big S) and refer to the individual self simply as self. Vedanta claims that in our ordinary lives, in those moments when we express love and sympathy towards others, we are indeed in that state of infinite oneness whether we know it or not, and that the expression of love is a manifestation of nothing but the Universal Self. We will attempt in this article, to examine the rationale for this claim using the notion of an ever-widening circle of identification brought to light by a brief introspection of a few experiences in our ordinary lives. We will present a simple analogy by means of which Vedanta explains how the individual self arises from the Universal Self.

Consciousness, mind, body, and their relations were thoroughly analyzed by Vedanta which claims to have solved the 'mind-body problem'. While Vedanta's main objective is to teach how to progress spiritually in order to be relieved from worldly miseries and realize eternal bliss, according to this philosophy, a way to realize eternal bliss is to understand what Reality is, and what the Real source of life and the world experienced in life is. As such, this philosophy contains concepts which can lead to answers to some of the difficult questions that modern researchers come across in their attempts to explain consciousness in scientific terms. In this article, we recognize that mind-body interactions as described in Vedanta are in some ways analogous to software-hardware interactions in today's computers. We suggest that this analogy sums up Vedanta's answer to the 'hard problem', namely, the difficult question of how subjective experience occurs in living beings but not in lifeless matter.

Do we ever have a conscious experience with no 'I' in it?

Samadhi and absence of self: In a conscious experience when we are awake, we are aware of something, which may be an emotion, a desire, a thought etc., or aware of seeing, hearing, touching, tasting, or smelling an external object accessed by one's senses. In a dream, there is ability to be aware of some imaginations but not of the sensory contacts with the outside world. Hence any of our conscious experiences has three components to it, the subject, the object of awareness, and to be aware. When we report the experience, the subject who is aware is always 'I', whose essence is to distinguish itself from everything else in the universe. Hindu and Buddhist philosophies extensively describe a state of consciousness

called Samadhi, which lies beyond waking, dreaming, or deep sleep and in which, the mental activity, the unceasing flow of thoughts that we experience in our usual waking state, comes to a complete stop. It is said to be a state of awareness without thought-flow and the 'I'; it may be attained by single-pointed concentration that slows down mental activity to a complete stop. In this state, the subject who is aware, the object of awareness, and the act of knowing, are all said to merge into just one; hence there is no subject-object division in this state [Swami Prabhvaananda and Isherwood, 1983; Sangharakshita, 1998]. *Ahamkara*/'I'/ self is said to be absent in Samadhi because by separating/distinguishing itself from the rest of the universe, *ahamkara* is the root of the subject-object paradigm.

However, in the lives of ordinary people who may or may not practice meditation, yoga, or other techniques of mind control, the self still may step aside momentarily now and then. As seen below, a little introspection and analysis of ordinary (not paranormal) experiences can show that there do exist some rare moments in our normal lives when we avoid the presence of self and act without being dictated by it.

Expansion of self and circle of identification versus separation: We all heard of the fairly common expression "to put oneself in somebody else's shoes". For example, sometimes, when a friend is in financial troubles, we may sympathize and try to help. Other times, we do not feel the same sympathy and may just pass a judgment like "he should not have spent beyond his means" or some other such remark. Compassion and sympathy indicate that we have identified with the other person and felt his/her anguish and wish that the problem would go away just like he/she does; we have put our feet in the other person's shoes. When we are not compassionate or sympathetic, we have separated ourselves from the other person; their problem is not ours. Usually we identify ourselves with our immediate families; we are happy when they are all happy, we are sad when any of them is not doing well. We say that a mother's love for her children is selfless because she does things for them not minding her own comfort. When we love another person or a pet animal, we identify ourselves with that person or animal.

The well-known Indian sage Vivekanada [Swami Vivekananda, 2018] explains that according to Vedanta, what we call love, sympathy, ethics and morality, and doing good to others, are all manifestation of oneness with others, and that oneness and unity are the opposite of separation and exclusion which are the attributes of the self. For example, risking one's own life out of compassion for others starts with forgetting one's self. Here is a story: In Louisiana a woman was driving on the very long and rather high Causeway bridge across the large Lake Pontchartrain. She bent down to open her glove compartment. Her car went through some cement railings and then into the lake. A motorist who was about to get on the bridge noticed a piece missing from its railings. He got out and saw the woman drowning in the water. He dived into the lake and saved her life. In this story, the motorist had no job duties requiring him to risk his own life to save a stranger; he could have just passed by. Even if he was taught at home or in a place of worship, to have compassion for others, no religion says one should help others at the expense of one's own life; our own survival has the first priority in our minds usually. Hence the motorist's decision to jump into the lake did not depend upon any content of his memory, to which the self usually attaches itself and makes use of to act. On the contrary, his usual 'I' identified itself with the drowning person at that moment. It was as if both the motorist's body and the drowning woman's body were his but the former was in a position to save the latter and so he initiated the former accordingly. On the other hand, when suicide bombers kill themselves out of revenge towards a community or for a political purpose, they have self-interest. The bombers do not identify themselves with their victims; they want their victims dead, which is not what the victims want.

Infinite oneness, the Universal Self: It is as though our self is an expandable balloon filled with what we may call the air of identification. For everyone, the I-thought identifies itself with one's body and its associated experiences; everyone loves oneself, loves one's own body, strives for its well-being by all possible means. Usually, a mother's balloon has her child inside it. For most people, the balloon expands to include their family. For some, the balloon may enclose the community they were born into, or the country they were born in or living in, and so on. In a moment of love without expecting anything in return, we are one with whom we love; feelings of distinction, duality, separation, and all that the self stands for disappear. Hence it is a self-transcending experience but it can be self-transcending in a limited way if the love is only for some but not for others, for example, if a mother loves her own children but is jealous of other children. On the contrary, people like Jesus Christ, Buddha, Sai Baba, and many other spiritual masters are said not to have had self-interest ever in their whole lives; whatever they did was for the well-being of others and without discrimination of any kind. This means that their balloon of identification covers everybody and everything and all the time.

The reality of infinite oneness is affirmed in *Isavasyopanishad* [Sharvananda, 1951]. Verse 6 of this Upanishad says that the wise one beholds all beings in oneself, and oneself in all beings; for that reason, he/she has only love for anyone and anything but no hatred. Hatred is born of self-interest, which in turn has its basis in the sense of separateness. When the unity of the Self in all is realized, there is no room for hatred. Vivekanada explains infinite oneness as follows: Vedanta claims that all that we call ethics and morality and doing good to others is also the manifestation of this oneness. There are moments when every man feels that he is one with the universe, and rushes forth to express it, whether he knows it or not. This expression of oneness is what we call love and sympathy. This is summed up in Vedanta by the celebrated aphorism "Thou art That". Vedanta teaches: "You are one with this Universal Being and as such every soul that exists is your soul; every body that exists is your body and in hurting anyone you hurt yourself; in loving anyone you love yourself. As soon as a current of hatred is thrown outside, whomever it hurts, it also hurts yourself. If love comes out of you, it is bound to come back to you." For I am the universe, this is my body. I am the Infinite; only I am not conscious of it now but I am struggling to get conscious of the Infinite and perfection will be reached when full consciousness of this Infinite comes.

The concept of an ever-widening circle of identification is emphasized in Buddhism as well. Hayward [Hayward, 1990: 64-65] expressed it fluently: "Rarely is one able to identify with other more distant members of the human species, and even more rarely with members of other species. Yet all spiritual growth is based in the experience that such broader identification is possible. The growing into maturity of a human is experienced as an ever-widening sense of self, from identification with the individual body-mind, to self as family, self as circle of friends, as nation, as human race, as all living beings, and perhaps to self as all there is. Buddhists emphasize the obstacle that arises at each step on the way of this gradually widening circle of identification, namely the belief that there is a separate self at all." Not having one's own self is also explained by Sangharakshita [Sangharakshita, 1998: 52-53], "one who breaks down the notion of a self that is separate from the world, and completely identifies with others has a will which no longer comes into conflict with the will of any other. He/she wants what others want; others want what he/she wants". While both Hindu and Buddhist philosophies talk about losing individual self to infinite oneness, Vedanta emphasizes the existence of the Self and its manifestation

as all the different forms in the universe whereas Buddhism discusses selflessness but does not propose the existence of an omnipresent and omniscient Self.

Figure 1. Awareness without 'I' and "I am the universe" experience

Chidabhasa — The Appearance of consciousness in living beings

If the mind is not conscious, how come we have so much conscious experiences in our lives? Before looking into how Hindu philosophy answers this question, let us briefly summarize Vedanta's account of body-mind interactions and relations of consciousness, to mind, body, and matter in general.

To explain proximity in space, succession of time, and cause-effect relations observed in nature, Vedanta postulates that an all-pervading, ever-existing, blissful, merciful, free willed consciousness exists as the unchanging ground of all creation and that it is the source, sustainer, absorber, and ruler of all bodies, minds, and beings in the universe. This Universal Consciousness (hereafter Consciousness for brevity) which is the same as Self is said to manifest Itself by Its own will, as all the various beings in the universe. Moreover, in *Kenopanishad* [Swami Sharvananda, 1932], Consciousness/Self is said to be beyond space, time, senses, logic, and mind and therefore Its existence cannot be predicted by any scientific theory, nor can Consciousness be detected by scientific experiments.

Bhagavadgita [Mookherjee, 2002], which is based on Upanishads and which is one of the primary sources of Vedanta describes *jiva* (translated as soul), the embodied individual being, as an infinitesimal spark from Consciousness and therefore eternal as well. *Jiva* draws to itself the body, the senses, and the mind that are constituents of *prakriti*, the Nature that is

not conscious. Vedanta considers mind as a memory, i.e., an accumulation of the individual's experiences, desires, emotions, etc., and endowed with the perceptual faculty, ability to think, argue logically, intellectual abilities, and ability to make decisions based on past experiences and future goals. The sense of 'I'/ego/self that claims a personal identity and ownership of actions is also part of mind. As said before, a major difference of Vedanta from Western philosophies is that Vedanta emphasizes that mind, although subtle is also a sense implying that mind is only instrumental in creating our conscious experiences but it is not conscious by itself. It is often emphasized that mind is restless and faster than senses and matter perceptible to senses explaining why mind is not accessible to physical senses, and why it is subjective [Swami Sharvananda, 1951].

In the chapter *Shetra Shetrajna Vibhaga Yoga*, Bhagavadgita describes the distinctions between the body mind complex and the one who is aware of them (*shetrajna*). The Field of activity (*shetra*) consists of the five elements (the earth, water, fire, air and space), the ten organs, sense objects, the ego/self (*ahankara*), desires, aversion, emotions, experiences (*manas* and *chitta*), and intellect (*buddhi*). In *Karma Yoga* chapter, Gita says that the senses influence the body, *manas* and *chitta* influence the senses, *buddhi* influences the *manas* and *chitta,* and *jiva* influences buddhi. All contents of the Field, namely, the body, its environment, and the mind are not conscious. Vedanta recognizes both mind's action upon the body and the body's role in creating experience but considers mind neither as a state of the biological matter in the body nor as an emergent property of it. In fact, Vedanta proposes that the subtlest aspects of the mind, the accumulated latent impressions of all past experiences, and desires called *vasanas* or *samskaras* survive the death of the physical body and are carried by the immortal *jiva* who enters them into another body for fulfilment of desires. This is the principle of reincarnation believed in all major Eastern philosophies and religions and not found in Western philosophies and religions.

***Pratibimba* Analogy[1]:** The question, "if the mind is not conscious, how come we have so much conscious experiences in our lives?" is answered by Vedanta using the following analogy: When sunlight falls in a pot containing water, it is reflected by the water and an image of the sun is created in the water. The image has some brightness but its origin is in the sunlight and not in the pot nor in the water. Vedanta says that a living being's body is similar to a pot and its mind is like the water in the pot. Consciousness/Self is like the sunlight. The living being's consciousness is like the image of the sun in the water. There are as many reflections as there are pots with water. It is said that the intellect component of the mind reflects Consciousness resulting in the formation of the image (*pratibimba* in Sanskrit). The quality of the reflection depends upon that of the reflecting medium; for example, the image is not clear if the water is not pure and the image moves if the water has waves but any changes in the reflection do not affect the sun. Similarly, different people seem to have different personalities because their mental contents differ but the underlying Consciousness in all of them is the same and unaffected by the personalities and any changes in them. Jiva Goswami [Satyanarayana Dasa, 2015] explains that being an atom of Consciousness/Self, *jiva* is also conscious and that in the analogy, the rays that fall into a single pot are like *jiva*. However, unlike Self, *jiva* may be influenced by lusty intelligence and identify itself with its own reflection in the circumstantial material body and mind giving rise to *ahamkara*, the individual self.

[1] The *Pratibimba* analogy is first given in Brahma Sutras 3.2.18, 19, 20 [Swami Vireswarananda, 1936]. Goswami explains that similar to a ray of the sun, *jiva* is neither different from the sun nor is the same as the sun; *jiva* is simultaneously one with and different from Consciousness [Satyanarayana Dasa, 2015].

Formation of *ahamkara* (individual self): Once the image is formed, if *jiva* identifies itself with the image (which happens more often than not), *jiva* begins to think 'I am this', 'this body is mine', and 'this mind is mine' etc. This thought of identification is *ahamkara*, i.e., ego/self. Then *jiva* begins to own the attributes of the body and mind and think that 'I am tall' if the body is tall, 'I am angry' if there is anger in the mind, etc. and begins to experience the temporary misery and happiness of material life and becomes addicted to enjoying material senses (Bhagavadgita). On the other hand, Consciousness/Self is independent of the pains and pleasures of the *jiva* in as much as changes in the reflection do not affect the sun.

Another implication of this example is that just as there is no reflection in an empty pot, there is no appearance of consciousness in lifeless matter but only in living beings because the latter have minds. Again, just as the reflection is gone if the pot is broken but the sun and its rays still remain, the mind cannot exhibit its apparently conscious behavior after the death of the physical body but Consciousness and *jiva* are there forever. The above example also indicates that both the mind and the body are required for consciousness to appear in an individual living being. In fact, Sankhyakarika [Swami Virupakshananda, 1995] states that the world can only be experienced when both *sthula sarira* (the gross body) and *sukshma sarira* (the subtle body same as the mind) are present together (interacting). Thus, Vedanta recognizes that both the mind and the body participate in creating conscious experience in a living being.

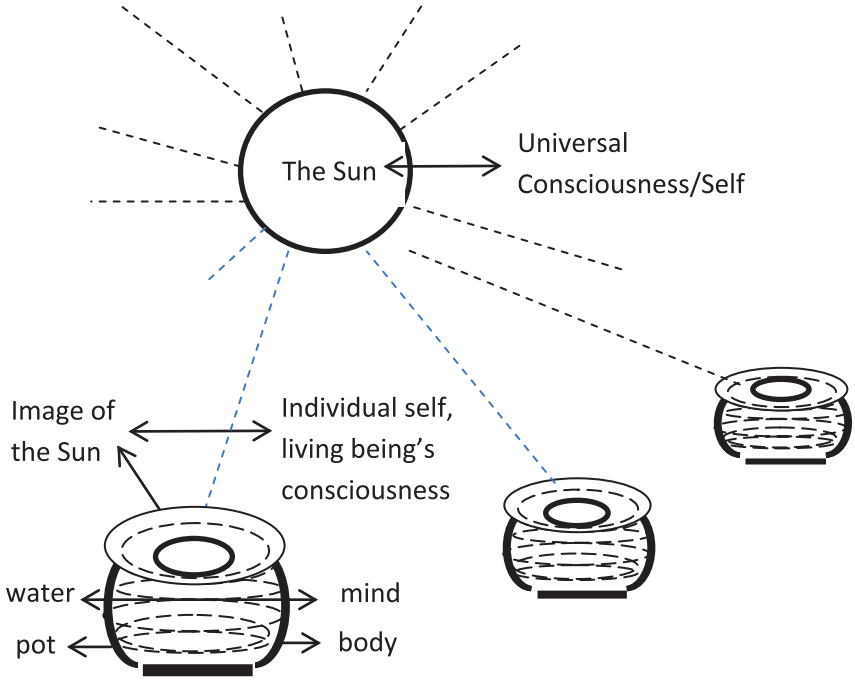

Figure 2. Chidabhasa - Appearance of consciousness in living beings

Compatibility with Neuroscience

The brain plays a role in creating conscious experience. Zoologist J.Z. Young [Young, 1981] thought that all conscious activities in life such as breathing, eating, sleeping, speaking

and all mental events, loving, hating, thinking, imagining, dreaming, believing, worshipping, etc., have correlated neural activities taking place in the brain. Regarding sensory experiences, he stated that the arrangement of the cells in the brain provides a detailed model of the world so that what goes on in the brain provides a faithful representation of events outside. Although for many experiences, the specific of correlated neural activities are not yet known, it is well established in cognitive neuroscience that a "conscious" sensory experience occurs in one's mind if and only if it is accompanied by a corresponding neural activity in the brain. The same is true in the case of awareness of one's own goals and intentions, which is apparently independent of immediate sensory stimulation [Baars and Gage, 2010]. There is extensive literature as well, which deals with neural correlates (NCs) of mental activities such as involuntary or spontaneous thoughts, and mind wandering. The point is that one may safely assume that all conscious activities in life have correlated neural activities taking place in the brain. The neural activity creates a neural pattern called a neural correlate of consciousness (NCC), which represents the information that one is aware of in the experience. In the case of a sensory experience, the NC is a faithful representation of the external object from which the brain receives sensory inputs. For example, Mormann and Koch [Mormann & Koch, 2007] say that "every phenomenal, subjective state will have associated NCC: one for seeing a red patch, another one for seeing grandmother, yet a third one for hearing a siren, etc. Perturbing or inactivating the NCC for any one specific conscious experience will affect the percept or cause it to disappear. If the NCC could be induced artificially, for instance by cortical micro-stimulation in a prosthetic device or during neurosurgery, the subject would experience the associated percept." Thus, a complete and healthy neural correlate is necessary and sufficient for the corresponding conscious experience to occur. A typical sensory experience is shown in Figure 3.

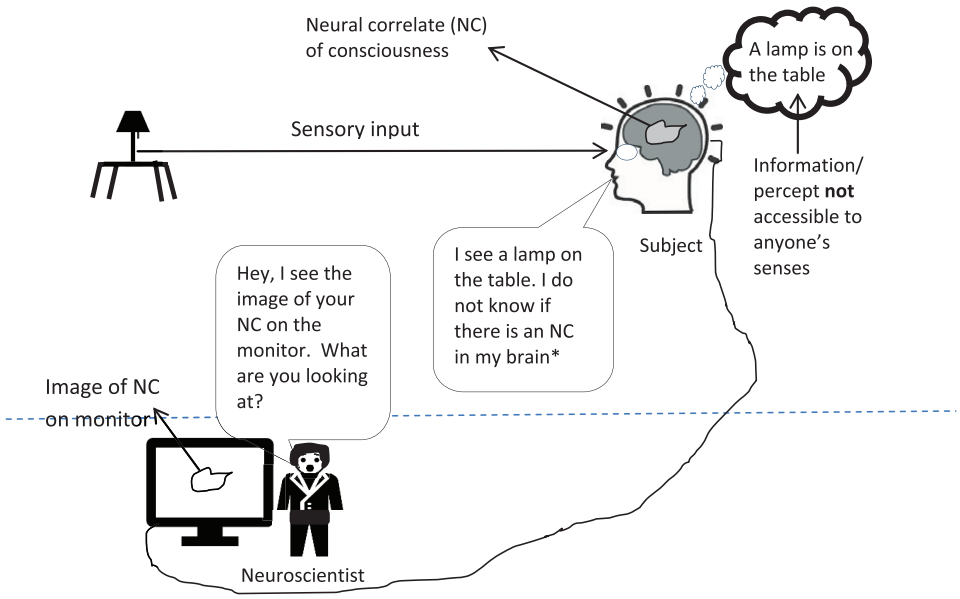

Figure 3. Sensory experience and its neural correlate in the brain

In the above example,

1. The first person is aware of the information that a lamp is on the table but he/she is not aware of the NC. On the other hand, any third person such as a neuroscientist monitoring the brain can see only the NC's picture but does not know its 'meaning'. Hence the NC is **not** identical with its 'meaning'.
2. The NC is physical whereas the 'meaning' is nonmaterial/unphysical. A third person cannot access or detect the 'meaning' either directly by senses or by material instruments unlike for example, physicists can measure electromagnetic energy in their experiments. A third person has no way of knowing what the first person is aware of unless the latter reports it to the former using some material means of communication. Briefly put, the first person's experience is subjective.

Physical sciences such as physics, chemistry, and neuroscience have been so far concerned with and successful in explaining the 'third person' rather than the 'first person' view of the world because all their methods essentially consist in proposing theories which can be verified in experiments using material instruments.

Consistency of the *Chidabhasa* (meaning appearance of consciousness) phenomenon with neuroscience is seen for example in Figure 3, by comparing NC to a pot, and the percept to the water inside. According to this analogy, both the mind and the body are required for consciousness to appear in a living being; clearly this position is consistent with the neuroscience finding that the existence of a neural correlate is necessary and sufficient for the corresponding conscious experience to occur; in other words, every experience-causing biological trace (a pot) in the brain's memory has an associated 'meaning' (water in the pot). However, there is a difference between the ancient and modern theories, which is the following: in general, neuroscientists consider the neural and mental records as identical and do not have an answer to why a neural record leads to conscious experience (the 'hard problem'). Vedanta's answer is that a neural record and its associated mental record are both not conscious but together they lead to conscious experience due to the underlying all-pervading and omnipresent Consciousness. If so, the following question arises: why do biological traces in brains and other living bodies have associated mental contents whereas lifeless matter does not seem to have any mental aspects whatsoever? Vedanta's answer to this question is the remaining part of its solution to the 'hard problem' and given below.

Body-mind interactions according to Vedanta — Living-being-computer analogy:

The *pratibimba* analogy shown in Figure 2 does not say anything about the interaction between the mind and the body because the pot and water do not interact. Instead, Vedanta's theory of body-mind interactions summarized in the previous section cam be illustrated by the following analogy which includes all the main ideas of the *pratibimba* analogy: Replace the pot in Figure 2 with a computer's hardware and water with the computer's stored information; replace the sun whose light originates the reflection, with the computer operator. Information/software cannot exist outside the hardware like water cannot stay in one place outside a pot. Similar to an empty pot that cannot show reflection, the hardware of the computer cannot display any intelligent interactive behavior unless it is loaded with some software. The computer operator who activates the software is like the sunlight that originates the image. We now have the living-being-computer analogy which models body-mind interaction.

The body and the mind are not conscious; they are respectively analogous to the hardware and software (information stored in a computer). Self/Consciousness and *jiva* are analogous

to the computer operator and really know and have control over all that happens in an individual's life. Mind is subtle and its magic is visible only when it is working within the body similarly to the way the capabilities of software (also subtle) are visible only when it is loaded into the computer and activated. When a program runs in a computer, it produces some results which are stored new information in the computer memory. Hardware without software cannot produce any new records of information. Similarly, the physical brain's interaction with already existing contents of the mind produces new mental contents.

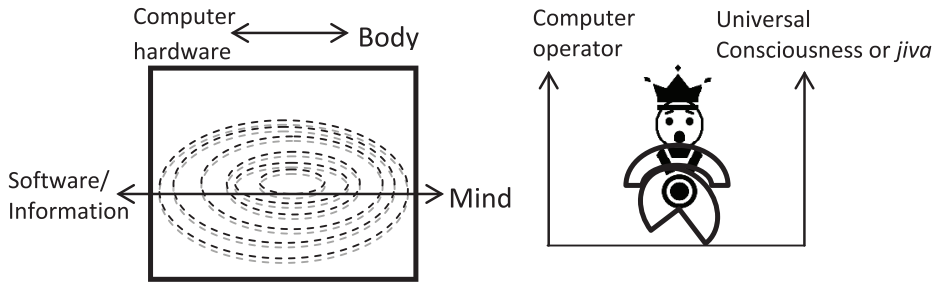

Figure 4. Computer analogy of Consciousness, Mind, and Body Relations in Vedanta

Information stored in a computer is of two kinds: data and programs. Data are passive; any program is passive until it is activated. A stored program has to be initiated into execution either by an external input or an already running program. Once activated, the program runs and creates outputs which are new records in the memory. To do even the simple task of creating a record of any input, the computer needs to have a "WRITE" instruction, a program, already in its memory. The input entered by the operator activates the stored program, which then runs in the hardware (i.e., the hardware goes through a dynamic process) and creates the record, which is a passive data item. After the activity is over, the program goes back to its passive state. Artificial Intelligence programs produce both new data and new programs. Therefore, activity of the software, that is, running programs in the hardware creates more records/information in the computer's memory.

One fundamental difference between information processing in a computer and in a living brain: Using the well-known Chinese room analogy for illustration, Searle (1980) pointed out that cognition is not solely a matter of formal symbol manipulation. This fact can also be seen from the following observations of our daily life: A word in any language is not identical with its meaning because the same meaning may be conveyed by different words in different languages. Sometimes language is not even used to communicate information. For example, a right signal flashing from a car is an indication to others that it is about to make a right turn. While information can be conveyed in many ways such as by words, sounds, and electrical signals, in any means of communication, human (and living) beings assign meaning or information to structures of matter or material energy but the material/energy structures themselves are not identical with the information they convey. The 'real information' which is in our brains is different from the language or energy signals that are used for its storage and communication just like water is different from its container without which it cannot be taken from place to place.

In the case of a digital computer, a mapping of some information that exists in the programmer's head is stored as a sequence of states of its hardware elements denoted by '0' and '1'. In a quantum computer, the representation is in terms of states of qubits which are quantum objects; still, meaning is assigned to the qubit states '0' and '1' by the computer programmer. Hence, when we casually say that information is stored in a computer, it really means that the computer contains physical records representing/mapping some 'real information' that exists in the programmer's head; often, we overlook the distinction between the meaning and its vehicle of delivery because their inseparability overshadows their distinction. On the other hand, the information content of a conscious experience and its NC are created together and linked together in a living brain; no one outside the brain assigns 'meaning' to newly created neural records.

A thinking process is an interaction of the mind with the body and is like running a program in a computer: Creation of a new conscious experience involves paying attention to the incoming sensory or endogenous stimuli such as volition, possible activity of some thoughts already stored in memory for example, opinions and prejudices, and activity of appropriate neural systems to either create a new neural trace or activate an existing trace to remember a past experien. Paying attention is like the READ instruction in a computer. Since awareness of the stimuli occurs if and only if there is a neural record representing the stimuli, the neural activity includes a WRITE instruction like that of the computer. Analogous to a computer program's run, this combined activity of the mind and brain produces a linked pair of records, one biological and one mental, together causing the new experience. At the end of a thinking activity which involves both body and mind, those mental contents which participated in the activity continue to remain passively in the memory[2]. For example, in Figure 3, while the brain creates the neural representation of the lamp-on-the-table, the percept is also created because the mind is already paying attention to the senses. Paying attention involves what Vedanta describes as mind's influence on the body and the senses; the experience is a conscious one because of the underlying consciousness of *jiva* as explained in the *pratibimba analogy*. Again, like a computer, a thinking activity in a living being may be initiated by an internal desire/purpose, or by external sensory stimuli, or by *jiva* or Consciousness/Self. Just as a computer's hardware cannot by itself produce a new program unless appropriate software is loaded into it, so also, lifeless matter which has no mind to begin with (analogous to hardware with no software), cannot produce conscious experiences which necessarily requires both body and mind (both hardware and software). Thus, the living-being-computer analogy implies that life begins with mind-matter interaction and ends (the living being dies) when the participating matter cannot support the interaction. Matter in all forms and states cannot support interaction with mind just as software cannot be loaded into any material system but only into suitably built computers.

The theory of mind-brain interactions in Vedanta may be called interactive dualism but it is NOT Cartesian Dualism. As said above, Vedanta affirms the existence of a supreme Consciousness and an individual *jiva* who are immaterial; they are beyond the mind. The self/*ahamkara* which is said to be part of the mind is not conscious. Hence neither *j*iva nor

[2] For example, a violinist has the ability to play violin but he/she does not play violin all the time. The ability to play violin is stored in the musician's memory in a passive state and he/she activates it to perform. He/she enjoys the music while playing violin and remembers the experience even afterwards. After the performance is done, the ability to play violin is still there and no one else knows about the musician's talent unless he/she performs.

the ego is the 'I' of Descartes who presumes that the mind, the 'I', and soul are essentially the same thing and that it is conscious. While recognizing both mind's action upon the body and the body/brain's role in creating experience, Vedanta considers mind neither as a state of the biological matter in the body nor as an emergent property of it; it asserts that the contents of mind are faster than matter which is perceptible directly by senses or indirectly via material instruments, implies that they are different from organic or inorganic matter. Moreover, Vedanta explicitly states that the subtlest aspects of the mind, the accumulated latent impressions of all past experiences, and desires called *vasanas* or *samskaras* survive the death of the physical body.

Interestingly, mind brain interactions can indeed be modeled as tachyon interaction with ordinary non-relativistic matter. This mathematical model shows how the brain creates new contents of the mind if the mind pays attention to the brain (Hari, 2011). This model also explains why every subjective experience (including remembering a previous experience or imagining a future event) happens 'now' in one's mind (Hari, 2016). This model was successful in explaining and justifying Eccles's hypothesis about the role of volition in exocytosis, the basic process of inter-neuronal communication (Hari, 2008), and Libet's causal anomalies (Hari, 2014).

One school of Vedanta called Advaita known as non-dualism or monism explains elaborately that Consciousness alone appears as the various forms in the universe, mind, matter, and all, like for example, jewels are made of one and the same gold. Since Advaita also claims that this fact can be realized only by spiritual means but not by any external material means, the monistic part does not contradict the dualistic part described above. Other schools of Vedanta differ from Advaita in their descriptions of *jiva's* relation with Consciousness in the state of ultimate enlightenment, for example, whether *jiva* retains its identity or gets absorbed into Consciousness but all schools agree that *jiva* is not mind, that mind is part of Nature, which is not conscious, and that mind is faster than senses.

Conclusion

Vedanta emphasizes the existence of an all pervading, ever-existing, omniscient, and blissful Universal Self which manifests itself as all the different forms in the universe and that love and compassion for others is its manifestation in human nature. Vedanta explains how individual self and consciousness arise from Universal Self and its analysis may provide solution to the 'hard problem' in a way consistent with the finding of modern neuroscience that conscious experiences of living beings are accompanied by correlated biological activities. According to Vedanta, both the body and the mind are not conscious but conscious experience occurs in a living being because the mind supported by the body reflects Consciousness/Self like water contained in a pot reflects sunlight; lifeless matter has no mind and therefore no conscious experience. Life starts with interaction of mind with matter creating more and more experiences i.e., more mind contents while it lasts, and ends when the interaction ends. Lifeless matter cannot create mind all by itself like hardware in a computer cannot create records of information unless the required software is already loaded into it.

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Peace Education as Arts Education: In Search of New Strategies

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The problem of peace education is in the sharp demand in the modern world. The art in general, and music in particular, have significant impact on a person and the content of his usual activities. Music, as a logical and expressive construction and a psychological phenomenon, contains possibilities for harmonization of personal, social and planetary life. Temporality of music, its actualization of the present, orientation to the eternal meanings and values, archetypeness and plasticity of the content and the ways of its perception, form the basis for understanding music as a universal communication mediator and an important factor in stabilization of contradictions and conflicts. The study demonstrates the potential of arts education to act as one of the instruments of peacebuilding at the present stage of human development.

Keywords: peace education, peacebuilding, arts education, music, temporality, duration, harmony

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Introduction

Analytical discourse of the present, as a rule, is presented in negative and depressed tones. In the history of the Western culture, the disadvantages of socio-cultural and political life were explained by the lack of education and upbringing. Modernity produces such challenges to humanity, which in a new way actualize the problem of peaceful coexistence on the planet. Hot military confrontation, clashes in the information and virtual space, post-colonialism and

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decolonization practices, alienation of personality and globalization tendencies — all these pressing issues require the development of new effective education strategies that focus on peace, sustainable development and the harmony of opposing trends and directions.

In personal terms the issue of peace and education, as a way of its obtaining, is no less urgent and in demand. The consciousness of a modern man is fragmented and chaotic, which is the result of a massive informational attack on the part of the social culture. Therefore, the question of harmonization of the contradictory tendencies in a single concept of peace is an urgent issue of modern education in the world as a whole, and in Ukraine in particular. The practices of decolonization and the principles of post-colonialism require well-balanced implementation, especially in the higher education system as a leading element of intellectual and spiritual activity. Accordingly, the general concept of a security strategy and its realization in a certain context also appears as an important problem of the educational work, "The theory of war and peace reveals the ways of the means by which it is possible to maintain a regulatory compromise in a mental space. Mainly, the ways and means are concentrated in educational technologies, the impact of which is precisely directed to the formation and maintenance of certain stereotypes and sets in a rhizome of mental space" [Bazaluk & Svyrydenko, 2017: 95]. Therefore, the education of peace should be a leading area of the educational management and educational diplomacy, which is convincingly grounded by a number of Ukrainian researchers: "Educational diplomacy uses diplomatic tools productively to mitigate the contradictions that exist in different sectors of education, between different stakeholders in order to overcome challenges and implement transformational education strategies with success" [Kyvliuk et al., 2018: 133].

Taking into account such an important issue of research, that is actualized by the geopolitical confrontation in the territory of modern Ukraine, and also on the basis of the generally recognized need to promote peace building through education, the involvement of all effective transformation tools is appropriate and justified. One of the most effective in the field of practical training of peace is the phenomenon of music. The justification of the relevant strategy and its implementation by means of musical creativity is the main content and purpose of the article.

Consequently, in the philosophical studies of the phenomenon of music two main lines are distinguished: ontological (Pythagorean-Platonic) and psychological (Aristotelian). Let us consider the content of each of them considering a paradigm of arts education as an instrument of peacebuilding more substantially.

Music as the construction of the universe: an ontological dimension

The Pythagorean-Platonic concept of the phenomenon of music produces an idea of the coherence and interrelation of all things of the world, the Universe and Man through music as a theoretical and cognitive structure. The rhythm of music is, in its essence, the dynamics of the Universe itself, and its duration and content are the logic of life itself. Note that modernity reduces and refutes largely the archaic myths. Therefore, antique enlightenment, profound on content and accuracy, acquires new modifications in the process of formation of science as a way of cognition and social institute. The problem of personality and the inner spiritual world of man, as a result of spread of the Christian ideological paradigm, the problem of objectification and social and political assimilation in the speculative systems of the German classics, the role of genius and freedom in romanticism make their own adjustments to the methodology of interpreting music as a reflection of the Universe.

The non-classical paradigm of thinking, philosophy and science deviates from the category of substantiality and focuses on the procedurality and regularity of the formation of the world phenomena. Therefore, the understanding of the world, being and essence of man, his life strategies form a different methodology of explication of content and become "compatible with music as a phenomenon and heuristic model. The categorical discourse of being as procedurality, duration and fluidity in a personal and universal dimension is worked out by the author of the fundamental ontology Martin Heidegger. The metaphysical problems of the whole and part, actual and potential, essence and representation find the adequate embodiment and illustrations in the philosophical analytics of a phenomenon of music. So, Oleg Bazaluk, examining the thesaurus of Heidegger's analysis, observes, "True Heideggerian enlightenment 'Dasein' cannot be shown clearly in the available forms, as any transformation of the process into existing forms leads to its fragmentation, and fragmentation is no longer a process. It is a set of separate fragments, the importance of which depreciates rapidly in time, because pulled out from the process, they do not come down to the process any more" [Bazaluk, 2016: 32]. That is, the semantic units recorded in concepts, schemes, and typologies represent the meaning of a phenomenon that has an ontological-temporal dimension. Rational knowledge is carried out as a post factum concerning the rapid development of the existence of the world. Music, by contrast, is relevant in its procedurality, the dialectics of the whole and part is organic for the nature of musical phenomena. Therefore, in the ontological aspect, music is an illustration of Haydegger's analytics of 'Dasein'. Indeed, Genesis (being), if one refuses to understand it as a universal predicate, manifests itself in the horizon of Time, or temporality of content-determined existence.

So, music, as a phenomenon, is accumulated in the duration of substantial sounding. If rational constructions describe the events that have already taken place, then music is modern in the relevance of its existence. In addition, there are no sense and value of music in the fixed form of music paper, but in the temporality of actual implementation. And if the rational and logical concepts are doomed to substantiate their own authenticity in the adequacy of reality, then music is the method of 'gathering', experience and comprehension of the world, and, therefore, it is self-valuable in the epistemological terms. In view of the implementation of predictive strategies, music is also a productive phenomenon. The logic of the composition is not accidental, but natural and determined (both by the author and the essence of Life/being), "The philosophy of cosmos exerts itself the existential essence not only in here-and-now-being-in-complication, but also implies (asks) in the future − here-and-there-being-in-complication" [Bazaluk, 2016: 38]. Consequently, music is temporality that actualizes memory in the present as in the past and the future as a project, anticipation. That is, it implements different timing modalities, different configurations of content and presentations in actuality.

It should be noted that in the analytics of 'Dasein' Heidegger appeals to the literature, namely to the artistic poetic word as a metaphorical expression of the complexity of Genesis/being/life. Language, as a semiotic system, is plastic in its form and large-scale according to contents tools for implementation of reflexive practices. But at the same time, it is peculiar to language, as a universal semiotic mediator, on the one hand, formalization as a technology of objectification, and on the other hand, polysemanticism of speech means. In principle, music does not require such verification, the effectiveness of its influence is indisputable at the pre-linguistic, archetypal level of the human psyche/ mentality. Music activates the empathic mechanisms of attraction and communication just because of psycho-emotional factors of influence.

Music as Emotion: Psychological Dimension

The Aristotelian tradition of interpreting music through attribution to the psyche and soul of a person, as well as its cathartic potential, draws the attention of researchers and educators well grounded. The reasonable question arises: why does the influence of music change the worldview, feelings and aspirations in humans? What intentions of a musical organization motivate a person to a certain emotional order and determine the content of daily practices and the model of self-identification: from the ethnic and political to the personal sphere. Art in general and music in particular, have the ability to transform the power of emotions, affective energy into the relevant activity. In addition, the task of upbringing is precisely in achieving a positive effect in productive activity, in reconciling man with himself, society and the whole Universe. Music does not 'tame' the affects by the force of political coercion, or the morality of public opinion, but by means of an example of expediency and integrity of harmony.

Indeed, the prerequisites for the transformation of individual ordinary experience into a universal mechanism of attitude and world outlook undoubtedly include an aesthetic factor. The combination of contradictions of reality into a single motivational and activity strategy of the individual cannot be realized only on the basis of rational thinking. Emotions, aspirations and preferences of a person determine one or another choice, the course of any activity. In addition, music, as an important factor in influencing on the emotional sphere, is an important tool of the educational work. This is due to the special plasticity of perception of the musical form, which is isomorphic in relation to human feelings. Indeed, music does not require translation or ethno-cultural adaptation. The logic of the musical form is acceptable and understandable for different countries, age groups and socio-professional belongings. In addition, the universality and openness of the musical form is an effective source of communication and adaptation, it demonstrates perfectly a wide range of emotional experiences, which affects positively the development of emotional intelligence. Moreover, as it is known, emotional intelligence is not just a necessary condition for successful communication, but it is also defined as one of the basic principles of the world and Ukrainian education. Therefore, music as an element of educational work, and the peace education in particular, is not only a communicative and heuristic element, but it is also a method of harmonizing the psycho-emotional component of a person.

Let us note that the problem of the relationship between the utilitarian pleasure and rational-logical understanding of the aesthetic phenomena in general, and the musical form in particular, has a long history of research and analysis. At the same time, we should note that aesthetic pleasure is an incentive and motivator for finding an appropriate interpretative practice. Therefore, music determines the relevant intellectual work, without which reflection is impossible, and, accordingly, the implementation of the strategy of peace and stability. Desire for peace and stability, expediency and balance, all this is the attributive essence of man. Only a crazy being does evil for the sake of evil. Any aggressive or deviant behavior is caused by a sense of injustice and inconsistency with the ideal of stability, peace and harmony. Realization of human life is motivated by considerations of expediency and integrity, harmonization of the personal being with universal one. Therefore, the aesthetic with its non-utilitarian pleasure of perception and attitude plays a significant role in reconciling the conflict of interests, harmonization of contradictory strategies of an individual and society. And there is the most important thing: it reveals a wider range of opportunities for self-identification and self-realization, which are able to level potential conflict situations.

Why does that happen? What in the nature of music harmonizes the human essence and produces a positive potential of activity? Music is the being of the actual present that translates memory, as a historical and cultural experience into the future, as a design of the ideal, a project. The peculiar temporality inherent in music forms the existential experience of a reflexive reality. Namely, it 'collects' to the integrity the essential projections of a person, realizing at the subconscious level the adoption of vital decisions and evaluations.

The combination in music of the fluidity of the work and the constancy of spiritual content, the completeness of the composition and the multi-vector of its interpretation and explication speak about significant projective possibilities in terms of updating, forming and directing emotions in the corresponding stratagem of life and practice. The perception and experience of the musical work allows a person to stop the rapid flow of everyday life, which is difficult to be reflected. The special temporality, which creates the sound of music or the projected semantic continuum, sets qualitatively different vibrations for the human soul. A sense of the fluidity of time against the background of the constant universals of the world − all this makes man look at the ordinary things in his life in a different way. The trajectory of self-identification extends from the immediate range of daily practices to the general context of the universe's eternity. From this perspective, perceptions of causes for everyday conflicts lose their importance and significance. Consequently, the educational potential of music, its strength "lies in the fact that there is a special simulation of emotions in it" [Bahtizina, 2012: 81].

Music has an attribution of being exclusively in time. Time is decisive in relation to the essence of human existence. The Bergson's category of 'duration' (durée) reveals a specific human way of feeling and experiencing of time. Obviousness of such extent of time coupled with the semantic content is music. It has been known for a long time, that self-identification of a person due to the prevalence of a separate time mode is disastrous. Thus, concentration on the past threatens with manifestations of the ressentiment and revanchism that finally bring to menacing of ideological beliefs. Focusing on the future, as the most valuable and significant field of investment in the subject's activity, causes increased anxiety and related neurotic disorders. Music, through aesthetic pleasure and intellectual suggestion, harmonizes the horizon of human being in the time dimension. The dynamics and dialectics of the mutual transition of the discontinuity and chaos of human existence to a conscious order and organization are reflected just in the construction of a musical work. Therefore, the perception of musical works helps a person find balance in his life and his own aspirations and beliefs.

The emotional state created as a result of listening to musical works integrates the fragmented human psyche into the assembled integrity necessary for a full-fledged life and peaceful coexistence. Such effect is based on the organic unity of the information component of the musical composition with its value verification and emotional tension. There are all bases to consider this influence as spirituality of personal formation and development. Based on the anthropomorphic nature of music, we should note that musical influence is carried out on spirituality of the personality integrating the chaos of objectification and alienation. Among others, it is just the intonation inherent in the melody that implements such effect of influence. Educational potential of music is articulated in transferring a rich palette of human emotions, expanding borders of perception and understanding of emotional intelligence, revealing variations of life experience on a pre-linguistic, but reflexive level: "Music can teach a person to feel and understand his own feelings. It has no equal in the art of formation of a human soul" [Bahtizina, 2012: 123]. The fact is that music is plastic in formal content and holistic in terms of spiritual meaning. Therefore, it causes systemic influence on human

consciousness and feeling, transforming both the individual and the way in which it interacts with the world.

However, understanding music as emotion does not mean its illogical character. The archetype of the mental structures laid down in music is a reflection of the nature of human thought. After all, emotions and thinking are not contradictory concepts, but mutually supplementing ones. Music should be understood as an emotionally loaded, prolonged and harmonized process of human thinking. 'Living' the aesthetic experience of a musical composition changes the focus of perception and assessment of reality. Music reduces the routine of everyday life and teaches us to think in the categories of eternity. Therefore, music performs the function of human reconciliation in all vectors of his self-realization. In addition, the most important fact, music is transcendental in its essence. Its sense and mission consists in harmonization of human life through a prism of eternity, imperishability of ideals and values. That is why music is an important tool for transforming the desired one into possibility, and possibility into reality. Transformation of the desirable in possible, and possible in valid. The whole process of education is such transformation, and only music makes this process expedient aesthetically and pleasant emotionally. The peace teaching by means of music appeals to the ancient principle of paideia as the basis of inculturation and socialization: "The general philosophical context of determination of the principle of paideia is based on understanding of it as an ontological process, the purpose of which is the total transformation of the human nature as the formation of a personality, self-consciousness and public consciousness" [Yatsenko, 2017: 82]. Based on the mentioned above, we should note that the educational possibilities of music are used very little, and the potential of musical education is underestimated.

Music as Harmony: Impact Factor in Peace Education

The statement looks logical that the peace-building potential of educational influence can be studied fruitfully using the concept 'harmony'. We consider it is expedient to dedicate a few sentences to the essence of the concept of noosphere humanism, popular in the post-Soviet area, as an educational strategy. The logic of noospheric humanism, which allows a person to find a fairly rational common language, the common sense of history, general world outlook, can serve as an important catalytic factor for the transition from the general consumer mentality to the psychology of planetary constructive creativity. This awareness includes or should include understanding of the direction of the next global development to achieve the highest viability of everyone, not just the chosen ones, and, consequently, the development of planetary projects that will contribute to such direction of development.

Man is polyfunctional by one's nature. One's internal world is full of polyphony of interconnections. And the system of artistic education, in our opinion, must comply with this important principle of organization of the human personality. Modernization of the system of higher education, integrating into the noosphere, ontological paradigm of ecological consciousness, personality-oriented and evolutionary-synergetic paradigms, reflects, accordingly, its noosphere, ecologically oriented, humanistic and physical component. At the same time, it operates with the acquired theoretical and methodological, and methodological tools.

Humanization of higher education at the present stage is understood by us as a being produced phenomenon within the framework of science and society, ethical teachings and the totality of humanistic knowledge, ideals of the future social structure based on the idea of social and natural consent. Noosphere thinking establishes and implements cognitive relationships

of logical, predictive and practical orientation. The system of moral principles, beliefs, and programs of social life is aimed at harmonizing relations in the system of 'man-society-nature'. Practical skills, abilities in the conditions of understanding and solving noosphere and humanistic problems, the 'behavioral' projection of the ideological culture, reflecting the degree of internalization of the noohumanistic knowledge, values, ideas, thinking, feelings of the individual in everyday behavioral status, manifests itself in psychological, theoretical and practical readiness to carry out transformative activity according to the laws of beauty and harmony.

These are the basic principles of cultivating peace and harmony in the traditions of post-Soviet education. Western theorists of peace education offer other initial positions in their theoretical models of education and the analysis of peace. Proceeding from the reasons that music is a fundamental step of reflexive activity, or in other words, it has archetypic structure and attribution, then its involvement in the education of good is important and necessary. However, the problem of peace is just as long as the world itself. In particular, Jeff Lewsader and Judit Myers-Walls point out: "Peace education has probably existed informally ever since humans recognized violence and its alternatives" [Lewsader & Myers-Walls, 2016: 34]. And for solving this important problem, specialists involve a variety of methods and techniques. However, not every factor of environmental impact has the ability to become a peculiar point of bifurcation, which disturbs the balance of an unstable system. But a significant amount of output data makes it impossible to validate the analytical procedure. From the chaotic flow of the phenomenal sphere, consciousness chooses selectively the most essential ones for itself. What causes this choice? Conducted empirical studies prove the following: "As we identified children's developmental levels of peace understanding, we felt it was important to consider the cultural activities and contexts — everyday occurrences in which individuals within the community participate (e.g. through daily household routines, school, and work) — in predicting and accounting for children's understanding" [Lewsader & Myers-Walls, 2016: 3]. So, to isolate, or stratify the determinants in the educational process, the task is rather illusory. However, music is not just a fragment of the context, it is able to change the context, fill it with other semantic and emotional content.

Peace as a concept and as a goal of educational work is a universal phenomenon, as well as a phenomenon of music. This characteristic proximity does not merely combine these concepts into a single field of practical implementation, but it sets a special vector of social and cultural, and political orientation. As rightly pointed out by Hella Behr and others, "We observe that there is no national or mono-cultural perspective on the content of peace education, but a curriculum for peace education is constituted by practical experiences and philosophical teachings on non-violence from a global, cosmopolitan perspective" [Behr et al., 2018: 78]. It is quite natural that the assertion of peace presupposes an appropriate level of civic self-awareness and social responsibility. Society cannot be imagined as the ideal construction of ideal individuals. All experiments on the artificial improvement of the nature of man and methods of social order, both speculative (various utopias), and real (eugenics, socialism) were not viable. Society is always a diversity of individual worlds, a complex construct of many specific communications [Bazaluk, 2015; Klepko, 2017]. As music is capable of implementing 'established harmony', and society aspires to find and maintain a balance of opposites and contradictions. The world is a harmony of a variety, and not unification and typology.

The appropriate explanation of this principle was given by Kerry Bickmore and other authors, "Peacebuilding refers to comprehensive social change, toward social-political equity

and cultural inclusion, repairing direct and indirect root causes of destructive conflict by (re)creating sustainable inclusive processes for ongoing constructive nonviolent conflict" [Bickmore et al., 2017: 283]. Or in other words, "Agency for peacebuilding citizenship includes both capacities — knowledge and competencies for transforming conflicts and altering structures to affirm justice — and motivations — hope, commitment, and moral judgment to make difficult choices. Peacebuilding education thus includes citizenship education" [Bickmore et al., 2017: 283]. Therefore, there is a certain link between music and the specifics of self-realization of a person in the social and political aspect.

Speaking about the social and political realm of human existence in the context of peace education, it is impossible to avoid the concept of tolerance as a manifestation of harmony. We believe that music is an important factor in the spread of tolerance in the perception of oneself and the Other, the frankness in recognizing emotions and events, expanding the boundaries of perception and potential experience. After all, the conflict cannot be ignored, or localized eternally/forever. As the rhythm of the melody leads logically to the culmination, in the same way the conflict that has already arisen needs to be solved as well: "Developing capacity to acknowledge and handle conflicts as conflicts — as embodying competing perspectives or needs, the need for choice rather than mere absorption of 'truth' — is perhaps the foundation of democratic peacebuilding citizenship" [Bickmore et al., 2017: 300]. Music contains intentions of reconciliation. Therefore, it is important not to avoid the conflict at any price, but stereoscopic view, or polyphony of perception and reflection of strategic choice.

Besides, music allows to carry out a discourse of such subjects and problems which are critical for the engaged perception. So, the urgent problem of post-colonialism is a subject of numerous researches and disputes. But the solution of this problem is still very far. It is also emphasized by Michalinos Zembylas:"Understanding the historical effects of coloniality could be the first step to interrupt the reproduction of postcolonial peace understandings that naively assume social imaginaries of absolute peace or a pre-colonial purity" [Zembylas, 2017: 13]. That is, the phenomenon of colonialism is thoroughly rooted in the modern civilization. But music 'conquers' without resistance, engages in a particular cultural context and adapts a person to certain living conditions. And considering the general tendency of globalization, the definition of modern civilization as a cult of consumption and material values, the peace education gains special sharpness. Resources are exhaustive, the population of the planet and its devastating impact on the environment lead to the emergence of anti-utopias in relation to the future of the mankind. Therefore, one should agree with the following thesis: "Education, then, has generally failed to bring about social justice at a local and global level. It mainly serves the needs of dominant groups in society, and it has largely failed to bring about participatory democracy and critical consciousness. Regimes of testing and accountability have resulted in an impoverished view of what it is to know and be able to do, and have foregrounded the content of the curriculum at the expense of processes of learning. Education suffers crises of legitimation and representation grounded in structural and cultural violence" [Cremin, 2016: 5]. Music, firstly, is self-sufficient, and, secondly, it is capable to reorient a person from the measurement of material values to the values of eternal and spiritual. Harmony of music correlates with harmony of the world, integrity does not mean monotony, and stability does not presuppose the static character.

These fundamental moments of understanding in the peace education should be the starting point for the organization of the educational process: "If peace education aims to

create unity, harmony and wholeness, then it undermines the legitimacy of the ground on which it stands if it compartmentalizes knowledge into fields and disciplines, and students into groupings based on age, ability, social class or religious belief (directly or indirectly)" [Cremin, 2016: 7]. As it was stated above, music is the most successful mediator for non-conflict communication and organic interactions. Thus, Elaine Sandoval pays close attention to the potential role of music in peace education, the problem of structural and indirect violence, which is quite common in the training programs in Europe as a center for education and technology, is carefully investigated in particular. [Sandoval, 2016]. Olivier Urbain, another well-known theorist of the concept of peace education, explores the synthesis of the transcendental methodology for transformation of conflicts and philosophy of peace that helps in research of the relationship between music and the teaching of peace, namely the unity of four values: the inner realization of peace, communicative creativity, planetary awareness and preventive peace building [Urbain, 2016].

Not smaller interest for justification of peacebuilding strategies through the arts education is represented by the universalist concept of Michael Golden, which justifies the idea of environmental friendliness and efficiency of human thinking as the fundamental factors of essence of human being, which is reflected in the course of social and cultural life [Golden, 2016]. However, the current challenges and goals of peace education need practical implementation in compliance with ecological and economic aspects in daily practice and in the general human contexts. That's why, the author proposes models for implementing this ambitious goal through musical exercises. Therefore, music as a tool for harmonizing individuals and societies attracts attention of researchers and practitioners of peace education quite rightly.

Conclusions

Music as the theoretical concept of ontology embodies the potentiality of harmonization in the existential experience of the main metaphysical categories of time and eternity, unique and general, form and content. Updating of long-term present, articulated in music, allows a person to find the necessary balance and focus of reflexive activity, which is necessary for the efficient organization of daily practices.

Music as an important factor in the psychological component of human nature carries out the harmonization of the emotional sensory component of the human soul through catharsis. Interaction with musical works contributes to expanding the limits of perception, tolerance and empathy as a way of understanding. These factors are important in the development of a person's emotional intelligence and stabilization of social life. In addition, music as the translator of the eternal values and ideals, produces in the human minds another system of assessments, different from the material and consumer way of life. Consequently, the attraction of the phenomenon of music to peace education is productive in the personal and social, political and global context as well.

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“Homo Economicus” Through the Lens of Metaphysics of Economics

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The problem of the expansion of the economics into other areas of public life has been the subject of intense discussion for more than a century, and modern attempts to conceptualize the complex and multicomponent field of economic relations, both in social and in personal terms, are articulated in the concept of “Homo economicus”. The concept of special productivity gains in the context of the application of the methodology of metaphysics. The metaphysics of the economics has a significant potential for the phenomenal and noumenal differentiation, which is extremely important in the era of simulation. Comparing the simulation of the present, the methodology of metaphysics articulates subjectivity in the coordinates of the economics. Such a universal approach allows us to verify the complex problem field of the study “Homo economicus”, having carried out its revision (rehabilitation).

Keywords: economics, metaphysics of economics, Homo Economicus, economic existence, methodological paradigm

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Introduction

Economics is the God of modern human and society, and the specified status is due to its inclusion in all spheres of society, domination in solving most of the issues generated by the logic of the development of modern civilization. At the same time, it creates a number of new challenges that are challenging the era. Their decision causes radical changes in the worldview, in the public consciousness and psychological motivatedness, serving as the main factor that brings about grandiose transformations in the world. This circumstance transforms the economics into a determining factor of contemporary life in all its manifestations. The main characteristic of life is “economism”, and traditional anthropological projects “Homo sapiens” and “Homo faber” give way “Homo economicus”.

An economic society, an economic person are not metaphors, but the most adequate theoretical concepts for the verification of modern forms of social relations. The cult of production and consumption, inherent in modern times, causes the expansion of economic

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factors to the whole context of social culture. However, this expansion threatens the leveling of morality, sociality and subjectivity. Therefore, there is a belief in the doom of "Homo economicus" on death and oblivion. Can metaphysics, as a methodology for analytics, prevent the falsification of this concept and stop a series of lethal precedents from the God to the Hero, the Author, and the Subjective? Thus, the approach to methodological approaches of economics metaphysics, which can offer one of the potential heuristic concepts of "Homo economicus" in the conditions of complex socio-cultural dynamics of the beginning of the third millennium, is timely.

"Homo economicus": From Origination to Contemporary Interpretations

The definition of "Homo economicus" is significant for the present. In the range of production and consumption, the whole spectrum of activity of a modern person unfolds. Moreover, the classical substantiation of the problem field of the economics in realities of modern social life acquires a fundamentally different scale and content. In the classical epistemological paradigm, the economics has been verified as a certain operation, accompanied by more significant and fundamental phenomena. Nowadays, the notion of the influence of operationalism and context is changing substantially, especially as a result of the crushing critique of the philosophical category of substantiality. It is the substantiality of rationality that served as the undisputed rationale for the expediency of production activity and economic relations. Roman Oleksenko and Lidiya Fedorova note: "In modern economic theories and game theory, Homo economicus is considered as consistently rational and narrowly self-interested agents who usually pursue their subjectively defined ends optimally. Generally, homo economicus attempts to maximize utility as a consumer and profit as a producer" [Oleksenko & Fedorova, 2017: 115]. However, the latter, revolutionary in essence, researches in the field of economics are increasingly insisting on an emotional, irrational factor in decision-making on people in general, and in the field of economic relations in particular. Paradoxical in economics, but the obvious fact in reality that a person is a person whose subjectivity does not amount to pure rationality, these authors are worded as follows: "Homo economicus "becomes human." Namely, Homo economicus as a concept begins to be used not only in statistical economic theories, but also in dynamic i.e. it gets more close to reality" [Oleksenko & Fedorova, 2017: 117]. Accordingly, such an expansion of the problematic field of the economics in modern social life predetermines the necessity of involving in the general cultural context both in the research and in the educational sphere: "Homo economicus enriched by new interpretations can be considered as a cultural ideal. Moreover, modern educational technologies must be directed to achieve this cultural ideal" [Oleksenko & Fedorova, 2017: 118]. In the context of large-scale modernization processes, the complex dialectics of economics and education was attempted to explore Denys Svyrydenko [Svyrydenko, 2016; Svyrydenko, 2017], Viktor Bazivelich [Bazivelich, 2010].

Consequently, we have reason to assert that the concept "Homo economicus" contains an informative component that can significantly influence the process of becoming a person and, accordingly, the content of social influence and the general dynamics of culture. However, even in this extremely wide context, the content of the concept is not exhausted. There are groundbreaking studies proving the implicit existence of economic relations in the animal world and in the biological nature of man: "Those who would seek to displace a mechanistic view of economic behaviour in favor of an animalistic one have been attracted by Keynes' insistence that human action is not reducible to the rational calculation of optimal outcomes,

but is equally shaped by impulsions that are instinctive, bodily, and precognitive; by his assertion that these latter elements of human nature are essential to the healthy functioning of psyche and economics alike; and by his contention that humans are skittish creatures, profoundly susceptible to influences that any strict definition of economic rationality would exclude" [Crosthwaite, 2013: 97]. The principal driving moment of such a transformation is to attract psycho-emotional and unconscious determination of the person's motivational sphere. Paul Crosthwaite is arguing with Peter Bernstein: "Viewing the current state of economics from a broad perspective, then, it is striking that a range of overlapping fields and sub-fields, encroaching on the discipline's orthodox centre from the heterodox margins, share a vision of Homo economicus not as 'an automaton capable of objective reasoning' 'under all conditions', as Peter Bernstein puts it" [Crosthwaite, 2013: 98]. The point is that rationality is universal and universal in its nature, and the individual character of subjectivity is often decisive in making economic decisions. A complex system of universal and ethnic values, personal beliefs and ambitious aspirations are not formalized in clearly articulated models of objectification.

The human person is not reduced to pure rationality, nor to the mechanistic principle of analysis and interpretation, the more complex is the problem of analytics of groups and systems of such complex subjectivity: "To align the human with the machine, in an economic context, is to suggest that economic decision-making amounts to a simple and undeviating calculation of effort and gain, and thus that 'the market' at large necessarily reflects, with optimal clarity and efficiency, the abundance of information that informs those numberless individual decisions. To align the human with the animal, in contrast, is to conceive of economic decisions as products of a broad spectrum of affective and cognitive states and processes, and therefore to acknowledge the capacity of markets to be propelled out of sync with wider economic and social conditions by disproportionate transactions on the part of market actors" [Crosthwaite, 2013: 102]. A tradition of a schematized and stereotyped view of the general principles of motivated "Homo economicus" emerged. Like any schematics, this tradition offers very simple and obvious principles of justification: "There is, to be sure, a sort of intuitive sense about the notion of Homo economicus which immediately sends us back to two intellectual traditions: classical economics and utilitarianism" [Merquior, 1991: 355]. It is known that the classical paradigm of economic thought is based on the idea of pure rationality, and utilitarianism − on the notion of effectiveness as a criterion and purpose of activity. This methodological approach is a kind of reduction, which is productive for generalizations, but it is limited in prognostic and analytical explications. In particular, the practical sphere of morality, solidarity, ambitious aspirations and archetypal determinants in these traditions of economic thought remains unnoticed, which is inadmissible in the opinion José Guilherme Merquior: "Homo economicus on the practical and moral levels. The net result of post-industrial reverie and its fellow travelers in "improvement ideology" − the pretended primacy of this new, sociologically oriented mentality − is a purely theoretical view" [Merquior, 1991: 360]. This fact is due to the fact that the theoretical concept of "Homo economicus" captures an important methodological principle in its content, but its detail and implementation in the research practice is rather fragmented and chaotic. However, without proper elaboration, even the most successful theoretical designs are to be destroyed.

That is why the constructive interaction between the specialists of different branches of knowledge for the relevant analytical work is required in a tangible way to different contexts. Indeed, different outlook contexts produce the appropriate methodological research tool. So, in the context of spiritual culture, a moral paradigm "Homo economicus" has the

following features: "Toward the end of the Enlightenment, the moral paradigm of Homo economicus encountered three rivals: the fanatically civic citizen, in the manner of Saint-Just; the virtuous man who followed Kant's Categorical Imperative; and Schiller's beautiful soul formed by the "self-culture" — the Bildung — of German Classicism" [Merquior, 1991: 355]. And all these concepts of morality need to clarify the principles of the formation and activity of the person in the economic cut of daily practices. It is logical that without the corresponding studios the meaning of the concept is empty, and the rhetorical question arises: "Today, one might well ask: who wants to kill Homo economicus. For there is no doubt that this brave man, as conceptual and even mythical as he is, is in danger of dying" [Merquior, 1991: 353]. Undeniable in the content of the concept of "Homo economicus" is the fixation of a fundamental philosophical shift, namely, from the classical understanding of the economics as a sphere of production and consumption to such a transformation of social culture, when any processes of subactivity and sociality are suitable for verification by the thesaurus of economic science. The most influential and significant in this analysis is the psycho-motivational sphere. And this aspect is the greatest attention of researchers: "The neo-liberal homo economicus manifests a shift from the classical capitalist model of exchange based on needs and utility. He corresponds with an order based on consumption as the primary market driver. Consumption is not necessarily reflective of needs in the classical sense. As any advertiser knows, consumption runs on a different logic. This has psychological significance" [Eyal, 2017: 660]. The psychoanalytic apparatus of the study finds trajectories of extrapolation of the methodological tools of the economics in general contexts, offering its own project "Homo economicus": "What's more, under a psychoanalytic gaze, homo economicus appears not only as self-sacrificing psychological creature but also as a social subject who sacrifices parts of himself to manage his family life and later his social existence. This is the essence of the Oedipal model. What homo economicus shares with his historical predecessors is that he continues to sacrifice his children. The psychoanalytic myth of the Oedipus complex ties the knot across the span of civilization" [Eyal, 2017: 666].

Consequently, there is every reason to argue the expediency and effectiveness of the chosen methodology, because the issues of value and value, capital and subjectivity, sociality, and codes of culture through the prism of the concept of "Homo economicus" acquire contemporary content and actual productivity. Constancy and polarity of evaluations and judgments in the interpretations of modern person and society are not suitable. After all, widely used in the circulation of the concept of intellectual capital, or understanding the psyche as a machine of desires, or willing to produce. That is, the horizon of the ontology of the economics is as broad as possible. In other words, "Once we realize that the creation of non-material value is as real and as important as, if not greater than, the value connected to goods production, "freed capital" can be linked to the further growth of human knowledge, understanding and consciousness" [Naastepad & Mulder, 2018: 18]. Obviously, this problem area requires thorough analysis and strategy universalisation.

Metaphysics as a Methodology of Economic Analytics

The problem of "economism" is now in the "field" of active metaphysical discourses. Their purpose is to determine the place and state of the economics in the life of modern society and man. After all, the widespread view of the economics only as a cost, the capitalist form of farming is narrow. It impedes the development of the very economic theory, narrowing its subject and turning into descriptive science. Because of this approach, the key function of the economics falls, which was to mediate the relationship of man with nature through its

economic use. Economics, as a sphere of industrial activity of man, stands between man and nature as "nature management". It is a key, generic to understand the "economics" category. In the opposite case, the domination of the economic point of view, which places the category of "value" in the priority place. Thus, meaningful "field" understanding of the economics loses informative space. However, this does not mean a reduction in the prestige of economic science, but causes a sharp increase in the need to reveal its deep meanings, penetration into the scale of the economic paradigm of thinking.

The solution of this problem pays constant attention to economic theory, the philosophy of economics, the philosophy of economics. The latter claims to be comprehensive knowledge of the economics, which forms the basis of human life: "The economics is not just a satellite, but the purpose of human life, as well as the way of its existence. The completely human life is an economics. Including the life of the intellectual, and cognitive, and artistic" [Osipov, 2001: 21]. While managing, a person will know the world, himself, while creating his own world — the world of culture, the world of society, the world of economics. Each of these worlds is the object of studying social science. However, the possibilities of the philosophy of the economics have a certain limit, due to the specifics of its subject. This also applies to the philosophy of economics, economic theory, and ethical economics. There is a need to find new means of in-depth penetration into the essence of economic reality.

The actuality of the search for new approaches in the knowledge of ethos of economic is also caused by the change in the social and cultural status of man as the result of the dominant influence of the economic sphere. A new vector of socioeconomic development was formed by globalization. It builds on a new structure — a pragmatic economic universe that tends to the logic of global and long-term management. Such a structure has a colossal social inertia, directly and indirectly influencing subordinate spaces, forming and fixing certain stereotypes and sociocodes [Neklessa, 2001: 63]. Data modification, polyphony of the increasing number of innovations on the planet makes it problematic to further use of traditional economic theory in solving controversial tasks of modern life. Actually, this became the main reason for attracting new theoretical discourses in solving economic problems, one of which should be "metaphysics of economics". Only within its framework is it possible to comprehend the modern economics, economic-economic activity, economic reality and the meanings of economic existence.

Metaphysics is a philosophical science. In this case, the question arises: how can it be applied to an economics with its subject, a developed research methodology, a thematic toolkit, etc.? What is the meaning of the application of metaphysics in relation to the economics and the isolation as a separate scientific discipline of "metaphysics of economics"? Moreover, today the publication of the "philosophy of economics", which further problematize the expediency of the subject of "metaphysics of economics".

To overcome such a biased attitude towards "metaphysics of economics" it is necessary to identify the purpose and objectives of this study. After all, we are not talking about a simple, local scientific discourse, through which you can add something to the already known. The goal is more global — to reveal the deep meaning of economic knowledge, applying the theoretical and methodological possibilities of metaphysics. However, as far as possible and, most importantly, is it advisable? The experience of numerous statements of metaphysics by European and domestic philosophers shows that in social science, there is a fairly free approach to this problem, and there is no established structure of this discipline. Although, of course, there is a certain range of problems that must affect each such presentation. Indeed, there are fundamental philosophical problems that cannot be ignored by any philosophy. Without them, it becomes impossible systematic presentation of philosophical science. These

are the problems from which the type of philosophical outlook or the way of philosophizing depends on the solution of which. These are the traditional problems of philosophy, such as the relation between being and nothingness, thinking and being, soul and body, spirit and material nature, transcendental and immanent, rational and irrational, etc., the conceptual statement of which we find in the works of representatives of the philosophical thought of the Ancient day [Afonasin, 2018; Bazaluk, 2018; Smith, 1990]. All of them can be considered as differently formulated variants or varieties of the main problem for metaphysics — the problem of being. Therefore, it seems appropriate to identify the "first philosophy" (metaphysics) with ontology. Economics — this is also the doctrine of being, but the existence of a businessperson, led into life, into the world. Economics — the phenomenon is universal, since it is the production of not only some consumer goods, but the production of life, thinking, being in general.

However, economics, despite the tendency to ontology in a number of points, is not limited to it. Similarly, metaphysics explores not only the general notions of things, but also different ways and levels of being of this being. The subject of metaphysics is the truth of things both in its general and in the highest measure. Consequently, the ontology passes into theology, finds the necessary connection with it. Here is the position, according to which the true science, economics, philosophy, religion almost do not differ, because universal and essentially similar. After all, the purpose of religion is to comprehend the meaning and value of the universe and our relationship with him, while the purpose of science — the comprehension of order in the universe and the nature of things. The purpose of the economics is active goal-setting, the transformation of economic existence, the development of productive activities for the implementation of life, its economic order and organization. Understanding the order, the value and the purpose — the tasks may not be identical, but they do not oppose each other.

The above considerations show that the distinction as an independent subject of "metaphysics of economics" is logical and logical in the context of the development of the study of the ethos of the economic, the range of being "Homo economicus". After all, the economics is not just the sphere of human production (analogue of production) –− it is the world of economic existence of man.

"Homo economicus" as a Subject of Metaphysics of Economics

The scientific-theoretical discourse of the "metaphysics of economics" is due to the need to identify the inner, deep, transcendental sense of economic existence, revealed in economic knowledge. However, economic knowledge is not as a "reflection" of economic reality, but knowledge as the truth of economic existence. It is necessary to go beyond the myths of traditional political economics and a more modern economics (in its conceptual part), which are not "obsolete", but do not fit adequately into the demands of the time. The point is not even that the theoretical economics does not give the corresponding for today a holistic understanding of the subject of the economics, which it explores. Such contradictions in general are inherent in scientific knowledge, especially because it deals with inaccurate, multi-vector, diverse, changing, "slipping" object, which is actually the economic life of man. There is nothing special in the periodic "exacerbations" of this economic "ontological-epistemological" contradiction. After all, the reality and the person in it change, and if science lags behind the changes that are carried out and it is also predetermined, then it falls into the state of crisis, which is obliged to be elected through the changes (meta-changes) of its axiomatics and the whole theoretical construction [Osipov, 2001: 34].

The state of things, which is the traditional economic science, raises the problem of the need to find and create a new generalizable idea of economic reality and economic activity of man. Representation, free of shortcomings and contradictions of the existing theoretical thought. In other words, we are talking about the construction of a new economic theory, which should replace the existing economic knowledge. It must be taken into account that the development of theoretical economics within the already paradigm inherent in it is over. Therefore, today, not the economic theory in the traditional sense, but new generalized theoretical, methodological approaches to understanding economic problems.

Having defined "metaphysics of the economics" as a methodology of a new high-quality economic theory, we proceed from other principles of understanding the economics as an object of cognition. It appears not only as a "commodity exchange", not just as "social production" ("production"), but as a colossal world, "space" (Max Weber), "the world of economics", which cannot be defined by traditional words, not you can penetrate into its inner meaning through the usual methods. It turns out that this "world, the universe of the economics" is full of meanings, symbols, transcendentalisms, entities, etc. "The world of economics" is not external in relation to human being. It is mediated by human activity, and in this sense is based on sociality. This means the energy of competition, the will of choice, the spiritual tension of social groups, strata and communities, the change of paradigms of management models, etc. All this transforms the economics into a world of "economic existence." It has become an economic reality, "the third nature" of human existence: "the first" — nature as nature, "second nature" — culture, and economics — "third nature" [Osipov, 2001: 35]. This statement seems fair, since no socio-physical, or cultural life of man and society can occur outside the economics.

What is the economic existence, if we apply metaphysical analysis in relation to it? It does not need to be understood as something purely external, as an "objective reality," which opposes the subject of economic activity. Economic existence is the actual existence of man, because "permeated" its economic activity. If the economics is a sphere of industrial and economic activity of a person, then it is simultaneously an integral part of human life and its meanings. In this regard, it appears as a metaphysical reality, as our knowledge of it goes beyond the sensory perception and empirical experience. Conversely, we know economic existence not as we see it directly, and not because of what we see. In fact, we know the world of economic existence as we think it, we comprehend with the help of reason. And this means that in the very reality there is something that "physical eyes" are not perceived, but thanks to what we know, we will know this reality. In the very economic reality we can thus distinguish between what is the subject of sensory experience (phenomenal reality) and what is perceived only by thinking, or, in other words, the reality of the noumenal [Osipov, 2001: 52].

If traditional economic science, using thinking, rational methods and means of cognition, seeks to know first of all the world of sensory phenomena (the world of empirically-specific economic existence), that is, the world of economics is phenomenal, then metaphysics, transcending the limits of sensory (concrete-empirical) experience, has its own the subject of the sphere of economic reality, which is comprehended only by reason alone, or economic noumenal reality. Due to the knowledge of this sphere of economic reality, "metaphysics of economics" intends to find the means of true knowledge of economic things, to know them as they are, and not to the ones that they seem to us. Thus, "Homo economicus" receives new ways to justify its own subjectivity, which more accurately reflects the specifics of modern strategies of self-identification and interaction.

What determines the noumenality of economic existence, which creates opportunities for its metaphysical reflection? In the "humanity" of the very economic being, the penetration of man into all spheres of economic existence. And the problem here is not in the human being in the realities of economic existence, but in the very fact of human existence. Decisive in it — a man must constantly contrast himself to himself, that is, to define his "I" in the contradictions of economic existence. Thus, its development is determined by the level of determination of the person's own contradictions. Therefore, as there is no human being without duality, the opposition of different meanings, so there is no economic existence without penetration into him purely human issues. The way a person overcomes his contradictions is a condition and a way of penetrating the essential problem of economic existence. This is the attributability of human being in relation to economic existence and vice versa.

Identity is the penetration of thinking into the content of economic existence. The desire to go beyond the bounds of experience and, therefore, beyond the limits of the fragmentation of the phenomenal world is a natural aspiration of man to truth. Not only metaphysics, but also every science, studying its empirically given subject, trying to understand what it really is, refers to aspects of reality that are outside the visible world. All our knowledge is conditioned by metaphysics, operates with concepts whose content goes beyond what we see or feel directly. This also applies to economic knowledge, which, by virtue of its interrelation with the object of knowledge (economic being), is produced by metaphysics. It gives this cognitive effort a complete and principled character, proves the distinction between the visible and the real, the phenomenal and the noumenal, the empirical and the theoretical to a certain logical agreement.

Legitimacy of "metaphysics of economics" is due to the very nature of metaphysics as a philosophical science. It consists in the fact that in the search for the basis or principles of being, metaphysics takes into account not only individual phenomena or systems of phenomena, not only the natural world, but also the whole set of phenomena of social life, in which the sphere of economic, by virtue of its totality, is decisive. Beyond that, not only the outside world is taken into consideration, but also the inner, spiritual world. The inalienability of the economics from human life, its determinism by sociality articulates the problem of the "spirit" and "soul" of the economics as the eternal metaphysical problems.

"Metaphysics of economics" is also not defined as a "reflection of social existence" or as a science about the most general economic laws. It is interrelated with economic science and its laws, but it explores the global and in-depth aspects of the relationship between man and being, man and culture, man and man. Multidimensional perception cannot be only objective, since the scientific and practical experience is limited in the understanding of some processes, for example, irrational. The desire of "metaphysics of economics" to consider economic reality as integrity due to the fact that all existing, the world of specific economic and economic phenomena, is "only a fragment to which it is necessary to conceive of its complementary reality" [Osipov, 2001: 70]. Metaphysical understanding of economic existence takes into account the transcendental nature of his knowledge, the identity and the distinction between rational and irrational, calls for the integrity of the "world of economics" to be sought.

Conclusions

Metaphysics as a methodological paradigm contains the necessary potential for productive analytical activity in the matter of verification of the actual problems of modern man and society. The proposed "metaphysics of economics" subject and methods of

research far beyond the traditional approaches based on the distinction of the economics as a concrete practical science and philosophy — purely ideological knowledge. There is no doubt that "metaphysics of economics" will become a field of sharp theoretical discussions in the professional environment — both economists and philosophers. Obviously, one must proceed from the fact that in conditions where economists are divided professionally, ideologically, theoretically, methodologically, and when the development of economic methodology has shown that the difficulties of communication between adherents of different scientific paradigms have sufficiently deep epistemological roots, the question of mutual understanding and professional communication within the scientific community acquires an entirely new sound, growing into one of the main problems of the functioning of economic science. Accordingly, the dissemination, creative embodiment, cultivation in the environment of scientists and economists of ideas and principles of "metaphysics of economics" will become a priority and productive direction for the further development of the "space" of the universality of economic knowledge. Following the metaphor of Friedrich Nietzsche about the death of God as a consequence of his oblivion by humans, we will emphasize that the death of the concept of "Homo economicus" will mean the escapism of reflection from the polyphonic reality of modern socioeconomics. Therefore, the steady growth of the scale and depth of methodological research in the field of economics has created a real need to strengthen such elements of economic knowledge and institutes of the scientific community, which support mechanisms within the scientific communication, provide mutual understanding between economists of different specializations and scientific directions.

Consequently, the use of the metaphysical apparatus in the reflection of economically deterministic reality is through the rehabilitation of "Homo economicus" as a meaningful concept capable of activating and optimizing the communication of specialists in professional discourse. And in this — the productive power of opportunities "metaphysics of economics".

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Transgression of the Megapolis in the Context of Anthropocosmism

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The paper is focused on the study of the "megapolis" phenomenon in the anthropocosmic aspect. The inquiry concludes that "transgression" appears as a leading intention of Homo Urbanus in organizing its habitat in a megapolis. Transgression can be defined as a desire to go beyond space-time limits to the infinity of the Universe. The following substantive attributes of the transgression are defined: anthropic time ("drop out" from the time, "acceleration" and "slowing down" of the time), anthropic space (three-dimensional expansion, sensory attack), and complication of the fractal nature of the city. The article describes the social practices of Homo Urbanus that embody following anthropocosmic intentions: the will to order and unity, comprehended time management, sensory filtration, anthropocosmic thinking. The creativity of Homo Urbanus in the context of consolidated responsibility for the future of the planet is considered to be the main factor of the harmonious development of the megapolis.

Keywords: megapolis, transgression, Homo Urbanus, anthropic time, anthropic space, fractal nature, anthropocosmic thinking

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Introduction

Nowadays the destinies of mankind are mostly being formed in megapolises. They appear as bifurcation points in the interaction of political, economic, financial and informational flows. Every big city in a metaphorical sense can be considered as a particular planet that includes the nearby territories in its orbit, and all sorts of other objects through the world network. The study of megapolises appears as a highly relevant in the matter of understanding the mankind's future and choosing the proper cultural and civilization strategies. Megapolis can be considered as a particular technogenic absolute in the context of eschatological myths or as the embodiment of an "earthly paradise" idea. However, in both cases, a large city is usually considered as a purely artificial formation created in the flow of technical innovations and focused on the maximum consumption. We presume that the phenomenon of a megapolis surpasses this interpretation, and in its basic manifestations, the big city reveals more profound anthropocosmic tendencies. Such an assumption leads to the global comprehension of the megapolis phenomenon. It can be interpreted as a natural and prior manifestation of the rational accommodation of a man to planetary life. The Homo Urbanus (an inhabitant of a megapolis) appears as a new type of Homo sapiens, who is able to live among the global civilization challenges providing the creative activity.

Purpose and objectives

The purpose of the article is to study the phenomenon of a "megapolis" in the anthropocosmic context. The important objective of the paper is the representation of Homo Urbanus as a potential creator of the "eternal" habitat. Other objectives are: to discover the actual attributes of the modern urban lifestyle that prove the Homo Urbanus' intentions to go beyond the limits and to show the substantive manifestations of the transgression in the sense-of-life intentions and social practices of the city-dwellers.

Methodology and literature review

The most reasonable and relevant method to resolve mentioned problems is the integrative interdisciplinary method. It combines philosophical, sociological and psychological points of view, as well as the holistic and comparative perspectives on the distinction between cosmo-concepts and urbo-concepts. In addition, analyzing the lifestyle of a megapolis-dweller, we take into consideration the philosophical, anthropological and existential approaches. This is necessary for a representation of the transgression as a system-forming principle of interaction within the Human-Megapolis-Space triad in the experience of urban everyday life.

In the definition of anthropocosmism, we refer to its traditional explanation as "a system of views, ideals, according to which man appears to be an organic part of the "cosmos", subordinated to its laws and influencing its evolution" [Kirilenko & Shevtsov, 2010:12]. The origins of "cosmic" interpretation of cities date back to antiquity when "sacred" and "cosmic" had a similar meaning; symbols and interpretations of Man, God, Universe, "earthly" and "heavenly" were intertwined. The archetypal algorithm of the mutuality of "cosmos" and earthly life was set in the emerald tablet of Hermes Trismegistus "What is below corresponds to what is above; and what is above corresponds with what is below, in order to realize the miracles of a single thing". Cosmogony, anthropological myths, the Pythagorean numerical correspondences of the soul and cosmos, the fundamentals of Hinduism and Tibetans' beliefs, the Taoist canon, mystical esoteric teachings, living ethics — all of them contain ideas for

the dependence of the human habitat on the Universe composition. Ancient mythology and philosophy affirmed the integrity, balance and the existence of the Universe centre, embodying these ideas in the image of the world tree (axis mundi). The ancient Greek city "polis" (πόλις) was constructed and comprehended in accordance to the principles of higher harmony. Its solar architecture, the positioning of its centre (agora) and temples followed the law of the "golden mean" and appeared as a reflection of the cosmic principles of space exploration. In addition, the spiritual sense of the Socrates' call "know thyself" extrapolated to the knowledge of both the earthly world and the cosmos, which was conceived as a living being. Likewise, the ancient interpretation of the city as a reflection of the Universe still exists in the Buddhist culture, according to which the city has to be a geometric symbol as well as the mandala [Toffin, 1982: 109]. The idea of the correspondence of the microcosm and macrocosm is one of the most important in Christianity. This idea highlighted the sacredness of the city affirming the ambivalence of the urbanity. The dichotomy of the fallen, sinful city (Babylon) and the ideal sacred city (Jerusalem) appears as archetypal. The whole history of mankind in the "City of God" by St. Augustine of Hippo is interpreted as the coexistence of two "cities", two lifestyles — in accordance to God's regulations or against those regulations. [Augustine of Hippo, 2000] Industry and urbanization rise, made the empirical interpretations of the city more relevant in comparison with its "cosmic" interpretations. At the same time, the idea of a perfect city became the main topic of utopias. Thousands of thinkers, scientists and visionaries, inspired by Tommaso Campanella's "The City of the Sun", were designing perfect future cities on the principles of the unity with Nature and the Universe. It should be noted that some of the "insane" Utopians' ideas became later useful for highly technically equipped "smart city" projects.

However, the principle "what is above is equal to what is below" was permanently present in humanitarian studies of many scholars, whose writings were targeted to reveal the "cosmo-planetary" essence of Man. The postulates of total unity, beauty and cosmic order were supplemented by the apologists of anthropocosmism with a deep faith in human creative mind and humanism. Nikolay Kholodny pointed out that anthropocentrism and anthropocosmism appear as an alternative position. Anthropocentrism considers a Man being the central point of the Universe, whereas anthropocosmism "aspires to... evenly illuminate the whole cosmos with the light of consciousness, and the person himself is illuminated mainly by reflected rays. This happens because the nature and fate of the Man find their correct explanation only in the light of the knowledge of the cosmos as a whole" [Kholodny, 1982: 187]. Volodymyr Vernadsky wrote that anthropocosmism appears as "a system in which the natural (cosmic) and human tendency of the development of science merge into a single whole" [Vernadsky, 1991]. Konstantin Tsiolkovsky as a representation of the flourishing future of civilization culture and nature postulated the continuity and unity of Life and Cosmos: "The Earth will share with its heavenly colonies the surplus of people... Eventually, we will see an infinite Universe with an infinite number of perfect beings" [Tsiolkovsky, 2013: 25]. Investigating the anthropic approaches in cosmology, Vyacheslav Voitsekhovich summed up that "The Universe as an evolving system represents that both its existence and evolutionary ascent, the complication of forms, systems, structures occurs due to the existence of a Man (actual or potential)" [Voitsekhovich, 2010: 33]. Nowadays the goals of the founders of anthropocosmism become extremely relevant. There are two equally possible scenarios due to the level of development of science and technology: annihilation of the planet and civilization or comfortable planetary life.

Let us turn to the subjective sphere, namely to the live experience of the cosmos and life processes. The existential fear of the "Finite of being" naturally followed by an inner rebellion

of Man, which manifests itself as the desire of infinite self-extension, of eternal presence in the world and eternal being of the world as well. Cosmos is the supreme incarnation of infinity. His mystery, undiscoverness and beauty set the only possible coordinates of life and demonstrate proportionality and excellence of the "heavenly" organization. Therefore, cosmos is at the same time the supreme incarnation of order. The Universe, from a speculative and scientific perspective, appears as an "order in infinity." In addition, the ancient Greek cosmology construed the concept of κόσμος as both an order and a beauty. At the same time, cosmos is a system that shows the unity of elements within the common matrix. If a Man is not an alien in the Universe we have to admit that all mentioned factors *(infinity, order and unity*) must have inevitably reflected in his earthly life and social practices. Megapolis appears as by far the best kind of the earthly way of life and life-space organisation due to the high level of its rationality and prevalence. Probably, in its "matrix" the will to order, the will to unity and the impulse to infinity are reflected as well. In our opinion, the impulse to infinity represents the quintessence of Homo Urbanus' intentions, namely — "transgression." Transgression here implies the desire to go beyond the limitations of time and space. This statement correlates with an idea of a vital "impulse" as the basis of human life, propounded by Max Scheller, the founder of the philosophical anthropology [Scheller, 1988: 43].

Defining the essence of the transgression, we will refer to the aphorism by Michel Foucault: "Transgression is an action which involves the limit" [Foucault, 1977: 33]. The transgression in the history of science is represented as a process of transcending of social norms, prohibitions and taboos. Some inquiries by Sigmund Freud and Jacques Lacan consider the desire and aversion as the driving forces of the processes of transgression [Freud, 2013]. The Friedrich Nietzsche's, idea of the "Overman" (the Übermensch) postulates the going beyond the limits of particular existence as well: "Man is something to be surpassed." ("Der Mensch ist Etwas, das berwunden werden soll!") [Nietzsche, 1990: 175]. This is quite correlating to Martin Heidegger's "eluding beyond ontic orders... beyond the boundaries of enslaving structures such as language, mentality, society" [Heidegger, 1993: 240]. Georges Bataille, interprets the transgression as "the supreme care of the first principles, the aspiration to overcome the boundaries of the finite in social experience... a man desires to turn away from the place of fleshly birth, to rebel internally against the fact of dying, do not trust the body at all, as well as all random and perishable within ourselves" [Bataille, 2006: 531]. Literally, a person rebels against the finality of earthly existence and seeks to infinity, to the eternity of the self-existence and the existence of the world. The ideas of existentialists could be considered in the same way. As an example, we can mention "The Rebel" by Albert Camus and his protest against "the meaninglessness of the incomprehensible and unjust fate of a Man" [Camus, 1990: 126]. Presently, the studies of transgression seem to be ambiguous. Can Altay defines transgression as a creative freedom that transcends the limits of society [Altay, 2013]. Gil Doron interprets the new Urban architecture as a transgressive way to confront the "dead zone" of the city [Doron, 200: 249]. Ursula Rao describes the transgression as innovative political intentions [Celebrating Transgression, 2006]. Mehdi Kacem interprets the transgression as the game, irony and catharsis. In the same time, it appears as a going beyond the ordinary experiences [Kacem, 2014].

However, despite a large amount of information, the megapolis was not practically considered in the anthropocosmic context until now. The concept of transgression did not appear as the unifying force of urban and cosmic processes as well. This article attempts to fill this gap by initiating a comprehension of the relationship between the declared phenomena.

Main Part of Research

We define a transgression as an existential phenomenon of being. Its essence appears as the will of the Homo Urbanus to go beyond the limits of time and space, beyond the limits of ordinary experience and other frames of possible-impossible. This reveals the strong aspiration of Man for existential freedom, the establishment of the personal immortality which corresponds to the infinity of the Universe. Megapolis, in our opinion, embodies the mentioned intentions in many of its basic manifestations. Some of them are following:

a) a special organization of time and space,
b) priority of speed,
c) the fractal nature of the city,
d) planetary thinking of the city-dwellers.

It is important to realize that mentioned phenomena are naturally organized as an environment. The violation of this environment may cause unexpected results: probably the formation of new boundaries or even the destruction of the City environment.

Anthropic time. The city, as well as a Man, has its own history in time: it is born, develops and can die. It is no wonder that one of the most famous books by Jane Jacobs on urban studies is called "The Death and Life of Great American Cities." Each city has its unique tempo-rhythm but megapolises' tempo-rhythm differs by its intensity. The sense of the city-time is always subjective because it is treated directly by the city-dweller, whose lifetime is "inserted" into the lifetime of the city. In this context, the concept of "anthropic time", proposed by a philosopher Volodymyr Khanzhy appears as the most appropriate. "Anthropic time" is a system that expresses human activity in terms of duration, order (an aspect of form) and semantic load (content aspect)" [Khanzhy, 2015: 262]. Authors admit the assertion of Elena Burlina that "in its light version an anthropic principle implies an understanding of time as an object correlated to a person, who occupies the position of an observer. In its strong version, time is considered as totally included into the person and, consequently, the "observer" becomes equal to the idea of the creator of time (the reason of time)." It is impossible to individualize the anthropic time as well as to make an exhaustive classification of city-dwellers. Nevertheless, it is necessary to identify some specific innovations of the megapolis that determine its temporality for the Homo Urbanus.

A megapolis dweller is the "creator of time" and at the same time the "user" of it, who dialectically combines light and strong anthropic-temporal principles. There are some examples. Due to the implementation of the artificial light and climate technologies, in many commercial locations, the customer finds himself in an environment of "eternal spring", where the illusion of being outside the change of time modes is created. The growing popularity of the shopping malls among the city-dwellers makes us believe that this tendency is nourished not only by the consumerism but also by "falling out" of the time, the transition from intensive tempo-rhythm to the atmosphere of "infinite time", beyond the ordinary traffic. The same effect of "timelessness" is achieved by the non-stop mode of many city service options that change the usual boundaries of night and day, beginning and end of the processes. Digital technologies, widely available to the megapolis dwellers, also allow "overcoming" the boundaries of the earth's time zones at any time of the day. The typical city-dwellers' time troubles (lack of time, time deficit) increase the deep necessity for unlimited temporality, freedom from the frames of time.

Let us have a look at the phenomenon of "selfie" mania among the gadgets users. The possibility to revive the pictures of the past at any time, to visualize plans and spontaneously record what is happening at the moment, lead to the fact that the permanent photo-video-fixation of the moments of life rotates in the "infinity" of replication, producing the effect of

the existential fusion of times. Being of "out of time" is even more obvious for Web users such as freelancers working for foreign partners or gamers and other people, pathologically obsessed by the Internet. Moreover, drug addiction and alcoholism widely spread in the big cities always targeted the "falling out of reality", the "loss of time." The widespread megapolis phenomenon of "job addiction", which is paradoxically similar to the drug addiction, causes a "falling out of time" as well.

Another marker of megapolises is the tendency to "slow motion" — "slowing down time" in the "third places" of the city (the "third place" means not at home and not at work) [Oldenburg, 2000]. In many large cities, more and more places for public and social meetings appear nowadays: cafes, anti-cafes, co-working, lodgers, lounges, libraries. Such places provide a communication opportunity for different people and purposes (business meetings or friends parties), giving them a chance to get rid of time frames of work and household duties. In some megapolises, the "cafe culture" has become an indispensable attribute of a city lifestyle, a part of city history and city brand (Paris, Rome, and Barcelona). Another evidence of the megapolises' "slow motion" trend is the widespread practice of yoga, meditation, relaxation and floating. Thereby, Homo Urbanus deliberately builds his relation to the time, leaving its dictate behind. The person of any era had a possibility to "fall out" of time by reading a book or doing arts, but the massive "overcoming" of time frames became possible only in the era of megapolises, the era of high technologies development. A conscious person is able to find a balance between destructive and constructive types of managing the time. Transgressively striving for freedom from time, he attempts to organize the chaos of temporality using a strong anthropic principle such as effective time-management.

Priority of speed. The social processes that take place in the cities always have their reflection in the culture. Mentioned reflection is illustrated by the widely known suite of George Sviridov named "Time, forward!" This suite was composed in the years of the first space flights. During the postwar epoch of high-technologies development, the urbanization increase takes place. The "priority of speed" phenomenon, that touched upon different life processes of the megapolises, was forming as well. The phenomenon of speed is closely connected with the paradox of anthropic time. The process of speed increasing seems to overcome the temporal and spatial frameworks. The Man becomes independent of these categories, due to the mobility achieved by technical innovations.

The increase of vehicles speed, acceleration of various services and even the service of fast dating (speed dating) are the markers of megapolises. Modern civilization seeks to reduce distances by making transportation public and planetary. Often, people perceive the speed scale using the analogy of the speed of light, counting new and new records. The Japanese train JR-Maglev MLX01-1 accelerates to 578.4 kilometres per hour. A specialized bicycle and additional equipment allow the bicyclist to accelerate to 223 kilometres per hour. The Thrust SSC reactive automobile, driven by British pilot Andy Green, reached the speed of 1227,985 kilometres per hour, what is beyond of the sound barrier [Samyy bystryy, 2015]. Elon Musk has already presented the "Hyperloop" vacuum train project, capable of accelerating four times faster than a high-speed train and twice as fast as an aeroplane. However, Paul Virilio, the author of the science of speed (dromology), points to the danger of obsession with the idea of speed. The scholar predicts the further person's mobility loss caused by extreme "body urbanization". He asserts that "large cities lose their cognitive and aesthetic potential when becoming only the focus of speed" [Virilio, 2006: 182]. In addition, it is necessary to consider the dependence of the number of traffic accidents on the fact of speeding on the roads.

The will to speed manifests itself in other aspects of the city life. In the field of information, there is an obvious seek for faster processing of information and a reduction in the informational messages. Web communication and SMS show the reluctance of many interlocutors to write long and voluminous texts. Communication is simplified by using the fixed phrases, memes, abbreviations, slang or "emoji" that replace the long verbalization of feelings. "Fast and short" looks like a motto of gadget-communication. At the same time, as we already mentioned, emotional communication is realized in the real dimension of the "third places" of the megapolis. The safe balance of acceleration and deceleration also depends on the individual choice. Generally, the time continuum of a megapolis can be represented by the image of particular fractal; the figure 1 displays the phenomena of urban time in the life of Homo Urbanus: "falling out of time", slowing down, acceleration, transgression as a striving for temporal freedom and the time-management as the rationalization of temporal processes.

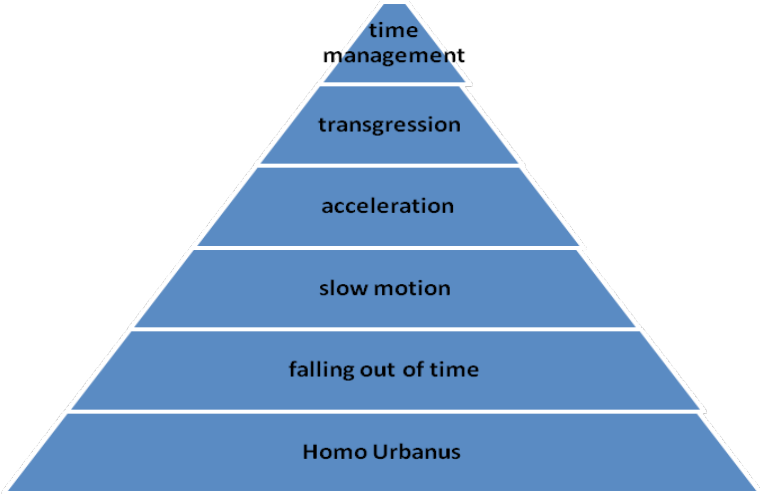

Fig.1. Time continuum of the megapolis

Anthropic space. The space of a large city gives a person numerous variants of the habitat and directions of internal migrations. From this point of view, it can be called "anthropic." We agree with Henri Lefebvre, who interpreted the megapolis lifestyle as an unceasing "production of space," "spatialization" (from the French "spatalisation", literally, the "space"), embodying "the right to a city" in anthropogenic circumstances [Lefebvre, 2002: 28]. Dorian Massey's idea about the unity of the autonomous and space movement is also interesting: "Setting on their ways in the city, people not just across the surface of the world fixed on a geographical map, but... they perceive their path in a world that is itself in continuous movement on the basis of unification of human and *nonhuman* strength" [Massey, 2000: 203]. Peter J. Riggs, defining the correlation between time and space, substantiated the fact of space expansion as an analogy of the flow of time [Riggs, 2017].

The architectonics of the megapolis, its visual representation in architectural artefacts (historically memorable objects that send to an immeasurable past, skyscrapers looking to the immeasurable future, and the present — the presence in the moment of synchronous coexistence of temporary layers) are an invariable attribute of "eternal movement" and "will to eternity". Urban semiotics and mythology have a tendency to date back the city

chronology from ancient times if it is possible, despite the fact that each city has its own starting point in history. The metaphor of the "eternal city" (aeterna urbs), which is usually associated with Rome, Istanbul (Constantinople), Jerusalem, Kiev perfectly represents the mentioned intention.

The architectonics of the megapolis shows its three-dimensional spatial expansion: the city consistently grows upwards, to the sides and to the depth. The archetypal images of the city towers usually symbolize the transcendental vertical, the desire to "reach the heavens". At the same time, three-dimensional expansion demonstrates a transgressive act of total expansion in the space, aspiration to global infinity. Skyscrapers — an invariable attribute of megapolises, embody, on the one hand, the gigantic-mania of the architects, on the other hand, a pragmatic idea of space economy and composition of a "Smart home". Their "inhuman" heights cause some city-dwellers feel infernal. Sometimes they become a place where suicidal people take their own life. Unfortunately, the Empire State Building in New York (381 meters high, 115 floors), constructed in the midst of the Great Depression in the United States in 1931, became one of the most popular suicide locations. However, the "impudence" of earthly architects is growing every year. International Finance Centre in Hong Kong rises above the ground at 415 meters, Jin Mao Tower in Shanghai is 421 meters high, and Trump Tower in Chicago is 423 meters high Petronas Twin Towers in Malaysia are at 451.9 meters above the ground. "Burj Khalifa" tower's height is 828 meters, and planned in Saudi Arabia Jeddah Tower skyscraper will reach 1.1 km in height. Let us note the fact of eschatological motifs escalating in the art connected with skyscrapers. For example, the plots of Hollywood blockbusters, depicting the destruction of skyscrapers, (which unfortunately became real in 2001 in Manhattan) as well as, alien invasion plots, still wanders from one movie to another. The movies "Apocalypto", "Armageddon", "Melancholy", "2012", "The Day after Tomorrow" convey the existential tension in the consideration of skyscrapers as a symbolic limit, the absolute point of civilization, the arena of the struggle between the Good and Evil.

Megapolises are steadily growing in depth. The Underground City of Montreal is the largest underground "city within the city", extended for 20 km. In different parts of the world, in Chicago, Dubai, Mexico City, in the Nevada desert, it is planned to build new "earthscrapers" hundreds of meters deep. The most suitable places for the underground cities construction are Canada, Sweden, Norway, South Africa and China. As the response to such intention, an "underground urbanistics", a new section of the city-science, took off in the early twentieth century.

The population of cities is growing at a rapid pace. There is a prediction that by 2025 the largest megapolises population will reach the point of 19-35 million people. Due to the megapolises population growth their area increases. Megalopolises, urban agglomerations and conurbations extend along the ocean shores. A quarter of The USA population is concentrated in the Northeast megalopolis (Bos-Wash corridor) that unites 40 highly populated agglomerations and covers more than 800 kilometres. Other large megalopolises are Tokaido (Tokyo-Osaka), Chippits (Chicago-Pittsburgh), San-San (San Diego-San Francisco). Pierre Merlin, making a distinction between spontaneous and regulated forms of cities growth asserts that "the metabolic (capable of expanding with indefinite forms) cities are about to become the mainstream. "The perfect city of the 21st century is an open city that *will never stop growing*" [Merlin, 1975]. Highly relevant in this context is an Oswald Spengler's idea of a "world-city", which, as the main element of civilization, "will absorb the entire content of history" [Spengler, 2009: 164]. There is a paradox, that despite the steady

growth of megapolises, they retain their identity in the perception of the city-dwellers and the tourists.

The architectural expansion of the metropolis is complemented by a sensory attack. In a big city, millions of irritants, influencing the senses, consistently influence a person. Movement in the crowd is full of tactile challenges. Visual challenges are delivered by storefronts, advertisements, transportation, landscape and architecture, weather phenomena and the most varied colours of this panorama. The olfactory organs are affected by the different smells of the city, and the taste organ is attacked by endless offers of meals. The acoustic of the big city is similarly varied. The sound of the rain, street conversations, obsessive music in public places, the rumbling of motorways and construction areas, which sometimes can exceed the pain threshold. The picture of such diversity can be supplemented by the phenomenon of spam — an abundance of unnecessary information, not initiated by the addressee. We mean that a sensory attack is a like a "cosmos" of diversity, striving for infinity. Enriching the human world with an infinite set of temptations, the city can cause one of the kinds of myxophobia — fear of redundancy. In fact, a person of the city requires a special sensory plasticity in order to adapt to such an environment. Many of inhabitants of megapolises have intuitively developed the original "sensory gating" that allows them to filtrate the incoming information and to catch in its flow only the necessary codes. It is obvious that both spatial expansion and sensory attack created by man require rational control to keep reasonable frames of processes.

The fractal nature of the city. Mise en abyme. Summarizing previous statements about anthropic time, priority of speed, anthropic space, with its three-dimensional expansion and sensory attack, reveals an idea of existence of some special mega-multi-structure of the city. It is obvious, that the structure reveals the endless construction, complication and fragmentation of its fragments. At the same time the fragments appear "inserted" into each other like a fractal, a Matryoshka doll or "mise en abyme" (literally French "falling into abyss"), the recursive art technology ("a dream in a dream", "a story in a story", "a picture in a picture", etc.). "In the city as in the meta-system, consisting of systems, which consist of subsystems of lower degree, hierarchically "nested" territories... networks, population density, and other demographic and sociological characteristics of urban culture appear as the fractals that vary in the degrees of complexity" [Nikolayeva, 2012]. Revising the urban empiric, we can find an obvious chain of fractals of the habitat of a city-dweller: apartment — house — district — street — place of work — transport — places of consumption — location of leisure and communication. In each cluster, the Homo Urbanus plays particular social roles, which can also be "fractalized": from a family member to a corporation employee or a participant in citywide movements. You can consider any social organizations, groups, interpersonal relationship as fractals. The communication of citizens seems to be multifractal too, what is shown by numerous examples from auto-reflection to the dialogues and polylogues in the social groups. The ideas of Marilyn Hamilton, who uses for the description of the large city the metaphor of a hive (similar to the fractal), where everything is interconnected, and each "bee" participates in the general activity In the context of the analysis, appear relevant in the context of analysis of the fractal nature of a large city. As a result, the city appears as a living multi-level system in the continuum of time and space. We also venture to declare that the being of a Man is also naturally fractal. Such idea is increasingly justified by synergistic [Gowan, 2010]. Omitting the purely biological components of Man, it is possible to admit that the soul-spirit-body triad is "inserted" into the human personality and, forming its essence, flow one into another. Spiritual aspirations are nourished by mental impulses.

Spiritual crises and weak-soul phenomenon on one hand lead to the bodily Psychosomatic manifestations, or, on the other hand, in the case of conscious lifestyles, develop healthy, harmonious existence. Except of the space of the Cosmos, the space of the Earth and the space of the city, each person has an infinite inner "space". It appears as "the source of the strength, as the place to get rid of something heavy and put some space aside for something more important." This is a statement of Bogdan Andreytsev who is an author of symbolic sculpture "Inner space", which, in our honest opinion, perfectly illustrates the fractal nature of a Man (Photo 1) [Siderskiy, 2017]. The phenomenon of a fractal is directly associated with the composition of the Universe, which, according to many scientists opinion, consists of an infinite number of nested fractal levels of matter. Benoit Mandelbrot, the author of the book "Fractal geometry of nature", considered fractals as the leading structures of universal order in chaos [Mandelbrot, 2001].

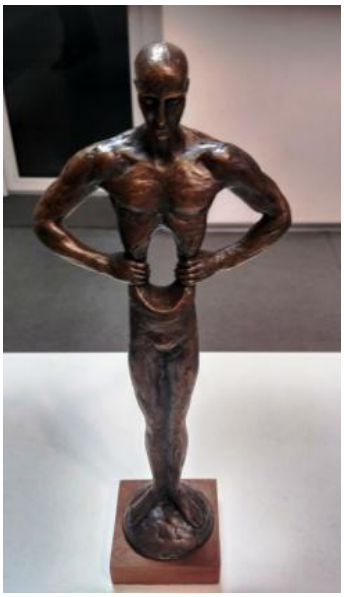

Photo 1. Innerspace Sculptor — Bogdan Andrejtsev

Anthropocosmic thinking. Developing an idea of the fractality of Man and city, it can be extrapolated on a planetary scale. Megapolises "inserted" in the general fractal of urbanization, globalization and virtualization of the world due to their contribution to the global processes. Peter Hall, comprehending cities interaction and their impact on the planet, uses such indicator for the classification of "global cities." Each megapolis is shown as an independent participant in a multi-level functional urbo-hierarchy [Hall, 1996].

Nowadays, in our opinion, many people develop a conscious attitude to the city and the world. Such attitude can be metaphorically called the "anthropocosmic thinking." We can outline two directions of anthropocosmic thinking: the mythological direction, which is associated with myths about the planetary threats and rational-realistic-thinking of Homo Urbanus who understands the relation of micro-macro processes and fills the responsibility for the planet. The ancient eschatological myths are being replaced in mass media by the ideas of a close "End of everything" such as "Parade of planets", "2012", "The planets Nibiru,"

Magnetic poles shift, destructive comets or asteroids. Despite the fact that some of these plots have a commercial basis and interest, we can say that the Cosmos still frights the mankind by its unpredictability and mysteries that does not exclude real dangers. The theories of the "Good Universe", which fulfils all the wishes if an application is "correct", appear as the antithesis to the previous. Neuro-Linguistic Programming models and the archetypal-fairy-tale image of the Higher Power paradoxically merge in modern pop-guides for a successful life, happiness and harmony. The modern man manifests an infantilism by the strong belief in miracles and welfare from above. At the same time, the power of the true believe is obvious and the good transformations are possible under its influence.

The researches on UFOs and contactee-people have been conducting for many years. Some messages from "supreme" alien races periodically appear on the Internet. At the same time, the mass media permanently inform the public about the dependence of the human health condition on the outer-space phenomena such as magnetic storms, solar flares, real climate change. The modern high technologies of everyday life, such as satellite antennas, satellite navigators allow us to observe the whole planet. Planet-wide *Wi-Fi becomes the matter of the near future, (projects of Elon Mask), as well as the human expeditions to other planets. However, the highest manifestation of planetary thinking is reflected in the search for effective models of the human civilization development, conservation of nature and the further discovery of the outer space.*

The planetary thinking manifests itself through the intellectual Internet platforms designed to consolidate the creative class of cities. The positive urban prospects are postulated in the pages of the "Asian multimedia utopia", founded by the informational agglomeration of megapolises (Hong Kong, Singapore, Shanghai), in the Internet project "Urban Multimedia Utopia" started by the international architectural school "Bauhaus Dessau, where the project of "highly-rational-city" as... a hyper-powerful matrix of interconnected forms is presented" [Chepelik, 2003]. Such projects contribute to the dissemination of the ideas of an integral and creative city, comfortable for a person's life and environmentally friendly.

A reasonable approach in the context of anthropocosmic responsibility for the city and the fate of the planet is reflected in dozens of modern books with similar key names — "Homo Urbanus." Stanislav Lose optimistically interprets the future city dweller as "the inevitably universally creative." Jelle Roymer explores the hypotheses of urban development in the context of the general evolution theory**.** Elisabeth Oberzaucher analyzes the behavioural reactions of large city dwellers. Thierry Paco shows the continuity of urbanization and morality. Maryna Prepotenska analyzes the existential modes of a megapolis dweller. The development of megapolises is increasingly reflected in the virtual mega-dimension. The adherents of the synergetic theory of the Universe argue that the worldwide informational web is already forming in an innovative structure of Synergonet — "the collective intellect of humanity that entered the epoch of the noosphere." The authors agree with an assertion of the "fractal nature of the entire network infrastructure as a super-complex self-organizing transportation and information system. Its main characteristics are openness, non-linearity and coherence." All these facts testify to the development of man's anthropocosmic thinking both in the scope of the audience and in the scale of the planetary problems included into the cosmic projection.

Conclusion

After examination of the megapolis phenomenon in the anthropocosmic context, we became insured that the topic of the city has long been inscribed in the overall perspective of cosmism. The human environment was organized and functioned in the natural, cosmic

and sacred canons. The anthropological turn in the science of the second half of the 20th century, coinciding with the active phase of urbanization and the growth of megapolises, was characterized by the justification of the theory of anthropocosmism.

We outlined the main existential moduses in the context of anthropocosmic thinking of "Homo Urbanus" which are the will to infinity in the overcoming of space-time limits (transgression), ability to organize the continuums and the aspiration to the planetary unity. We defined the relevant attributes of a modern urban lifestyle as a substantial manifestations of transgression in the sense-of-life intentions and social practices of the city dweller (anthropic time, anthropic space, fractal nature of the city, anthropocosmic, planetary thinking of "Homo Urbanus.") The creative city dweller, who has a will to infinity, seeks not to "conquer", but to "save" the nature, conserve all living creatures and justify the cosmic prospects for the mankind development.

As a result, the future of megapolises and the civilization depends on the free transformational activity of people. We were convinced that the will to infinity is followed by the desire for awareness and orderliness. The more conscious Homo Urbanus is, the more effectively he is able to act in the environment of megapolis challenges to prevent chaos and destructive behaviour. This requires the high intelligence and developed spirituality for people who are able to impact the future. The synergetic processes, corresponding to the synergy of the space of the Universe, could also be seen in the development of the urban environment. This field, in our opinion, requires a separate study.

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Security At Information Culture: Wouldn't We Lose Humanity?

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The question of informational culture as a semiotic space of functioning and interaction with the information and ethics and communication complex regulating this activity is an urgent need in modern humanities and other related branches of knowledge and socioculture. The study of information security at the psycho-motivational, functional and value level gives a relatively complete spectrum of the mentioned problem in view of its cultural influence. Without such an integrated approach to understanding the essence of information culture, mankind faces a catastrophe in the form of loss of democracy, sociality and humanity. The proposed research actualizes the need for a socio-philosophical reflection of the problems of the boundary between information freedom and information security as one of the key issues of the civilization progress of modern civilization.

Keywords: informational culture, information security, operability, functionality, humanity

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Introduction

Modern information culture radically changes the way human interaction with the environment, which determines the corresponding transformations both in the middle of society, and in the context of personal identification itself. This is about the formation of the

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so-called informational worldview as a holistic view of information, information resources, relevant technologies and the principles of knowledge and activities they make. It is clear that a qualitatively new level of information activity gives humanity some freedom to realize activity, but at the same time creates additional threats and dangers at all levels of social and cultural life.

Therefore, the problem of formation of information culture of an individual, society and humanity as a whole becomes more important and relevant. Especially in view of the speed, quality and efficiency of the processing of information. In addition, the information is indifferent, but the possibilities of its use involve a number of contradictions and abuses. Therefore, it is quite natural to question the formation of information culture in view of the need to address security issues. After all, in the global information flows, the person is not just are protected, but in general there is a tendency to fragmentation and compilation of the concept of personality, in contrast to integrity and assemblage. This tendency is dangerous, first of all, as a threat to the loss of the integrity of the individual, of consciously rational activity and humanity as an example and a value regulating freedom of choice.

Information Culture: From Product Activity to Activity Productivity

The democratic ideals of freedom, equality and fraternity find a new imprint in the virtual space of information culture, which is essentially personalized and anonymous. There is an essential contradiction: on the one hand, external barriers and obstacles to freedom are overcome, and on the other hand, absolute freedom reduces responsibility. And a situation arises when the information space has a destructive effect on the person: from psycho-emotional trolling to political manipulation and financial fraud. This space of freedom provokes essential changes in the motivational sphere of a modern person, in particular, creates and reinforces the aspiration for creative self-realization, in contrast to the technical and schematic activities. That is why the notion of an expert in the modern information space is offset: after all, everyone who wants, not just knowledgeable and experienced, strives to share his thoughts. In the chaos of statements and pluralism of evaluations and impressions, the issue of awareness, the reliability of information, its ability to effectively serve is crucial to survival, not only organizations and institutions, but also human beings as biological beings. Numerous armed confrontations in the modern world, accompanied by massive information attacks, are a striking example of this.

The fact is that in the concept of information there is an indication of integrity, the principle of integration and integration (‘information’ consists of two parts ‘in’, that is, ‘in’, and ‘formation’ − formation, that is, ‘something’). That is, the information, in essence, reflects the structural principle of the organization and operation of the system. Logically, any manipulative effect in the information space is associated with disorientation, with the destruction of integrity. So, let us consider the main theoretical and methodological approaches of security policy analytics in different accentuations of socio-cultural life.

Information Security in Dimensions of Mentality and Subjectivity

Information influence on consciousness, society and culture is obvious. Therefore, there is considerable interest in the study of the psycho-mental perception of information threats. Thus, in the course of factor analysis, Ding-Long Huang developed a mental structure that describes the most important factors in perceiving information in terms of its operationality and potential threats, namely knowledge, impact, complexity, manageability, capabilities

and awareness (perspective) [Huang et al., 2010]. The authors established the existence of a regression relationship between the threat assessment and the corresponding activity of the subjects for its verification and neutralization, revealing the relativity and contextuality of the perception of virtual threats, which most often indicates lack of awareness of users: "Significant differences were found in the Knowledge factor and in the Newness and Personal Exposure items. Marginal significant differences were found in the Understanding and Ease of Reduction items. Naturally, experienced computer users knew more about threats to Info. Sec, perceived those threats as not so novel, had better understanding of those threats and felt it would be on people's perception of information security were tested, using the types of loss that respondents selected for each threat as independent variables, and the overall danger as dependent variables. There were six options (multiple choice) for each threat: financial loss, exposure of personal information, inconvenience of computer use, waste of time, loss of reputation and loss of data" [Huang et al., 2010: 230].

Proceeding from this position, the question of formation of information culture as a philosophical principle of ethics of communication requires an appropriate educational work. After all, the fundamental contradiction between information as a realm of freedom and the security strategy as a control and restriction is clearly demonstrated by a lack of awareness of these issues. The exchange of information cannot be controlled, edited, restricted. On the other hand, the availability of information is dangerous for many reasons. For example, Chad Anderson articulates this problem as a contradiction between the exchange of information and the need to protect it, by offering a dynamic model for the contextual solution of this problem [Anderson et al., 2017]. This research is based on the following methodological approach: the definition of the priorities of activity, its main and secondary components, the ability to navigate through chaotic information flows, without losing the effectiveness of realizing their own potentials — a universal one that should be contained in the context of any activity [Anderson et al., 2017].

In general, the problem of verifying information on security/hazard requires a thorough research and analysis. Philip Menard, with a group of authors, analyzes the mental-psychological factors of information security, addressing the internal motivation of people, the authors seek to establish a mechanism for assessing information on safety/security: the authors believe that using data and individual referrals to provide a choice for users, managers can to observe their intentions of hazard verification and appropriate effective response [Menard et al., 2017]. It is argued that motivation for fear of information security is not effective. Perhaps the curiosity inherent in man prevails over the instinct of self-preservation, and vice versa, the appeal to a personal strategy of choice and responsibility significantly increases the indicators of security efficiency. From the analysis of the work, we conclude that solving the issue of information security is possible only through personal awareness, interest and responsibility.

From a methodological point of view, I would like to emphasize that most research on information security either contextually motivated or probabilistically determined. As Jens Braband and Hendrik Schäbe rightly point out, most of the theoretical constructions on information security are monotonous and ineffective before the challenges of modern times [Braband & Schäbe, 2016]. This is explained by the involvement in the theories of the probability factor, which reduces the coherence of the system. The key to solving the problem, according to the authors, is to handle IT security as well as systematic security failures. The authors argue that the introduction of information security levels is similar to SIL, and therefore, information security cannot in principle be fragmentary, selective, or

probabilistic [Braband & Schäbe, 2016]. At the same time, there is a point of view, the lack of modern philosophical discourses on information security due to the lack of clear protocols of the necessary activities.

The productivity of this approach is to substantiate the co-evolution of social and technical mechanisms, which enables to accentuate the source of information security through social constructions, rather than operational-rational schemes. Introducing the concept of causation, the author applies a pragmatic approach to information security, the main content of which is algorithmization and protocol information security tangibly to a specific task and the corresponding functional. The author of this approach offers the notion of causal isolation, or non-interference as an ethical principle: "Based on this research, it can be argued that a notion of causal insulation has already been developed that is specific to information. This notion has been termed non-interference" [Pieters, 2011: 329]. This non-interference strategy is an effective principle of regulation of interpersonal and business relations: "By connecting the technical and policy discourses on information security and privacy, this analysis can form the basis for a better understanding of their relations in current and future developments. This holds not only for electronic voting, as shown in the example, but also for public transport payment systems, road pricing, electronic patient records, and many more. In all of these cases, technical perimeters as such are overrun by the many connections needed, but perimeters in terms of causal insulation, running through computers, organizations, buildings, and people, can provide the necessary understanding of how security is constructed, and in the end enable better judgments on what is more secure than what" [Pieters, 2011: 334]. That is why; the question of the functionality of the system in the security plane requires careful study and study, heuristively applying the approaches of modern social philosophy.

System Functionality in Information Security Strategies

Information security, due to its purpose and application, has been updated in the works of a number of researchers of the philosophical problems of informatization. David C. Li, analyzing information security at various levels of the organization, notes that the authors usually distinguish three groups of factors: the importance of information security, measured by its disclosure; the existence of state regulation; the size of the organization and the complexity of the links [Li, 2015: 26]. Developing the opinion of the authors, we note that only the first two variables, the correctness of their interpretation, and the regulation of mechanisms for working with it, have a prevailing importance and a positive influence on the indicators of online security. Characteristics of the same system on the way of implementing information security do not significantly affect, and therefore there are grounds to offer universal recommendations.

For their effective processing, it is necessary to find out the concept of risk in information security and the parameters of their influence on the work of the system or organization, to understand the significance of the risk parameters that is the basis of the operational response to information danger. As a key factor in the analysis, some authors propose an economic factor, namely, the possibility of investing in technological security solutions, the introduction of organizational procedures, and the training and transfer of risk to the management of the organization [Bojanc & Jerman-Blažič, 2013]. This analysis is necessary in the context of implementation and implementation of the security strategy of subjects of any level. After all, information security is directly related to the general context of the economic life of society: "Trends like globalization, higher productivity, and reducing costs make business organizations increasingly dependent on their information systems and

Internet services. A potential attack on information systems and an eventual crash may cause heavy losses relating to data, services, and business operations. Security risks are present in an organization's information system due to technical failures, system vulnerabilities, human failures, fraud, or external events" [Bojanc & Jerman-Blažič, 2013: 25]. Consequently, the economic indicators in the analysis of information-space risks are sufficiently substantiated and in demand. At the same time, the issue of investment in business is inextricably linked with the problem of risks and threats, and their collisions in the information space are no less fierce and more effective than real conflicts. In other words: "The economic approach to managing security-risk assessment and selecting the optimum measure in information security is typically a large project. It implies a thorough analysis and evaluation of the information assets, an analysis of threats attacking information assets, an analysis of the consequences of information-technology failure, an analysis of the probability of a successful attack, and an assessment of the costs and benefits resulting from an investment in information security" [Bojanc & Jerman-Blažič, 2013: 35]. However, a mere recognition is not enough. Necessary systemic analytical concept of possible risks and threats using modern research tools of social philosophy.

This is the concept proposed by Mary Sumner, who implements a correlative-regressive analysis of information security operations, also offering a substantive empirical research base whose analysis allowed for the following conclusion: "For the information security risks that are high-impact and high-probability, organizations should implement a risk pre-paredness strategy, which enables them to safeguard and to mitigate against these risks. In contrast, for low-impact, less-probable risks, information security pre-paredness may not be as critical" [Sumner, 2009: 11]. However, system work and protocol technology in responding to possible threats in the information sphere can significantly change the quality of the system as a whole. An important factor in this activity is the philosophy of management processes and organization, their focus on information security (IS): "The next step is to have managers actively promote the organizations IS measures in their daily interaction with subordinates. This is where a genuine familiarity with IS matters and how they pertain to the organization writ large (as well as the local subsetting) becomes so important. If presentations of IS matters convey a sense that information security is a separate and only intermittently revisited concern, then that is basically what it will become" [Sumner, 2009: 76]. Therefore, it turns out that the systemic nature of managerial activity provides sufficient potential for monitoring the dynamics and flow of information activity of a system or organization. And the role of managers in providing information security is a key, although public practice demonstrates that information security managers are usually perceived as peripheral entities in the overall management system. However, modernity is changing accents. A striking example is the defeat of Hillary Clinton in the 2016 presidential race as a result of the release of her emails.

However, the logical question is: how to combine systematicy and dynamism, or freedom of expression, word and conscience in a democratic society with the need to implement an effective security strategy in the information sphere? Chad Anderson, together with other authors, formulates this issue as an important ideological orientation in the information culture, and the main pathos of the study is the contradiction between the exchange of information and the need for its protection [Anderson et al., 2017]. Indeed, on the one hand, the exchange of information cannot be controlled, edited, restricted, but, on the other hand, the availability of information is dangerous for many reasons. One of these threats is the reason to consider the inherent information entropy, which is perfectly illustrated by the famous game in the 'broken phone'. In the information risk assessment, entropy is associated with

subjectivity, as detailed in the modern researches [Cheng et al., 2017]. Mentioned research is devoted to the assessment of the probability and risk impact on system functionality. The previously proposed technologies of risk definition are rejected by these authors, since they were determined using a fuzzy integrated evaluation method. The introduction of the entropy coefficient provides an opportunity to overcome subjectivity in the examination of information threats, therefore, to measure the degree of risk of the information system, possibly by finding out its entropy trends. These source data are needed to form an effective security strategy.

In addition, by overcoming entropy it is appropriate to consider raising awareness of functors (users, managers, engineers, etc.). Therefore, educational work in the formation of information culture needs comprehensive support and implementation. Several studies have argued that information security awareness techniques such as web-based training materials, context-based learning and in-built learning are productive ways of developing and disseminating the principles of information culture. The complex of efforts aimed at increasing awareness of information security is extremely in demand and little studied at the same time, therefore, some authors devote considerable attention to determining the method of reliability of the information that is the most successful in ensuring security awareness as well as the identification of the most effective methodology of training Information Security Rules [Abawajy, 2014: 239-240]. Consequently, the lack of awareness in the areas of information culture and security emphasizes the need for detailed elaboration and implementation of practical recommendations for their application to interested parties.

One of the important information security strategies is the problem of its excessive volume and excess content. Daniel-Ioan Curiac and Mihai Pachia raise an extremely important task in the context of the present, namely the problem of utilization of information: they call this process 'controlled data destruction' [Curiac & Pachia, 2015]. Its purpose is to protect personal data that is no longer needed for future goals and strategies, but the leakage of which may be threatened. Similarly, in the work of organizations there is no longer relevant information, which is a burden for the internal structure, and a potential risk factor and challenges, so the destruction of such information is both the optimization of the information space and the factor of system organization. The scheme proposed by the authors describes a reconstructed life cycle of information that shows its direct relevance to the information society, information states, and information space in general at various stages of this life cycle [Curiac & Pachia, 2015].

Consequently, not only the theoretical and methodological complex of information security issues is a topical problem of the life of society at all its levels, but the practical introduction of regulation and ordering of the relevant activities requires careful attention of the specialists of the respective branches of knowledge and activities, their legal and political support. It is clear that modern social philosophy has a special place in this process, which consists in the development of strategic, even paradigmatic concepts for ensuring the steady progress of humanity in the information society.

Modern Ethical Dimension of the Problem of Information Security

If in matters of information security, we quite rightly raise the question of the responsibility of the involved individuals and legal entities, then naturally the question of morality of one or another action and relations in the field of information culture. Indeed, modern technology is a powerful human challenge in human beings, and information culture and information security are radically updating our anthropological practices and value horizons, as pointed

out in their works by Vadim Rozin [Rozin, 2017]. The anonymity of the information space outlines the broad field of explication of human freedom and forms a fertile field for numerous manipulative practices. Indeed, a new type of society, often outlined by the 'smart' metaphor, appears to be the socio-cultural space for the implementation of the informational effects of negative nature, which poses a threat to human in humans [Voronkova & Kyvliuk, 2017].

For example, Liisa Myyry, together with other authors, investigates the problem of the moral and psychological measurement of information security: they offer a theoretical model that demonstrates the gap between moral considerations that determine the flow of information activity and general perceptions about the values of human life and society [Myyry et al ., 2009]. Their model combines two well-known psychological theories: Kolberg's theory of cognitive moral development and Schwartz's theory of motivational types of values, and the empirical intelligences presented by them give a meaningful context for the elaboration of practical recommendations for improving information security from the personal to the political levels. However, the greatest value of this study is the analysis of the psycho-motivational dimension of activity in the information space, since the spectrum of determinants in this aspect is very broad: from personal ambition and sublimated aggression to conscientious psychology and international politics [Myyry et al., 2009: 131- 133].

In this regard, it is appropriate to recall the original study of Stilianos Vidalis and Zafar Kazmi focusing on the research inquiry on the reverse side of information security; in particular, the level of deception and manipulation is a problem area of this work [Vidalis & Kazmi, 2007]. It is clear that the conflict of interests is an inalienable companion of public life. Moreover, in today's technological and globalized world, information advantage is both a goal and a means of realizing aspirations and beliefs. Therefore, the authors argue that the art of deception is a reliable and cost-effective technique that can provide the necessary security infrastructure of a system of any level of complexity [Vidalis & Kazmi, 2007: 37-38]. Indeed, according to the principle 'warned, therefore, armed', manipulative techniques should not be left out of the attention of the involved persons, but rather, thoroughly investigated and typologized. A fascinating attempt to analyze neuro-programming technologies, which are widespread at the present stage of the formation of the information society, were carried out by Vasyl Fatkhutdinov and Oleg Bazaluk [Fatkhutdinov & Bazaluk, 2018].

At the same time, modern education should also become an instrument for developing the 'immunity' of the personality in relation to potential threats from manipulative mechanisms of influence on the person, which, as a rule, are of a culturally determined nature and are addressed to young people as the most socially active population. Denys Svyrydenko in this regard notes that involving of personality to the processes of academic mobility can contribute to the adoption of a wide range of cultural experiences that, in our case, will promote the development of individual stability in relation to external influences of a destructive nature [Svyrydenko, 2015]. This same researcher develops the above thesis, analyzing the challenges of globalization to the ideological orientations of modern youth, which are actualized by the processes of the establishment of a global information society [Svyrydenko, 2016].

It is the developed and productive information culture of the individual and society as a whole that allows to successfully overcome various challenges and obstacles, to reduce emerging crashes, noise and obstacles, breakages of communication, etc. Information culture produces 'massification' of communication and communication, which leads to an increase in the stress ratio, which is why its function is precisely the regulation and regulation of activity, a certain universal principle. Consequently, we have reason to assert that information

culture is a certain technology of modern modernized society, and its value and significance constant. In addition, a culture of any type is impossible without the carrier — a separate person, because information in a pure (not internationalized) form is axiologically and hermeneutically neutral. It is known that the real integral of culture is man and humanity. After all, culture is a cult of human being, and no semiotic, political or other factors dominate the value and value of man and humanity.

Conclusion

The information society produces a qualitatively new type of culture whose purpose is to prepare a person for life in the information space. Conceptual content of informational culture is, on the one hand, the theoretical and functional aspect of information operations, and on the other hand, the formation of a new ethics and communication complex, which will fix the basic regulations of information security. The ontological gap between the operational-functional stratum of information culture and the corresponding axiological basis contains the immediate threats of human life and society. An illustration of this situation can be imagined by a train moving in an uncertain direction, with an unintended purpose, and does not take into account the current circumstances: the presence of a railroad trail, possible obstacles in the way and the associated consequences.

It is indicative that the philosophical thought about the contemporary issue of information culture and information security is mainly negative and pessimistic. Numerous authors predict anthropological catastrophe, the main consequence of which may be the loss of human in man, or humanity as a principle of social life. If we remove the principle of humanity from a social life, then we obtain the primitive state of "war of all against all" for survival, synonymous with the concept of de-modernization. Sociality requires explication in personality, and if the infospace is anonymous and infinitely free, then the catastrophe is inevitable. That is why the issues of information security and information culture require the attention of researchers, and the mechanisms for ensuring effective demarcation between information freedom and information security should be in the focus of research optics of modern social philosophy.

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Cyberculture: Change and Rehabilitation the Body

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In the article, the authors considered the ideas related to change *and rehabilitation the body within the boundaries of a new social phenomenon, syberculture. As a result of the research, the authors concluded that the expansion of the possibilities of self, due to body composition changes and creation of the cybernetic organism is one of the possible scenarios for the development of future human being. Changes which happen in the Universe, which are considered and predicted in the paradigm of the Mental Universe, approve in the science new understanding of the place of man and the sense of his life. Change and rehabilitation the body are considered by the authors as the integral quality of everyday life of man of the future, which provides expansion of the opportunities of self. Such approach changes the attitude towards disabled people who are forced to use the modern technologies in body composition changes, and who assert self priority over a body on the example of one's personal life. The authors believe that man of the future will have to turn to the experience of affirming self over a body of a disabled person and use it to adapt one's body to the conditions of the changing Universe.*

Keywords: cyberculture*, transhumanism, Transhumanist Declaration, body composition changes, disabled people, the cyborg theory, cybernetic organism, Mental Universe*

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Introduction

Let's specify the terminology and make a brief analysis of the works devoted to cyberculture. Cyberculture or internet culture is considered by us as the intensively developing culture of communication, entertainment and business with the use of computer networks. Cyberculture is a new, adopting sustainable characteristics, social phenomenon, based on new understanding of the equipment and technologies in human life. As a social phenomenon, cyberculture provides: identification, security, confidentiality, rehabilitation, the formation and development of social relations in a virtual environment, such as online communities, online multi-player gaming, wearable computing, social gaming, social media, mobile apps, augmented reality, and texting. In "The Language of New Media" Lev Manovich offers the first systematic and rigorous theory of new media. He shows how new media works create the illusion of reality, address the viewer, and represent space. He also analyzes categories and forms unique to new media, such as interface and database [Manovich, 2001]. Social manifestations of cyberculture are considered in numerous works, for example, Olga Brunnerová and Jakub Charvát [Brunnerová & Charvát, 2017]; David Bell, Brian D. Loader, Nicholas Pleace, and Douglas Schuler [Bell et al., 2004]; etc.

The analysis of researches in this area shows that the term cyberculture is used quite widely: from the cultures of virtual communities to cybernetics, cyborgization of the human body and human society itself. According to David J. Bell et al. cyberculture includes: artificial intelligence, cyberfeminism, cyberpunk, electronic government, games, HTML, Java, netiquette, piracy [Bell et al., 2004].

The history of cyberculture is stated in the article by Jakub Macek. Conclusions to which the author has come are relevant in our days. The conclusions made by the author are relevant in our days. Macek has formulated them as two hypotheses [Macek, 2005]:

1. Themes that I describe as the core of cybercultural narratives are common for all narratives originating from early cyberculture and they were reflected in expectations connected with the supposed characteristics of advanced information and communication technologies.
2. Values and expectations connected with cyberculture and advanced information and communication technologies were adopted by the majority society and became part and parcel of everyday political and economic ideology of "information technologies" and currently they play an important role in the hierarchization of the world of new technologies.

Thus, the authors consider cyberculture as "the world of new technologies" which is created by man, and in which man expands possibilities of self. In the article, authors allocated and considered only one of the directions "the world of new technologies", which is connected with the researches of change and rehabilitation the body.

Transhumanism

In hierarchy of the social relations, which are formed by cyberculture, the ideas of change and rehabilitation the body belong to transhumanism (abbreviated as H + or h+), to one of the basic directions of cyberculture. Now transhumanism is an international intellectual movement that aims to transform the human condition by developing and making widely available sophisticated technologies to greatly enhance human intellect and physiology. There is an official site of the worldwide transhumanist movement, Humanity+ (https://humanityplus.org/). It is noted on the website that Humanity+ is an international nonprofit

membership organization that advocates the ethical use of technology, such as artificial intelligence, to expand human capacities. In other words, we want people to be better than well. This is the goal of transhumanism (https://humanityplus.org/).

The main ideas of transhumanism are stated in The Transhumanist Declaration, the first option of which was created in 1998. In subsequent years The Transhumanist Declaration was finalized and specified. Final version of The Transhumanist Declaration was adopted by the Humanity+ Board in March, 2009 [Bostrom, 2005; *The Transhumanist Reader*, 2013]. The Transhumanist Declarationncan be found on the website Humanity+ (https://humanityplus.org/philosophy/transhumanist-declaration/). The first and last items of The Transhumanist Declaration are important for our research:

1. Humanity stands to be profoundly affected by science and technology in the future. We envision the possibility of broadening human potential by overcoming aging, cognitive shortcomings, involuntary suffering, and our confinement to planet Earth.
2. We favour allowing individuals wide personal choice over how they enable their lives. This includes use of techniques that may be developed to assist memory, concentration, and mental energy; life extension therapies; reproductive choice technologies; cryonics procedures; and many other possible human modification and enhancement technologies.

Some important, from our point of view, ideas follow from The Transhumanist Declaration, which we will discuss in this article. These ideas are associated with change and rehabilitation the body. The first idea, for any person it is important to maintain the integrity of self and the inner peace. Modern technologies allow not only to change a structure of the body and compensate even its significant disadvantages, but also to consider the change and recovery the body as a necessary condition for the survival of man in the changing Universe. The second idea, change and rehabilitation the body is the direction of "the world of new technologies" which will enter everyday life of man of the future, approximately also as cars, the Internet, mobile devices, etc. have entered life of modern man. Let's consider these ideas in more detail.

Remaking the Body

In the book "Remaking the Body: Rehabilitation and Change", Wendy Seymour interviews men and women who have suffered profound bodily paralysis, and explores how they deal with their appearance, relationships, sexuality, incontinence and sport [Seymour, 1998]. As a result of the analysis, Seymour found that even serious disturbances in the functioning of the body did not eliminate the desire of self toward the fullest self-realization. Man is a harmonious development of one's above all, which itself is the fullness and integrity of the emerging inner world. Self is the basis of all "human" features. In essence, the harmony of the structure and functions of self determines the harmony of human manifestations, including those related to the body.

Examples from the history of culture prove that the body composition does not affect the person's mental capabilities and the harmony of his self. Perhaps, the most striking example is the story of life of Stephen Hawking, who was director of research at the Centre for Theoretical Cosmology at the University of Cambridge. The example of the life of the famous physicist demonstrates us the opportunities of modern technologies to compensate the disharmony of body composition and to provide complete realization of self. It is important that the development of self was self-sufficient and harmonized in order to avoid conflict between self and impossibility to realize these opportunities because of the pathologies of the body. For this reason, it is important that:

1. The shortcomings of the body composition are not emphasized and not actualized by the social environment. For this, the authors propose to change the perception and rehabilitation the body, and consider Remaking the Body in the paradigm of the Mental Universe.
2. The possibilities of "the world of new technologies" correspond to the possibilities of self in self-realization.

Wendy Seymour's book, on the one hand, expands understanding of the lives of disabled people, reveals their suffering, care and empowerment. The book reveals the complexity of the body composition changes, both in the emotional and conceptual embodiment. However, on the other hand, the book reveals the richest possibilities of transhumanism, allowing disabled people to find the second life, the harmony of self and the fullness of self-realization in society. The book reveals valuable links between lived experiences and theories, including the cyborg theory [Seymour, 1998].

For Donna Haraway, the creator of the cyborg theory, a cybernetic organism is a creature of social reality, which is involved in the social, political, gender, cultural relations [The Transhumanist Reader, 2013]. However, in Wendy Seymour's study, we see that a cybernetic organism is the sociology of the body primarily, it is the involvement of self in "the world of new technologies." Cyberculture and transhumanity in particular, allow self to consider the technique and technologies as the most important composition of a body, which not only and not just compensates its shortcomings *but expands possibilities of self* in self-realization. The technique and technologies are involved in a body composition changes and become the main way of adaptation of self both to the changing environmental conditions, and to new scales of self-realization.

Seymour emphasizes the importance of the initial psychological orientation for disabled people. Essentially, the result of resolving the conflict between self and the body depends on it. To become over the body and consider "the world of new technologies" as a new qualitative step in realizing the possibilities of self, one must possess leadership qualities, holistic competence of leadership [Porvaznik et al., 2018]. The following factors depend on the formation of leadership qualities self: social adaptation, involvement in social relations, the fullness of self-realization and its other manifestations. According to the authors, regardless of the body composition, the outlook of the younger generations should be formed in accordance with the ideas of the Mental Universe. Involvement of self in the cosmic processes opens new prospects for use "the world of new technologies." The paradigm of the Mental Universe eliminates the conflict between self and a body, gives rise to new ideas for sociologists and health professionals concerned with rehabilitation.

The role of education in change and rehabilitation the body

An important role in the lives of disabled people and body composition changes is played by education. Education forms the basic characteristics of self: psychological stability, leadership qualities, the scale of the worldview, the direction of self-realization, perhaps, put in self by the nature. We want to draw attention to two key points that follow from the history of the formation and development of theories of education in the history of culture. The authors believe that these key points allow us to rethink the ideas of change and rehabilitation the body at a new qualitative level [Bazaluk & Blazhevych, 2015; Bazaluk, 2018]:

Firstly, if we consider education as a way of life, i.e. in the traditions of ancient paideia, then the attitude to change and rehabilitation the body changes significantly. In this case, the body is considered as a means of achieving the goal. The main emphasis is shifted to

the harmonization of self, to the formation of a specific ideal for imitation. Education, as a way of life, consists in creating a sustainable image of imitation, which a priori implies: the formation of the goal of life, an in-depth understanding of the meaning of life, drawing up a plan (scheduling on) for life and understanding the priorities. Education mobilizes the potential of self to achieve a specific ideal, an image for imitation. Education accents self to the profound self-understanding, self-discipline and self-education. It forms a certain direction of realization of self. In this case, the body composition fades into the background and is considered by self only as a means to achieve the ideal image. The body composition is considered as a *technology*, as the possibility of the fullest self-realization of self. Right here the idea of the cybernetic organism is born, which is regarded as the necessity of self-complication, as the only opportunity to achieve the fullness of realization of self, as an opportunity to achieve the goal. This approach to education changes attitudes toward the body initially. Change and rehabilitation the body is perceived by self as a technological innovation and progress, as one of the ways to use "the world of new technologies" for expansion of its own presence in the world around. Change and rehabilitation the body is used by self as a way of more qualitative achievement of the goal, the possibility to surpass the ideal, to become better and to go beyond the capabilities given at the birth. In essence, the use of the ideas of *change and rehabilitation the body* in everyday life is the first step towards man of the future.

The conflict between self and a body is eliminated. Olga Khrystenko, based on the achievements of modern embryology, sociology and bioethics, defined four levels of this conflict. The first level is a conflict concerning the life of the unborn child. The second one is a conflict concerning a mother. The third one is a conflict with the nation. The fourth one is a conflict with God [Khrystenko, 2016].

The authors consider that it is necessary to add one more level to these levels of the conflict: the conflict between self and a body. This conflict reaches apogee in the lives of disabled people. However, in the case when education is considered as a way of life, when disabled people are imposed a concrete ideal, an image for imitation, this conflict is eliminated, as accents in outlook are changed. Self and its harmonious development becomes the center, and a body is considered as an environment in which self develops. Change and rehabilitation the body are perceived as *improvement* or perfection of the environment in which self develops. It is the involvement of self in the paradigm of the Mental Universe, in which the body composition changes are the only possibility of opening up the Universe.

Secondly, if we regard education as a transcendence of humanity to the new levels of perfection, then change and recovery the body acquire completely new meanings, close to the cyborg theory. Education puts absolutely new perception of the equipment: as strengthening of the opportunities of self, as transtsendention out of limits of possible. Until now, education has been forming the relation of self to a body, as to the environment of the forced presence. The quality of formation and realization of self depends on the quality of the development of the body. The authors propose to change the key orientation and, instead of the body, "the world of new technologies" to consider as the place of the forced presence of self. In this case, self will treat technology as a body, and treat technique and technology as the sociology of the presence of self.

Such approach to technique and technology will change the attitude towards the transformation of the body, to its cybernification. Change and rehabilitation the body will turn into the daily necessity. For self, body composition changes and the transformation of the body into a cybernetic organism, will be the only opportunity to compete on the Earth

and in space, and to adapt to the conditions of the expanding Universe as well. Just now, the physical and chemical characteristics of the Earth has changed intermittently, that leads to the death of people because of their inability to withstand natural disasters and technogenic catastrophes. Under the influence of the environmental conditions there is a transformation of biological and neurobiological processes in a human body. It is possible that the cybernetic organism will be the only potential solution to limit the destructive influence of the Universe on the development of self and its self-preservation [Slyuta, 2017].

The paradigm of the Mental Universe

The paradigm of the Mental Universe reveals the true possibilities of self and a body. According to Bernardo Kastrup, experiments have confirmed that — as predicted by quantum mechanics — reality is contextual, which contradicts at least intuitive formulations of realism and corroborates the hypothesis of a mental universe [Kastrup, 2017; Kastrup, 2018]. In the article "Making Sense of the Mental Universe" Kastrup explained how a mental universe can — at least in principle — accommodate (a) our experience of ourselves as distinct individual minds sharing a world beyond the control of our volition; and (b) the empirical fact that this world is contextual despite being seemingly shared [Kastrup, 2017].

For our study, the value of *the paradigm of the Mental Universe* is explained by the fact that man is regarded there as the evolution of self, and the change and rehabilitation the body — as a necessary condition for the involvement of self in the cosmic processes. The cyborg theory takes on the new meanings completely in *the paradigm of the Mental Universe.* Cybernization of the body becomes necessary and the only possible condition for human adaptation to the changing conditions of the Universe. This is the only possible way to expand the possibilities of self and its self-realization on the scale of the Universe [Matusevych & Bazaluk, 2015].

The paradigm of the Mental Universe gives birth to new ideas for *change and rehabilitation the body*. For example, the development of the resources of the Universe implies a long-term presence of man in space. The biological organism, as the medium of the presence of self, is not adapted to a long-term staying in space [Space Travel, 2012]. Just for this reason, "the world of new technologies" becomes the only possibility of self to expand its presence in space, including the way of replacement of the biological systems of an organism by the artificial ones, i.e. the technique and technologies [Matusevych & Bazaluk, 2015].

Conclusion

Thus, considering the ideas of change and rehabilitation the body, we came to new understanding of the place of man in the Universe, which follows from *the paradigm of the Mental Universe*. The authors consider that cyberculture and transhumanism, as one of the directions, predispose to change and rehabilitation the body. Adaptation to the changing conditions of the Universe, as well as opening up the cosmic resources, assumes the active involvement of self into the space processes. However, a human body, as a comlex functional biological system, is not ready for this. For this reason, for man of the future the following matters acquire a special urgency: 1) domination of self over the body; the initial attitude to the consideration of the possibilities of the body as a natural extension of the possibilities of self; 2) consideration of change and recovery the body as the only possible condition for the adaptation of self to the changing possibilities of one's own structure and functions, and also to the physical and chemical conditions of the expanding Universe. The authors established

that in the change and rehabilitation the body the special importance is gained by education which is intended to form steady understanding of prevalence of self over a body. The future human being in "the world of new technologies", as the education philosophy problem, was considered in article "Cyborg, Mutant, Androgyne: The Future Human Being — What Will It Be Like? (Issues of Philosophy of Education)" by Tetiana Matusevych and Oleg Bazaluk [Matusevych & Bazaluk, 2015]. However, from our point of view, only when the paradigm of the Mental Universe dominates, the conflict between self and the body is eliminated, because the body is viewed by self as a means to expand its opportunities. The body as a means of empowering self is a cybernetic organism.

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Futures Studies: Spirituality in the Cosmic Man

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Today's crisis of education should be considered as a crisis of a moral and spiritual basis of our society. Upbringing and education are a kind of spiritual activity, an important component of spiritual culture. Thanks to upbringing and education, a person improves himself intellectually, mentally, morally, artistically, aesthetically, spiritually, acquires the image of the Man of Culture. The crisis of the educational system is an integral part of the global spiritual crisis that has embraced society. Pedagogical science needs now a careful study of the multidimensionality and multiplicity of a person, the understanding of its true essence on the basis of a new methodology of knowledge of a unified and holistic world.

Keywords: spiritually, spiritual creativity, spiritual values, spiritual crises, cosmocentrism, cosmic man, cosmoplanetary, human creativity

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Introduction

Today, the devaluation of the spiritual and cultural values has significantly influenced an increase in spread of the brutal individualism, the pragmatism of high and mighty attitude towards others and humiliation of their human dignity, contempt for native culture and historical and cultural traditions. Modern information and technological civilization gradually devalues the spiritual and cultural value of upbringing and education, replacing

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them with the acquisition of life experience from films that have dubious spiritual, moral, artistic, and aesthetic values, various shows, and education is easily acquired through the use of the Internet. This leads to the creation of a dangerous situation of separation of knowledge from the education of a person. Modern technologies intensify the processes of alienation of knowledge, marked by the experts already, including the educational activities. Mechanical technological procedures devalue the significance of a person's place in education. All this exacerbates the problems of upbringing of Man, Humanity, and Spirituality. It is our time to become the time of the Resurrection of Spirituality, Culture, and Purity of Soul.

It should be noted that an educated, but not a well-bred man, having no formed general human and national values, is dangerous to society. Upbringing and education are a kind of spiritual activity, an important component of spiritual culture. Upbringing and education carry out the mission of human creativity, cultural creativity, and spiritual creativity in the society. We consider education as a process for students' acquisition of the system of spiritual and cultural values, which are a guiding light in the selection and implementation of life-oriented ideals; as a sense basis of education, which is the source of the intellectual development of a person, who develops his intellect through science, culture and the criticality of thinking, reflection, participation in various forms of creativity. The process of upbringing appears to be dominant in this set. Thanks to upbringing and education, a person improves himself intellectually, mentally, morally, artistically, aesthetically, spiritually, acquires the image of the Man of Culture [Shevchenko, 2017].

Methodological Framework and Objectives of the Study

Pedagogical science as a branch of human studies needs now a careful study of the multidimensionality and multiplicity of a person, the understanding of its true essence on the basis of a new methodology of knowledge of a unified and holistic world [Bazaluk & Blazhevych, 2015; Bazaluk, 2018]. It is clear that and methodology, and theory, and practice of education are determined by the nature of man in his age formation, and in general — the evolution of mankind.

Despite all the efforts of the world pedagogical community to raise the level of education in society, it decreases with each passing year. Centers, institutes of perfection, harmony and beauty of a person turn into centers of preventive education, rehabilitation of groups of risk, etc. For millennia, the brightest heads of the world have been struggling with the issues of upbringing of a humane, beautiful, God-like man. Today, as ever, Oleksandr Klyzovsky's opinion that the material crises in the society are directly related to the spiritual crises is current: "... the education of humanity has removed the main lever of perfection, the main factor in the development of life — the upbringing of the spirit. Mankind is experiencing an unprecedented crisis, precisely because of the stoppage of its development, because of the loss of its spiritual values. Economic impoverishment is the result of impoverishment of the spiritual" [Aleksandrov, 1999]. It is not superfluous to emphasize here that these words, which so clearly reflect the state of our contemporary society, were prophetic. After all, the author formulated them during the crisis that arose in Latvia in 1934. It would be possible to cite many similar thoughts, which were expressed at different historical stages.

Take at least the 30th century BC. In ancient Babylonia there is an inscription on the clay crockery, full of sorrow and disappointments: "This youth is corrupted spiritually to the depths of the soul. Young people are harmful and careless ... The young generation of the present will not be able to preserve our culture", but the main thing is that the problems of spirituality, breeding, and high culture of the individual are eternal.

In recent years, the problems of spirituality have occupied a prominent place in the various fields of knowledge, because they bring us closer to the disclosure of the eternal mystery — the man's ambiguity, its true essence.

The anthropocentric, materialistic worldview (claimed from the seventeenth century and, in accordance with it, the paradigm of analytical and pragmatic cognition and the development of the world) created the modern technocratic civilization, which led to the fatal distribution of knowledge on natural sciences and humanities, to the typology of sciences about nature and spirit, on traditional separation of the integrated knowledge on separate disciplines in the secondary school already, that is, to the discoordination of different areas of knowledge [Vilkov, 2018].

Such a substantive approach in education of all degrees poses a threat to pragmatism and utilitarianism, the fragmentation of knowledge, its lack of system, separation, and isolation from one another. In the content of modern education, most educational subjects are oriented, mainly to "subjugation of nature", the world, and not to cooperation, interaction with them; and knowledge, as it is known, depending on the "carrier of knowledge", can be used both on the processes of creation, and consumption or destruction. Moreover, the domination of materialism and polytechnicalism has pushed aside the spiritual and humanitarian knowledge that forms the soul-spiritual hypostasis of Man, his inner world that affects the spiritual development of a personality and a society negatively [Tytarenko, 2018]. Another important problem of the modern education is that traditional pedagogy, understanding a person as a biosocial creature and ignoring its spiritual component completely, interpreted a person not as a bio-socio-spiritual phenomenon, but only as an earthly being, a distinct living structure that is not interrelated with the world, leading to disharmony, a violation of harmonious relationships with the information and energy space. Today a person, unfortunately, does not realize himself as the complex bio-energetic information system that is a part of the world: the Earth, the society, the Universe, with which he is in a stable information and energy interaction. The consequence of this is the loss of a person's need for knowledge of himself and the world, the lack of desire to understand his mission and purpose on the Earth, responsibility "for the world and for himself in the world." Having lost a sense of involving, belonging to the world, mankind did not form responsibility for the life on the Earth and in the Cosmos and came to be in the "space" of the pernicious process of moral, spiritual and environmental self-destruction. Today, scholars are deeply concerned about the fact that the high ontological and existential goals are not raised in today's school, schoolchildren are not taught the ability to create their lives, proper attention is not paid to the problems of spiritual self-knowledge, self-development and self-realization, which leads to the formation in the younger generations of consumer psychology, upbringing of a technocratic man, a human-destroyer, a non-spiritual person, and not a creator. According to Alla Kuznetsova, today's crisis of education should be considered as a crisis of a moral and spiritual basis: proclaiming of high humanistic principles and goals and ignoring them in practical activity, lack of spirituality of participants in the educational process, irresponsibility in decision-making, ignoring the personality in the educational process and the lack of spiritual component in the goals and content of education [Kuznetsova, 2012: 139-52]. Despite the proclaimations in the normative documents of slogans of human centered education about the self-worth and uniqueness of each person, the importance of maximum disclosure and development of the desires, spiritual needs and interests of each child, the education system, which developed in the 19th — the first half of the 20th century, is oriented mainly on the reproductive type of education, training intellectuals Modern education of all levels does not pay proper attention

to the moral and spiritual education, disclosure and development of the creative potential of the individual, as evidenced by a sharp decline in the moral and ethical potential of education. Today, the state of education all over the world has collapsed, that is testified by the "systemic crisis on the planet", which includes the general crisis of education, which was recorded by the Roman club in the 1970's [Peccei, 1997: 302]. According to the modern scholars, the crisis of the educational system is an integral part of the global spiritual crisis that has embraced society [Shevchenko, 2017].

In the cognition, the model of subjective and objective opposition prevailed, which turned out to be a special form of the gap between Man and the World, and which for a long time remained unconditional and the only form of explanation for the world. This led to the consumers' attitude towards the world, mechanistic understanding of the relationship between Nature and Man, and generated patterns of interaction between Man, Nature, Society and State, which contribute to the destruction of the biosphere and the degradation of Man.

The famous scholars of physics and cosmology (David Bom, Paul Davis, Fritjof Capra) form a new paradigm of human knowledge as a biological, social and cosmic being on the basis of a holonomic approach to the world and a holistic view of the Universe.

A new model approach to the knowledge of a single and holistic world, on which the philosophical picture of the cosmic phenomenon of man is constructed, attracts attention. Ihor Alexandrov [Klizovsky, 1998], sharing the view of Man as a cosmopolitan phenomenon of Pierre Teilhard de Chardin, as well as their ideas of the integrity and unity of nature and space, emphasizes a specific feature of a new stage in the development of land civilization, the essence of which he saw in the change of human worldview: from the ideas of anthropocentrism to cosmocentrism. It intensifies the attention to the study of the deep essence of Man, whose nature is extremely controversial and multifaceted. In view of these features, it is possible to design a program of 'cultivating human perfection'. By the way, Jan Amos Komensky in his work "On the culture of natural talents" wrote, "Look at the precious stone that shines radiantly in the royal crown or on the princely fingers. Do you think so it was born? You are mistaken, when you think so. It was born rough, dark, and dirty; you would not raise it from the ground. In order for it to shine, it is necessary to clean it, to saw it, to smooth it, to trim it, to file, and to polish." Let us add to this that the master must know the features and the secret power of the stone. Let us recall Danila-Master from Bazhov's story. Let us emphasize once again that taking into account the latest knowledge about Man enables pedagogical science to reconsider many pedagogical phenomena, to depart from stereotypical views on learning, formation, development of personality.

Let us consider human diversity and contradictions, the essence of which is manifested in the unity and multiplicity of the opposite qualities, such as materiality and spirituality, spirituality and lack of spirituality, rationality and irrationality, consciousness and unconsciousness, etc. [Klizovs'ky, 1998]. We consider Klizovs'ky opinion about three necessary directions of knowledge of the integral essence of the complex phenomena of the human world to be very fruitful:

1. The study of a separate and solid hierarchical plurality of human properties, its diversity;
2. The study of the cosmic nature of Man, understanding of space and man in the unity and integrity of the spirit, mind, consciousness, matter and life;
3. Study of the unity and integrity of the world, in which Man acts as the active force.

Scholars relate spirituality, intelligence, consciousness, activity, psychologicalness, symbolicalness, creativity, and sophisticalness (wisdom) to the main forms of manifestation

of the true essence of Man in the modern philosophical and psychological literature. Pierre Sharron, a well-known French philosopher-moralist, a theologian of the 16th-17th centuries, noted that wisdom is not knowledge brought by someone else, but its ordering for the "convenient" use. We understand only ourselves. If something else succeeds other people in relation to us, it just wakes up that which is sleeping in us [Shevchenko, 2017].

The most important factor in improving the nature of Man is his cognitive, objective, creative activity, communication, learning, games, work, and creativity. The "second" nature of Man is being polished and born just in the activity. The more diverse participation of the individual in different activities is, the higher his creative potential is, the more harmonious, spiritualized, integral his inner world is. In the activity the worldview, and the spiritual needs of the individual, and the essence of his individual evolution, and personal contribution to the evolution of the mankind are captured. There is a classic example of a Georgian fairy tale about this. The Tsar of Georgia fell in love with the daughter of the goldsmith and asked for her hand in marriage. Moreover, what his surprise was when the bride's father asked him, "What can you do? What kind of craft do you have in your hands? What is the business you have mastered? To issue orders and decrees is not something that glorifies a person and raises him on the stage of the earthly value!" The Tsar had to pass the science of mastering the art of chasing, to become the Real Master — the Creator and worthy husband of the daughter of the Great Master. Even this example gives an opportunity to see the correct way of forming the multiplicity and cultural essence of a person — a way of tireless work of spirit, mind, consciousness, psyche, and creativity. Recall the words of Jesus: "Faith is dead without works." Consequently, work, respect for Man-Master in the conditions of the new market relations in our state should take a worthy place in the pedagogical researches, because activity in all its varieties is a ray in which all spiritual values of Man, hopes of the mankind are focused. We should remember that each nation has its own mentality. For the mentality of the Ukrainian people, the desire to create beauty of the environment and the surrounding reality, love for work is a national feature, an archetype of the Ukrainian culture. That is why activities on the creation of the external and inner world are always shrouded in beauty, high moral virtues, harmony and high spirituality.

Understanding the essence of spirituality can help to look at a person as a cosmopolitan phenomenon. Ancient myths, historical and cultural monuments testify to the fact that Man is the essence of the heaven and the Earth. In the 4th century BC Hermes Trismegistus ("three times the greatest") in his "Emerald Tables of History" formulated the idea: "The globe is rolling, and it will never be possible to establish where the beginning of any story takes place — in the heaven or on the Earth. Only that one serves the truth who claims that all of them are performed/played accordingly and simultaneously here and there, and it seems only to our eye as if they fall and rise again. But what happens underneath, and could not have happened, it, so to speak, would not have lighted upon to oneself without his heavenly pattern and likeness."

The views on space and life belonging to Volodymyr Vernads'ky, Kostyantyn Tsiolkovs'ky, Oleksandr Chyzhevs'ky, and Ihor Alexandrov, who affirmed that the fate of a person depends on the destiny of the Universe, that life is more a cosmic phenomenon than the earthly one, that life comes from space, and its code is recorded on the earth, are the continuation of this thought [Bazaluk, 2016]. The cosmic essence of Man is determined by the Cosmic Absolute, which has given the birth to Man just as itself in the form of a system of microcosm, and Cosmos, which affects it with its rhythms and laws of development.

The source of the development of the true essence of Man is the Universe, the driving force — Cosmos and Man, the prerequisite — the Cosmic Absolute. From the point of view of

the cosmoplanetary essence of Man, his development is determined by the living nature, the Universe, Cosmos and the Cosmic Absolute, which, on the basis of integrity, harmony, and spirituality, create a single environment rich in information. That is, the total essence of man is formed by Cosmos: everything in Man is also in Cosmos. Therefore, Man possesses the ability to self-construction, self-creation, synergeticness — the ability of self-improvement, to merge with God.

Pedagogy cannot ignore the predictions of cosmic philosophers about the interaction of life and man associated with the emergence of a new form of Life (above "Super Life") (Pierre Teilhard de Chardin), and the transition of Man (humanity) into one whole type of radiation energy [Krymsky, 1992: 21-22]. When Vlayl Kaznacheyev expresses the hypothesis of the emergence of life on the Earth as a result of "marital relations" of the space meeting on the Earth of various forms of cosmic life — protein nucleic and field, he leads us to the conclusion that the modern mankind is the unity of terrestrial and cosmic forms of life, it becomes clear the significance of the Spirit in the life, human creation of life. People say when their spirits are low, "Do not lose courage, do not lose heart"; "Strong in Spirit is indestructible, persistent, meaningful" that means to put into motion one's inner forces — mind, consciousness, self-consciousness, creativity, subconsciousness, wisdom, goodness, beauty, and every day strive to rise, eulogized above existence, realize oneself in the world and the world in oneself as a ray passing through the heart.

We share the point of view of one of the leading scholar-philosophers Ludmyla Bujeva about the essence of spirituality as a problem of gaining sense, the existence of a certain hierarchy of values, goals and meanings, the constant ascension to the heights of the highest values and their realization in the practical activity. However, these are just some of the milestones that indicate a possible way to study spirituality in pedagogy.

Из мужества борцов,	From the courage of the fighters,
Из крови битв,	From the blood of the battles,
Из страданий одиночества,	From the sufferings of loneliness,
Из жертвенных деяний народа	From the sacrificial deeds of people
Возрастет духовный плод,	The spiritual fruit will grow,
Если души духовно и сознательно	If souls will send their feelings
Обратят свои чувства и помыслы	And thoughts spiritually and deliberately
К Царству Духа.	To the Kingdom of Spirit.
Рудольф Штайнер	Rudolf Steiner

As for the goal of modern education, it gradually, veiled shifts from the formation of a spiritual and moral person to the development of a successful person, "knowledgeable man", interested, mainly in obtaining the knowledge and skills that will help him to make a career and self-assertion in the society.

In modern education, the importance of informatization and computerization in society is declared, but the ideological function of knowledge (outlook) is forgotten, as a result of which the basic ideological meaning of education is lost.

Unfortunately, the modern school unilaterally relies on a materialist outlook that does not focus on the Volodymyr Vernadsky's Noosphere Concept of the whole Unity, the Laws of the World and Society, a deep understanding of these Laws, which should become the basis of the outlook and constructive activity of a modern man.

Perhaps, therefore, we are talking about the most powerful crisis in our technocratic, globalizing world associated with education. It is difficult not to agree with Moisey Kagan, "The deep meaning of the problem of globalization is not technological, but — pedagogical." At one time, Vyacheslav Lipinsky said, "Babylon plummeted and old Rome perished, because its material technology has evolved its social morality" [Lypynsky, 1995: 204; Kagan, 2005].

The overcoming of the global spiritual crisis and ensuring the further existence of the humanity as a whole is seen by the world community in changing the paradigm of the civilization towards the co-evolution of Man, society and nature, in changing the consciousness of people, the formation of the new ideological landmarks and moral values, education of Man as a biosocial and spiritual phenomenon. And in this process, the main place, undoubtedly, belongs to education, which, being one of the basic social institutions of modern society, is an important factor in the development of the civilization. The analysts connect people and their coming out of the global systemic crisis just with education.

According to many modern scholars one of the ways to overcome the crisis of education is a noospherization of education, the relevance of which is related to the awareness of the need to rethink the laws of human life on the Earth, the character of the relations of man, nature, society and the Universe [Bazaluk & Blazhevych, 2015; Bazaluk, 2015].

The important tasks of the noosphere education are:

1. The construction of an ecocentric or anthropocosmic worldview oriented to the harmonious partnership between man and the world;
2. In the gradual formation of a new noospheric man — the Earthman of the 21st century, a spiritual and moral person with a holistic worldview, a noosphere consciousness, a harmonious type of thinking as the result of the combined work of the cerebral hemispheres, which will lay the foundation of the noospheric civilization of the future.

Conclusions

Thus, in our opinion, solving the problem of overcoming the crisis in the modern education will become possible under the condition of changing the consciousness of a modern person from technocratic to a spiritual, anthropocentric, materialistic outlook on the noosphere through a noospheric education aimed at forming a creative, high-spiritual personality with the deep, internal need for self-knowledge, self-development, self-improvement, self-realization, Citizen of the World, a responsible and highly educated person, who seeks to understand the meaning and purpose of his life, to live in harmony with oneself and the world. Aurelio Peccei, the founder and president of the Rome Club, noted rightly, "If we want to change the world, we must first change the person" [Peccei, 1997: 302]. As it has been already noted, an important part of the noospheric education is the moral and spiritual component, which in the 21st century got the global meaning in the world, since the level of spirituality, humanization and democratization of the terrestrial society as a whole depends on the level of spiritual development of each one.

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Section Four
COSMOLOGY IN PERSONS

The Problem of Forms of Completing the Copernicus Revolution in Modern Cartesian Science

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Due to the opinion that philosophy of the Modern Age might be considered as uncompleted Copernicus revolution, the purpose of this paper is to outline the main points of manifestation of anthropology in early Descartes' writings. Emphasizing the ambivalence of the basic intention of early Descartes' writings, authors are focused on the forms of overcoming the naive impact of the scientific revolution and related ways to make anthropology relevant. It is argued that Copernicus' inquiries persuaded Descartes to conceive his anthropological studies. It was discovered that the first form of actualization of human nature for Descartes was the problem of the proper principles of human existence. The text of "Rules for the Direction of the Mind" proclaims the tendency of self-development, which can be implemented firstly, by focusing on individual features of the human nature. Secondly, since the peculiarity of the Cartesian interpretation of human nature is emphasizing of combination of mind and will in it, Descartes is trying to improve the human nature using will and habits. Observation of the uncompleted Copernicus revolution allows outlining some following points. Firstly, the significance of anthropology in his draft of the system of knowledge; secondly, the ethical orientation of his inquiries; thirdly, the expediency of reconsideration of the established technomorphic interpretations.

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Rene Descartes is one of those key personalities in the history of philosophy, whose philosophical heritage contributes to a more fundamental understanding of presence. Present crisis of ideals and values of technogenic civilization make Cartesian texts more relevant because they can assist in the disclosure of mankind's essential potential forces, what is highly important today.

In the present Cartesian studies, two main opinions on the Rene Descartes philosophical heritage could be traced. The first opinion represents Descartes as a pioneer of the scientific and technological revolution and the founder of a rationalistic way of thinking. In frames of this opinion, Descartes appears as the methodologist of science, who extrapolated the methodology of the natural sciences to all other fields of knowledge due to his general technocratic research strategy. The second opinion insists on the significance of the anthropological interpretation of Descartes philosophical project and does this interpretation on his metaphysics, epistemology, ethics, and other related fields of philosophy. This position is now far away from being theoretically completed because it mostly appears not more than as episodic, fragmentary researchers' interpretative tendency. Interpretation of Descartes philosophical project as anthropologically targeted reveals the new perspectives for revision of revolutionary changes in the Modern philosophy and critical reconsideration of the basic anthropologic values of scientific and technological progress.

The present revision of the Cartesian heritage is provided on the principles of distancing from the past naive reception of his texts as strictly epistemological and non-anthropological. The main condition of deconstruction of mentioned reception is to focus on the contemporary interpretations of Cartesian research ambitions as unfinished Copernicus' revolution. In other words, the reason why the anthropological project of Descartes is under the reconsideration now is a high attention that is paid to the cosmological revolution of Nikolai Copernicus, which deprived the Earth and man of the status of a key place in the Universe and emphasized the appropriateness of the reception of space as a set of astronomical objects. Copernicus approach contains threatening implications for theology, which put the eternal philosophical questions on new discussion and actualized the problem of the anthropology status.

The key issue of Descartes' philosophy, which has been based on the incomplete ideological and epistemological "Copernicus turn", appears as the question of the presence and representation of anthropological interest in the early texts of the founder of the Modern European rationalism. In this case, the famous Descartes' dreams of 1619 have to be reconsidered. Their determinative influence on his way of reasoning has repeatedly been emphasized in the numerous research papers. Assessing the significance of these three dreams, Australian scientist Stephen Gaukroger highlights that they represent an important "turning point in his life" [Gaukroger, 1995: 106, 152]. The appeal to the modern history of philosophy does not seem to clarify the mentioned transformation. Generally, it is obvious that this is a matter of the Cartesian way of reception and interpretation of the scientific revolution itself. This way is specified as a statement of the priority of natural sciences

influence on the way of his worldview formation. Such approach is widespread in the history of philosophy what is proved by scholars' uncertainty about the sense meaning of "miracle discovery" of 1619. Gaukroger mentioned that "There are a lot of undiscovered points and even Descartes' progressing during 1620-s still remains mysterious." He, like most scholars, is tended to consider the determinative role of mathematics. At the same time, he emphasizes a mysteriousness of the thinker's position for the present that is related to the fateful nature of the famous dreams and the necessity to make an explicit choice. This emphasis is evidenced, firstly, by the questioning on the proper principles of human existence ("what road in life shall I follow?") and, secondly, by the emphasizing of the necessity of making a choice by focusing on the importance of the key concepts, "it is and is not" [Gaukroger, 1995: 107].

In this paper, as well as in a number of others, the anthropological aspect of the Cartesian philosophy is mentioned fragmentary, which is caused by the naive reception of the scientific revolution. Therefore, the value of those studies of early texts, whose authors go beyond the specified limits, grows. Among the fundamental Cartesian studies, particular attention should be paid to the contribution of Jean-Luc Marion [Marion, 1999], who is well known modern professional in Descartes philosophy.

The researcher is focused on the "Vulgate" of Descartes" pure rationalism, and therefore he is against the interpretation of dreams as forms of manifestation of an immature form of rationalism and giving them an independent theoretical status. The scholar rightly states that general opinion about Descartes anthropocentrism, which appears in the form of the hypostasis of the autonomy of thought, deserves particular attention and deconstruction. Outlining the basic principles of his own methodology, Marion distances himself from the only true interpretation of Descartes senses and values, which could be defined on an interpretation of his dreams (as it took place in psychoanalysis by Freud and Jung). He states that the primary task is to clarify the actual philosophical interpretation of dreams. Analyzing the flaws of the naive reception and ways of their overcome, which could be found in established research approaches, the scholar takes into consideration the peculiar trait of the Descartes doctrine, which represents itself as a continuous apply to the symbol of a mask, as emphasizing the secrecy and loneliness of a thinker's lifestyle.

Another flaw of the established methodology, which is being criticized by the scholar for being a serious obstacle on the way to authentic Cartesius is superficial stereotypes to assess the Descartes' position as dehumanized. Doing his own interpretation of the Descartes position, Marion rejects the temptation of the "Vulgate" of anthropocentrism (because there is an affectation in the basis of consciousness) as well as other two opposite temptations, which are connected a) with the reduction of human consciousness to the lower layers of the psyche (psychoanalysis), and b) with the interpretation of consciousness as manifestations of divinity, where dreams are the manifestation of divine revelation (Thomas. Aquinas).

Analyzing Descartes' intention to develop anthropology, Marion unambiguously emphasizes the key role of the phenomenon of man in Descartes' texts: "The only protagonists are Descartes himself and "a man", also called "a person."[Marion, 1999: 7] This implies the legitimacy of the use of the concept of anthropocentrism in its positive, constructive meaning, which is completely different from commonly known. This statement is evidenced by a close reading of Descartes' texts.

The scholar states that Descartes' self-concentration appears to be sufficient reason for interpreting the further course of his thought as a "figure of self-interpretation." This point is noted in the title of the second paragraph. Analyzing the question of what is the "Self", on which Cartesian philosophy is based. Marion emphasizes the expediency of a

fundamentally different (wider) vision of Cartesius position. The matter concerns qualifying Descartes' position as a rationalistic, in which the rationality of human being is reduced to the thinking. Explaining each of mentioned points, Marion consistently focuses on the specificity of the Cartesian understanding of thinking as a mentioned "foundation." Firstly, he appeals to affectivity as an attributive trait of consciousness, and therefore "cogitatio" in his opinion means "all that consciousness experiences." Such position allows interpreting Descartes' position of 1619 as "awakening of cogitatio." As for the nature of the "foundation of miraculous science", it seems to be radically different from thinking, what is proved by appeal to the Private thoughts: "The Lord has made three marvels: something out of nothing; free will; and God as Man." Therefore, it is proposed to consider the free will as the foundation. Predicting possible arguments and objections, Marion emphasizes that such interpretation does not contain any logical or substantial fallacies, because Descartes' position is not reducible to the "Vulgate" of pure rationalism.

One of the most powerful arguments against considering Descartes as a rationalist is a modern scholar's interpretation of substantial originality of Cartesian rationalism. The matter concerns the key points of human nature which appear axiomatic for Descartes (that is the reason why he never mentions or accents them). The validity of the proposed explication is obvious to any attentive reader of the Descartes texts: "Autonomy of the cogitated evidence and divine warranty through the will: Descartes would never again question this duality — or, perhaps, dichotomy." [Marion, 1999: 19] Mentioned points are invariant for Descartes in all of his further work, what becomes more obvious while observation of the late texts.

"Rules for the Direction of the Mind" — one of those Descartes' texts, which were written soon after the famous dreams appeared. Dreams were written between 1619 and 1625 and were never completed. The scholars have a common opinion that "Rules for the Direction of the Mind" heralded the radical turn in thinker's convictions. The matter concerns the man's getting beyond the boundaries of established traditions, which means the impossibility of their subsequent uncritical reproduction. The main factor of mentioned changes was the radical shift of the human position in the Universe, which was initiated by Copernicus. One of the most important transformations, caused by mentioned shift, is the priority of the individual and personal dimensions of human existence. Such new condition persuades individuals to seek their own answers to the common worldview questions.

Until recently, the dominant interpretations of the basic vector of early Descartes' philosophical inquiries were propounded by authors, which gave the priority to the methodological problems of natural science. For thus authors mentioned approach appeared as axiomatic since it correlated with the scientific revolution and was based on the extrapolation of the mathematics methodology. In Kraye's article "Conceptions of moral philosophy" author emphasizes the intention of the New Age philosophers to follow the Euclidean method and to extend its constructive application beyond the boundaries of mathematics. The title of the paragraph, in which the author outlines the vision of the main points of Descartes' position, representatively named — "From the traditional to the geometric concept of moral philosophy." [Kraye, 1998: 1300-1308] We want to highlight that the common opinion of scholarly writings favors the reductionist approach, which represents itself by focusing on the Mind (as the single element of human nature) and full omitting of Will. (The essential role of the concept of "Will" will be explained later by referring to the text of "Rules for the Direction of the Mind") It is quite representative that such simplification dominates in the text of an unfinished doctoral dissertation by Nathan Douglas Smith "The origins of Descartes' concept of mind in the "Regulae ad directionem ingenii" written in 2010. Considering

the sources and key factors, which influenced the appearance of Descartes' "Rules for the Direction of the Mind", Smith pays necessary attention to Cartesius intellectual crisis of 1619-1620 years. However, despite stressing the importance of the third dream (related to the problem of the proper principles of human nature ("what road in life shall I follow?"), he underestimates the significance of an anthropological project [Smith, 2010: 42-43]. The thoroughness of this inquiry is evidenced in by the researcher's attentiveness to the relativity of the topics in the "Rules for the Direction of the Mind" with a problem of the World and Man [Smith, 2010: 108-113].

Analyzing the peculiarity of the present level of science development, it becomes obvious, that professionals in Descartes' philosophy warn us against the temptation to move in line with the established tradition and to reduce the ideological richness of the text of the "Rules for the Direction of the Mind" to the simple reception of the scientific revolution, which means a synthesis of achieved scientific results. In other words, illusions about transparency and simplicity of Descartes' way of thinking are being substituted by the admission of their hidden and mysterious character for us: "There are, in fact, a number of grey areas in this period, and even Descartes' movements (of the thought — M. A.) during 1620 are something of a mystery" [Gaukroger, 1995: 126]. Quite similar evaluation of the Descartes' creative period of the 1625-1628 could be found in the papers by Clarke, who emphasizes, that during this period Descartes launches a large number of projects which remained uncompleted [Clarke, 2006: 81].

Gaukroger's statement about the ambivalence of the Descartes' position during the "Rules for the Direction of the Mind" composition appears as an indirect evidence of the reductionist approach narrowness. Gaukroger contends that Descartes had a plan for universalization of mathematics. This plan he was not able to complete. This failure caused a disappointment in mathematics and general descend of his enthusiasm [Gaukroger, 1995: 180-181]. The opposite opinion is associated with comprehension of anthropological dimension of Descartes' heritage since the main intention of the "Rules for the Direction of the Mind" is considered to be a self-education, which requires a self-conviction: "the central task, he writes, is to convince you."

The reductionist approach is now in descent because much more attention is dedicated to the anthropological intention of Descartes philosophical heritage. Particularly important to us is the correlation of the discussed points with the context of the Copernicus unfinished revolution. Ernst Cassirer was one of the first scholars, who outlined its existence in the early 20th century [Cassirer, 1988]. Cassirer asserts that one of the essential traits of the mentioned revolution is the requisition of compliance with the scientific spirit. That is why the only reliable scientific basis of new anthropology seems to be the new cosmology, i.e., the heliocentric system by Copernicus. A quite similar approach is developed by Clarke today, who emphasizes the significance of the individualistic and personal aspects. Clarke writes: "Descartes was already aware of the fundamental challenge to the traditional picture of the Universe that was implicit in the work of Copernicus. On the Revolutions (1543) was not just a new technical theory for astronomers. It was an emphatic displacement of man from the center of creation and his relocation, on one tiny planet in space, as a much less significant creature than a literal reading of the book of Genesis had suggested to generations of Christians" [Clarke, 2006: 69].

The fact of the ambivalence in Descartes' philosophical inquiries, which manifests itself in the text of the "Rules for the Direction of the Mind", is in the focus of attention of Marion, whose texts were quoted above. He pinpoints the profound difference between

the space for thought, "in which the "Mathesis Universalis" dominates, and "the second principle of Descartes' thought" [Homa, 2014: 342], which never moved into the backstage. The scholar is convinced that this ambivalence goes beyond the boundaries of a particular work of Descartes and relates to his heritage in general. Referring to the text of "Discourse on Method" scholar particularly stresses the anthropological character of the basic intention: "Thus interpreted, generosity might for the first time make it possible to overcome the separation, so often lamented, between the theoretical work and the "morale par provision" which in 1637 unbalanced the Cartesian enterprise" [Marion, 1999: 116-117].

However, besides the emphasizing of the ambivalence of Descartes' position, there is another form of overcoming the reductionist interpretations of Descartes heritage. The naive and unambiguous interpretations of the Cartesian method are being replaced by the recognition of its ambiguity and irreducibility to the methodology of natural sciences. The mentioned intention is well presented in the following studies [Dika, 2015; Aaron, 2017; Brissey, 2015], and others.

> *Note. Dika emphasizes an insufficiency of the commonly established approach, which tends to interpret the Cartesian method in philosophy as a literal replication of the doctrine of the world. Such approach ignores the fact of Man's existence and the constitutive influence of his inner world on the result. We mean the assumptions about the homogeneity of the Cartesian method and the possibility of applying its invariant form to any science. The scholar rightly insists that mentioned approach is unacceptable for Descartes. He asserts that his method is universal and effective because of its flexibility and variability but not for its invariance. In other words, the positive point of this study lies in moving beyond the limits of the dehumanized vision of the Descartes method and heading towards the rehabilitation of its anthropological component. Clarke expresses similar ideas differently, stressing Descartes' disappointment about illusiveness of his method, which was described in the "Rules for the Direction of the Mind". Scholar writes that Descartes "...acknowledged eventually that such an ambitious project (the project of the "Rules..." — Kh., M.) was impossible to realize" [Clarke, 2006: 86].*

Until recently, it was a commonly held opinion that the Cartesian project was focused on the idea of expansion and universalization of mathematics. Considering the impossibility of its accomplishment would be a complete collapse of creative plans and life fiasco. Because of the ambivalence of the Descartes main ambitious project, finding the way out from the crisis appears as the shifting of the main accents. The anthropological intention of Descartes' inquiry is only revealed as the result of interpretation of Descartes' heritage as a form of completing of the Copernicus revolution.

The essential role of the anthropological topics for Descartes is evidenced by referring to his later works. In the "Discourse on Method" and in a private letter, he mentions about the method, which he discovered in his youth, and stresses the anthropological factor as the reason of impossibility to finish the "Rules for the Direction of the Mind." In a letter to Mersen, the key role of the problem of the principles of proper human behavior is indicated: "but what am I worried about and what I believe is the most important, is to discover by what I shall be guided in my life" [Descartes, 1996, X: 137]. This is a "new project", which is an already existing problem, observed from a new perspective. In our opinion, the characteristic of the Descartes" mood that follows mentioned curiosity is highly important:

"...I will not change my thoughts ever no matter if I will discover something new". It is a firm, immutable internal conviction that is independent of any external circumstances and factors. The analysis of possible principles of this intention shows their relation to the Copernicus revolution [Descartes, 1996, X: 138].

An appropriate reflection of the anthropological project significance presupposes attention to the ambivalent manifestations of the thinker's position regarding the problem of the proper principles of human existence, which can be discovered from the pages of "Discourse on Method". Descartes consistently emphasizes the significance of mentioned problem in a positive and negative form, where, on one hand, it is about the necessity to choose my ways independently; on the other hand, it is about the necessity to get rid of the way of behavior inherited from childhood, when the mentors guided our desires.

The interpretation of Descartes' philosophical method manifests the ambiguity of his position, what is now widely discussed in scientific papers. Comprehension of ambiguity and discursiveness of Descartes' method supersedes its naive and unambiguous interpretation what is convincingly demonstrated in recent scientific publications particularly from the text of Discourse to Passions [Aaron, 2017]. Mentioned ambivalence manifests itself by emphasizing an ambiguity of Cartesian method, which is considered as a paradoxical combination of empirical and metaphysical aspects of human nature.

The interpretation of Descartes' method as focused on the experience of mathematical cognition seems to have been evidenced by philosopher's texts (especially by the text of the "Rules for the Direction of the Mind"). Mentioned attitude manifests itself in the form of a guideline for the depersonalization of the picture of the world, which defines the world as a mellowing fruit (arithmetic and geometry). In the mentioned context, the objection of the constitutive role of the individual in the process of comprehension of the truth seems to be appropriate. "... It is impossible to add anything to the pure light of the mind not to overshadow it in any way" [Descartes, 1996, X: 373]. The constitutive role of personal experience in the process of knowledge is denied in the same way. "... The mind can never be misled by any experience" [Descartes, 1996, X: 423]. It would seem that the texts of Descartes clearly confirm the legitimacy of reductionist interpretations of his position.

However, a modern revision of "Rules for the Direction of the Mind" and some other texts requires keeping the ambivalence of the basic Cartesian attitude in mind. Descartes did not consider the ambivalence as the critical obstacle. Therefore, he asserts that elimination of personality and at the same time, innate personal gifts (the ability to find the problem solution individually) appear as the constitutive elements of truth. It is the representation of the key role of the factors which are associated with the peculiarities of Descartes' personal spiritual constitution: "I admit that the natural tendency of my mind is that the greatest pleasure in my studies has always been connected not with acceptance of others arguments, but with the discovery of arguments with my own efforts" [Descartes, 1996, X: 403].

The present analysis of Descartes' position on the main forms of completing the Copernicus revolution requires paying attention to anthropologization of philosophy that he propounded. Descartes' anthropologization of philosophy manifests itself first as a radical revision of the established picture of the world and the necessity to come up with the new vision of human nature, and secondly as the focusing on Man in considering the conditions of authenticating the scientific picture of the world. The condition of the first is the rejection of the established tradition of a technomorphic vision of its basic intention, which deforms anthropology. Descriptive summary of the second moment becomes possible after comprehension of the destruction of Theocentricism and the capabilities of the human mind (as an aspect of human

nature) to be the source and guarantor of reliable scientific knowledge.

Being aware of the priority of self-education for Descartes, it is reasonable to focus on the possible forms of its implementation. The comprehension of the personal component importance at the beginning of a new system of coordinates, which is a form of continuation of the Copernicus revolution, is only one of the stages of the stated path. Substantial development of the Copernicus revolution means the acquisition of the new coordinate system. The person ought to get used to the new requirements and ideals to distance him from false ways. Explaining his position on this problem, Descartes in the tenth rule points out expediency of forming a habit of truth. Firstly this has to be done with the help of more accessible things in order to get to the hidden truths of things: "Therefore, we must first deal with easier things, first of all methodically, so to gradually become accustomed to the following accessible and familiar things, as in the play to uncover the deep truth of things" [Descartes, 1996, X: 405]. Outlining the significance of the mentioned moment, he proves at the end of the twelfth rule the expediency and relevance of personal efforts and exercises to target the further development of the method. In our common opinion, the ideas presented by Descartes are important in case of illustration of the irreducibility of his position to the abstract vision of human nature as the embodiment of intelligence. Due to Marion's observations, it seems obvious that acquisition of the new coordinates system and in the same time getting used to the truth is based on the volition component of human nature.

In Ukrainian history of philosophy, the modern achievements and anthropological interpretations of European Cartesian studies are still partly ignored. Therefore, the image of the Cartesian anthropology in Ukrainian philosophy looks fragmentary and reduced. A paper by Victor Petrushenko is an illustrative example of the mentioned condition. "Anthropological ideas of R. Dekart and B. Paskal in the context of the actual problems of modern philosophical anthropology" [Petrushenko, 2017: 24].

Superficial viewpoint on philosophy and anthropology of Descartes is dominant because the influence of the scientific revolution on the philosophy is being naively underestimated by most of the scholars. This underestimation manifests itself in form of reduction of this influence to its epistemological consequences. Mentioned approach to the interpretation of the philosophical revolution resulted in a dehumanization of Descartes philosophy. The genesis of anthropology due to this approach could be seen only in the later works of thinker. The text of an article confirms that one of the main factors of such deformation of philosophy is the neglect of the heliocentric revolution of Copernicus. This deformation was also caused by one personal Descartes' reason — the concealment of his sympathy for the theory of Copernicus. Appealing to the mentioned reason makes possible the comprehension of the process of anthropologization of philosophical knowledge, which takes place in the early texts of the thinker. Emphasizing the ambivalence of the basic intention of early Descartes' works, authors focus on the tendency of going beyond the technocratic direction of Cartesian inquiries to actualize anthropology. It was found that the implementation of the self-education within the text of the "Rules for the Direction of the Mind" is realized as a focusing on individuality and a radical changing of the will in the form of a habit. Observation of the uncompleted Copernicus revolution allows us to emphasize some following points. 1) The significance of anthropology in his draft of the system of knowledge. 2) The irreducibility of the doctrine of the human nature to its rational component. It appears irreducible to the rationality because of the leading role of will. 3) The ethical orientation of his quest. 4) The expediency of reconsideration of the established technomorphic interpretations.

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The End of Time or Time Reborn? Henri Bergson and the Metaphysics of Time in Contemporary Cosmology

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In this paper, I evaluate the work of two contemporary cosmologists, Julian Barbour and Lee Smolin, through the lens of Henri Bergson's metaphysics of time. Barbour and Smolin center their cosmological systems on their respective philosophical conceptions of time: for Barbour, time is a human illusion that must be eradicated from cosmology; for Smolin, time must be considered a reality of the universe, a force of change that underlies our everyday observations and which not even the laws of physics can escape. Both systems, however, run into dead ends. Barbour cannot escape dealing with observed movement and change and ultimately restricts them to the human brain, where these phenomena are left unexplained; Smolin posits the need for a meta-law that would account for why temporal phenomena unfold as they do, but fails to provide such a law. As I will show, Bergson's original take on the problem of time has a lot to offer to both sides of the debate. On Barbour's side, it provides compelling arguments against the latter's eradication of time, which, if accepted, would invalidate the philosophical assumptions behind his cosmology; on Smolin's side, Bergson sidetracks the "meta-law" problem and offers a deeper understanding of time than the one presented by Smolin, putting forth a consistent philosophical theory of time which, as I will show, is missing from the latter's work. Ultimately, my aim is to illustrate, through Bergson's work, how, without the aid of philosophy, cosmology is likely to keep running into such dead ends.

Keywords: Henri Bergson, Julian Barbour, Lee Smolin, Time, Metaphysics, Contemporary Cosmology

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In 2009, Julian Barbour's article "The Nature of Time" won the first prize for a prestigious essay competition in contemporary cosmology, organized by the celebrated Foundational Questions Institute (FQXI). In the article, Barbour argues that time does not exist and that the concept of time has no place in physics. The article summarizes arguments first developed in

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his 1999 book *The End of Time: The Next Revolution in Physics*. An independent scholar who takes on the fundamental questions of physics on his spare time and translates Russian scientific journals for a living, Barbour is among the most respected contemporary cosmologists. Lee Smolin, another great name of the discipline, has considered Barbour's views on the nature of time an important contribution to ongoing cosmological debates [Smolin, 2013: 169-71]. Unlike Barbour, however, Smolin argues that time must exist and that embracing its reality is the key to solving persistent problems in cosmology. Smolin's defense of the reality of time is developed in detail in *Time Reborn: From the Crisis in Physics to the Future of the Universe* (2013). While Barbour's defense of a timeless universe finds support in the work of other important cosmologists, including Einstein, Smolin's view that time is a fundamental reality of the universe has fewer adepts. The great majority of cosmologists is extremely resistant to the idea that time exists, for they consider it to entail that Einstein's theory of relativity is incorrect, and hence that our current understanding of the cosmos must be completely revised [Smolin, 2013: 74].

Although Barbour and Smolin give divergent answers to the question about the reality of time, they agree that the fundamental problems of cosmology turn on this question, as is suggested by the titles of their aforementioned books. Both argue that many if not all puzzles of contemporary cosmology can be either solved or dissolved with a correct understanding of time. For Barbour, the chasm between General Relativity and Quantum Theory only appeared due to erroneous conceptions of time [1999: 16] and the much sought after theory of everything, considered the "holy grail" of modern physics, can be obtained by means of a well thought out eradication of time [1999: 13]; for Smolin, on the other hand, if physicists can embrace the reality of time, the very need for a theory of everything will be made absurd, since it is in itself a symptom of timeless or static thinking [2013: 12-25]. Whether one sides with Barbour or Smolin, therefore, a consistent theory of time might well be the escape route in the endless search for a unified theory and thus the keystone of contemporary cosmology.

Henri Bergson (1859-1941), a major figure in modern European thought, gives comparable emphasis to the concept of time. Unlike Barbour and Smolin, however, Bergson thinks about time in the context of philosophy, particularly metaphysics, using data from the sciences to support his philosophical arguments. In this paper I will situate Bergson's ideas on time against those of Barbour and Smolin, identifying what Bergson's conception of time can add to one of the most pressing debates in contemporary cosmology. Bergson is, at first glance, more in line with Smolin than with Barbour, since, as we will see, he defends the reality of time. Bergson and Smolin, however, while they agree that time exists, have markedly different views on what it is.

Barbour and Smolin both draw heavily on Western philosophy in their books on time, yet neither makes a single reference to Bergson, arguably the most important philosopher of time working across the 19th and 20th centuries. As I will show, Bergson's original take on the problem of time has a lot to offer to both sides of the debate. On Barbour's side, it provides compelling arguments against the latter's spatialization of time, putting into question the philosophical assumptions behind the postulated unreality of time; on Smolin's side, Bergson offers a deeper understanding of time than the one presented by Smolin, putting forth a consistent philosophical theory of time which, as I will show, is missing from Smolin's work.

Bergson's Philosophy of Time

Bergson's philosophy of time is marked by the insistence that time must not be confused with space. Our habitual representations of movement and change are spatial: we understand

movement as a series of positions being occupied successively in space; we understand change as a consecutive series of fixed states, each one immediately adjacent to the next in an imagined line of time [Bergson, 1946: 18]. If this picture were accepted, however, duration would be no more than the unrolling of a series of immobile snapshots of reality. The movement and change that we observe would be lost and time would be a mere juxtaposition of immobile objects. We would then have to explain how these immobilities are set into motion, why they do not remain immobile, which for Bergson, is impossible [Bergson, 2016: 99]. Rather, we should think of movement as preceding immobility; we should grasp movement in its entirety as something indivisible and time as what is ceaselessly happening [Bergson, 1946: 14].

According to Bergson, we usually think of time in terms of space because intelligence itself seeks fixity and refuses to consider transition. When observing a moving object, we want to frame and fixate all of its individual spatial positions, rather than consider movement as it is [Bergson, 1946: 15]:

> [A]s a certain space will have been crossed, our intelligence, which seeks fixity everywhere, assumes after the event that movement has been *exactly fixed on* to that space (as though it, movement, could coincide with immobility!) and that the mobile *exists* in turn in each of the points of the line it is moving along [Bergson, 1946: 16].

Just as the intellect breaks up movement into fixed spatial positions or "virtual halts in time," it breaks up change into fixed successive states, each of them supposed to be invariable in themselves [Bergson, 1946: 12]. But, for Bergson, change is, like movement, continuous and indivisible [1946: 16]. The illusive character usually attributed to change is a consequence of this tendency of the intellect to break it down into fixed snapshots, instead of considering its fluidity as something real: "It is not the 'states', simple snapshots we have taken once again along the course of change, that are real; on the contrary, it is flux, the continuity of transition, it is change itself that is real" [Bergson, 1946: 16].

For Bergson, the history of philosophy is tainted by the confusion between time and space, which leads to a series of pseudo-problems [1946: 14]. Time and space have been treated as things of the same kind and theories of space and time have been mere counterparts: "to pass from one to the other one had only to change a single word: 'juxtaposition' was replaced by 'succession'" [Bergson, 1946: 14]. As Bergson admits, the masking of duration, the spatialization of time, can be advantageous in certain contexts, such as that of science, which is preoccupied with extracting from nature what can be repeated [1946: 13]. But science itself, if it wants to put its abstractions at the service of understanding reality as the moving changing complex that it is, must make its way back from general to particular; and, in the context of metaphysics, where we want only to understand reality as it is, we must avoid generalizations entirely and grasp duration in its flow, without stopping it, just as it is experienced [1946: 13].

As Bergson notes, the spatialized conception of time is already present in the work of the Eleatic philosophers. Zeno of Elea famously elaborated a series of paradoxes to prove that movement and change were inherently contradictory [1946: 17]. His "arrow paradox," for instance, was elaborated to prove that motion is impossible: since the arrow will always have half of the remaining distance to travel toward the target, it supposedly never reaches the target, and thus motion is impossible. Our impression that the arrow moves and reaches the target is illusive, just like all movement and change.

In Bergson's view, the main effort of philosophers and scientists since the time of the Eleatics has been to surmount these contradictions related to movement and change. But to do this, they have seeked the reality of things beyond time, "beyond what moves and what changes, and consequently outside what our senses and consciousness have perceived" [Bergson, 1946: 17]. Succession has been understood as a "co-existence which has failed to be achieved" [Bergson, 1946: 18]. Duration has been viewed as a "non-eternity" [Bergson, 1946: 18]. For Bergson these are, consciously or unconsciously, the thoughts of all philosophers and scientists: "*Not one of them has sought positive attributes in time*" [1946: 18]. This failure to embrace fluidity would have led to a lack of precision in both areas, generating systems of thought that are "too wide for reality" [Bergson, 1946: 11]. Thus, if thinkers should have any hope of understanding reality as it is, they must begin by understanding time as duration: "let us restore to movement its mobility, to change its fluidity, to time its duration" [Bergson, 1946: 17].

Time, acknowledged as duration, is thus, according to Bergson, the key to understanding reality and how we experience it. But what would this picture of time as duration look like? How can we understand time without spatializing it? Bergson offers a comprehensive theory of time as duration, to which I now turn.

Perhaps the simplest way to summarize Bergson's concept of duration is to say that it is a "virtual qualitative multiplicity." To understand this, let us first consider its converse, i.e. an "actual quantitative multiplicity," which is easier to grasp. A flock of sheep, for instance, is a good example of the latter sort of multiplicity, and one offered by Bergson in *Time and Free Will*, his first published work [1910: 76]. The sheep that constitute the flock have material existence, and therefore the flock is actual; the flock is also quantitative, because the sheep can be counted as discrete and juxtaposed units of the same kind. A flock of sheep is thus an actual quantitative multiplicity.

The feeling of pity, on the other hand, is an entirely different kind of multiplicity [Bergson, 1910: 18]. Bergson gives the following account of the feeling of pity: one begins by putting oneself in the place of others and suffering their pain; this is followed by a need to help our fellow-men and alleviate their suffering; in its lowest forms, this need to help others is based on a dread of future evils to ourselves; but if pity keeps deepening in its intensity, this fear of evils will be replaced by a desire for such evils and one will take it upon oneself to suffer what others are suffering; this willingness to suffer results in a feeling of superiority, which has a certain charm about it [1910: 18].

When one feels pity, this whole sequence of feelings is experienced indivisibly, continuously, and in full movement. The feeling of pity cannot be divided up into discrete elements that can be juxtaposed and counted, because its components all interpenetrate one another. It is a continuous intensity, as opposed to what is discrete and extended in space [Bergson, 1910: 20]. Any attempt to decompose it or halt its movement to try to understand it would result in changing it and failing to grasp it as it is; it would yield an imprecise definition of pity, an empty abstraction.

Although the feeling of pity is real, it is not material (actual); hence it is virtual, if we understand virtual as precisely that which is real but not material[1]. Additionally, it is not composed of homogeneous elements. The flock of sheep is homogeneous. We can only count the sheep because we assume they are objects of the same kind and discount the differences among individual sheep. Homogeneity is thus implicit in quantitative multiplicities. The

[1] This is the definition of "virtual" that Deleuze famously offers in interpreting Bergson's works, in *Bergsonism* [Deleuze, 1999: 96-98].

feeling of pity, on the other hand, is entirely heterogeneous. We can attempt to divide it, but each time we divide it, it changes in kind [Pearson and Mullarkey, 2002: 3]. Hence it is qualitative, rather than quantitative. The feeling of pity is, therefore, a virtual qualitative multiplicity.

Our experience of being conscious in general can be understood in the same terms, of a virtual qualitative multiplicity. As Pearson and Mullarkey point out, Bergson's aim in *Time and Free Will* is precisely to show that the way we experience our psychic states presupposes a virtual multiplicity of this sort, since our states of consciousness are continuous, indivisible, and interpenetrate one another [2002: 2]. They constitute a succession that is not an addition and does not culminate in a sum [Bergson, 1910: 79]. Bergson thus offers a way of depicting psychic events that does not dismiss their movement and interdependence:

> We can thus conceive of succession without distinction, and think of it as a mutual penetration, an interconnection and organization of elements, each one of which represents the whole, and cannot be distinguished or isolated from it except by abstract thought [Bergson, 1910: 101].

For Bergson, physical time, as duration, should be understood as a phenomenon of the same sort [PM, 2002: 1]. It requires the same "uninterrupted prolongation of a past into a present which is already blending into a future" [Bergson, 1946: 32]. The whole of the universe moves and changes much like our conscious states. The flux of the external world is as indivisible as the feeling of pity. What is material and extended is thus also continuous and "this continuity changes from moment to moment and can be conceived in terms of a whole that changes like a kaleidoscope: there is no center since everything is bound together in relations" [PM, 2002: 13].

Movement is therefore indivisible and happens "in one stroke" [Bergson, 2014, 4179]. And the same goes for change. Zeno's paradox of the arrow, along with all paradoxes related to movement and change, would arise only when one fails to understand movement and change in this way [2014: 4179]. The space that the arrow traverses is extended and a quantity, and hence divisible; but its movement is intensive and a quality [PM, 2002: 5].

For Bergson, there are no isolated material objects. Conscious beings are deeply connected to everything that surrounds them; and all things endure [Bergson, 2014: 277]. We are not merely contemplative with regards to what happens around us. The brain, which is one more object among objects, or image among images to use Bergson's vocabulary, merely receives movements from other objects and responds to them, just like everything else in the universe [PM, 2002: 15]. Perception is a part of things; it is not interior, or subjective [PM, 2002: 16]. Therefore, duration, when properly understood, bridges the gap between subject and external world: the process of movement and change in our conscious states and that of the universe are one and the same. In Bergson's picture, we do, contra Kant, have access to absolute reality, by means of intuition, which, unlike the intellect that searches for immobility, allows us to apprehend duration as it is [PM, 2002: 33].

But, for Bergson, duration has an even more radical role in the universe: it is an agent of invention and novelty: "duration means invention, the creation of forms, the continual elaboration of the absolutely new" [2014: 277]. This aspect of duration is, in Bergson's view, supported by the verifiable fact that living species evolve through time. Bergson thinks of the evolution of life as an intrinsically creative process, one that is constantly bringing about novelty and is thus unforeseeable.

Evolution is usually conceived as a mere realization of the possible: each stage of time always contains what is needed for the appearance of new living species in the next stage [PM, 2002: 21]. As time passes, existence is merely added to what was already possible. New forms of life appear as a result of rearrangements of material, or mutations, at each stage. This is a spatialized view of evolution, because it draws on the notion of change as mere mechanical rearrangement of spatial parts [PM, 2002: 21]. In this view, new species appear by mere reassemblage of materials, and adaptation happens solely through the exogenous workings of natural selection [PM, 2002: 26].

Bergson proposes a "creative evolution," conducted by duration, in which there is an "incommensurability between what goes before and what follows" [2014: 5128], and which thus renders intelligible the ruptures and discontinuities we observe in the evolution of species. For Bergson, mechanism, i.e., the view that new forms of life can be explained by preceding ones, cannot explain life [2014: 645]. Similarly, finalism, i.e. the view that there are final goals orchestrating the appearance of new living forms (for instance that eyes were made so that living beings can see), is inappropriate [2014: 645]. Both views neutralize the agency of time, with its marked characteristic of bringing about true novelty [2014: 645]. In both, all is given in advance: in mechanism, what is given is in the past, whereas in finalism, it is in the future [2014: 645]. Both preclude novelty and invention, juxtaposing all events in a pre-established and predictable sequence. They are instances of the tendency to spatialize time, which Bergson wants to overcome.

Bergson posits a vital impetus (élan vital) that struggles with matter to produce novelty [2014: 3450]. This vital impetus creates divergent lines of evolution, each finding solutions for certain problems. For instance, life requires energy; to solve this problem, the vital impetus invents photosynthesis for plants, animals that are able to eat these plants and to use the energy drawn from the sun [2014: 3450]. For Bergson, life is precisely this tendency to solve problems by means of the creation of new forms [2014: 3450]. A coherent theory of evolution requires this interplay between organic memory and new situations, and thus requires the notion, implicit in duration, of a prolongation of the past into the present [PM, 2002: 45].

Bergson acknowledges that describing life in terms of an impetus is merely to offer "an image" [2014: 3495]. The image, however, discloses that life is not of a mathematical or logical order, but "of the psychological order, and it is of the essence of the psychical to enfold a confused plurality of interpenetrating terms" [2014: 3496]. What is psychical in nature cannot be thought out spatially or fit into separate categories of understanding [PM, 2002: 2]. Duration would thus be a creative force in the universe and evolution would offer evidence for its existence.

In conclusion, Bergson shows that the tendency to spatialize closes down possibilities for thinking, while the intuition of duration opens up new avenues. If we take reality to be intrinsically stagnant and uncreative, we will be unable to explain observed movement and novelty. The question about the origin of the universe, for instance, only appears because we assume that nothingness must logically precede things. The question about how it is that order came to be, comes from our presupposition that disorder precedes order. Similarly, the question about how movement and change are possible, rests on the assumption that inertia and stability have some sort of logical priority. Anchored in his concept of duration, Bergson described a universe in which things precede nothingness, creative order precedes disorder, and movement and change precede inertia and immobility [Bergson, 1946: 62-3].

Barbour and The Unreality of Time

In the first pages of "The End of Time," Barbour describes the main aim of his cosmological treatise: to introduce a way of thinking about "instants of time" without presupposing that such instants constitute a force that flows forward ceaselessly [1999: 7]. He then suggests the following way of understanding instants of time: instants are merely "possible instantaneous arrangements of all the things in the universe" [1999: 8] or "configurations of the universe" [1999: 9]. The idea is that each possible configuration of all the things in the universe constitutes an independent instant and that instants do not flow into one another, since they are, in themselves, "perfectly static and timeless" [1999: 9]. Barbour does not deny the human impression that time flows, but claims that the reality behind such impression is a collection of timeless instants or configurations of the whole, which should be explained on entirely timeless principles.

Reality, beyond our impressions of flow, is thus a multiplicity of static, timeless instants, or "nows" [Barbour, 1999: 16]. While physicists usually assume that things travel in an invisible framework of space and time, Barbour wants to get rid of the invisible framework and keep only things and their possible configurations [1999: 16]. "Nows" are "more fundamental entities that fuse space and matter into the notion of a possible arrangement" [1999: 16]. These possible arrangements are the ultimate things of the universe: "The world does not *contain* things, it *is* things" [1999: 16].

The common-sense idea about time — i.e. that it is a ceaseless linear flow directed forward, stringing one instant to the next — is, according to Barbour, counterproductive, because it makes time into something invisible and difficult to grasp [1999: 18]. For Barbour, "Nows" are more tangible than time, since it is easier for us to agree on what an instant of time looks like than on what time is [1999: 18]. A "now," is like a "three-dimensional snapshot" [Barbour, 1999: 18], constituted of objects in definite positions. "As instants, rather than an invisible river, time becomes concrete" [Barbour, 1999: 18]. Because these separate instants can be arranged in a linear sequence, we have the experience of time passing; but this impression is a result of concrete things, not of invisible time [Barbour, 1999: 18]. The properties usually ascribed to time—that it is linear, that it can be measured or has duration, and that it has a direction—are in fact properties of concrete instants, not of an invisible force that strings instants together [Barbour, 1999: 19].

Barbour allegedly developed this way of understanding reality by means of a very simple philosophical argument: (1) we orient ourselves by objects we actually see and not by invisible space, (2) at any instant there are certain distances between all objects in the world and us, and such distances provide the only way for us to tell where we are, (3) hence, any motion we call our own is a mere change in the complete universe, (4) the reality of the universe, therefore, is that, at any instant, the objects it contains are disposed in some relative arrangement [Barbour, 1999: 68-9]. For Barbour, what we can see is all that there is: "I believe in a timeless universe for the childlike reason that time cannot be seen—the emperor has no clothes" [Barbour, 1999: 251].

Time as an absolute invisible framework was first posited by Newton, in 1687, and for Barbour, it is unfortunate that it should have remained the common-sense understanding of time up to our days [1999: 20]. Newton's time is more fundamental than things and precedes them. For Newton, an empty world would still have time [Barbour, 1999: 20]. Richard P. Feynman's definition of time, quoted by Barbour, perfectly illustrates this image: "time is what happens when nothing else does" [as cited in Barbour, 1999: 2]. Barbour suggests "an alternative arena" to space and time, which he calls "Platonia," comparing his timeless

instants to Platonic forms [1999: 44]. Platonia is the totality of all possible instantaneous configurations of things, i.e. the totality of possible timeless instants. Different instants of time are different places in Platonia [1999: 69].

History, for Barbour, is merely "the passage of the universe through a unique sequence of states" [1999: 69], but there are many possible sequences in Platonia, not just one [Barbour, 1999: 36]. Barbour admits that it is tempting to think that these unique sequences, since they imply progress from one state to another, require the existence of time [1999: 69]. For him, however, this is not the case, since "there is nothing outside the universe to time it as it goes from one place to another in Platonia — only some internal change can do that" [1999: 69]. There is no motion in Platonia. There are instants or configurations that can be "piled" in the same heap, so to speak, forming a unique path, but there is no movement or continuity from one instant to the other. Barbour gives the example of a three-body universe, in which all possible configurations, or instants, would form triangles, and in which we could come across different heaps of triangles: "With time gone, motion is gone. If you saw a jumbled heap of triangles, it would not enter your head that anything moved, or that one triangle changed into another" [Barbour, 1999: 69].

Why then do we experience motion and change? To explain this, Barbour puts forth the concept of "special Nows," or "time capsules" [1999: 30]. He defines time capsules as "any fixed pattern that creates or encodes the appearance of motion, change, or history" [1999: 30]. A straightforward example of a time capsule would be a fossil: It exists only within a particular instant, but it encodes the appearance of history, and thus suggests the existence of other particular instants [Barbour, 1999: 30]. But fossils are not the only cases of time capsules; every object that we experience as being in motion is a time capsule. When a person watches a kingfisher flying, for instance, what actually happens is that her brain *at that instant* contains a series of snapshots of the kingfisher and somehow plays the movie for her in her mind [Barbour, 1999: 266].

Barbour does not go into details about how such movies are played in the mind and merely states that this hypothesis is compatible with observations from the brain sciences that "what we seem to experience in one instant is the product of the processing of data coming from a finite span of time" [1999: 266]. What we experience as motion would thus be a collection of stills in the brain, within the instant that contains the experience. Hence, there would be no motion at all. In fact, for Barbour, there is not only one kingfisher flying across instants, but also billions of kingfishers, each one inhabiting a different timeless instant in which it is placed at different distances from surrounding objects [1999: 48]. The illusion of a single kingfisher flying across instants is a result of our abstracting and detaching all of those billions of kingfishers from their corresponding instants [1999: 49]. For Barbour, Zeno's arrow will indeed never reach the target, because "the arrow in the bow is not the arrow in the target" [1999: 49].

Hence, instead of seeing instants as belonging to time, Barbour sees time as belonging to particular instants [1999: 34]. Time capsules are precisely that: time inhabiting the instant. We only believe in time and in motion because we always experience the universe by means of time capsules [Barbour, 1999: 51]. Yesterday only seems to come before today because today contains time capsules that point to instants that we define as pertaining to "yesterday" [Barbour, 1999: 53]. My current memories are pictures of other Nows within this Now: "Each Now is separate and a world unto itself, but the richly structured Nows 'know' about one another because they literally contain one another in certain essential respects" [Barbour, 1999: 55]. By surveying things in one Now, consciousness makes itself present in other Nows [Barbour, 1999: 55].

The advantages of Barbour's view, according to him, would be to make it easier to solve persistent problems in cosmology, such as how the world was created [1999: 45], how order exists in the face of increasing entropy [1999: 25], and why General Relativity and Quantum Theory seem to be incompatible [1999: 15]. Whether or not this is the case, Barbour himself claims that his argument for the unreality of time starts from "the philosophical conviction that the only true things are complete configurations of the universe, unchanging Nows" [1999: 49]. His argument, therefore, regardless of whether or not it is useful from the point of view of physics, has a purely philosophical basis, and thus can be criticized on purely philosophical grounds. It is thus pertinent to examine how Bergson's philosophy of time, discussed in the previous section, might serve us in criticizing Barbour's central philosophical conviction.

Barbour's conviction that there are only timeless instants, which are no more than possible spatial configurations of things, is a clear instance of the spatialization of time against which Bergson vehemently argues. As we have seen, Barbour claims that time as it is experienced, as a directed flow, is too difficult to grasp, and thus that we should look at concrete instants in their immobility. But, for Bergson, this difficulty is created by intelligence, which requires immobility. The difficulty, however, should be overcome by the use of intuition, which can grasp duration as it is, in its fluidity. Barbour's claim that he does not believe in time for the childlike reason that it cannot be seen, aside from being problematic on its own (since Barbour himself believes in other things that cannot be seen, such as Platonia), also loses strength if we think of time in Bergsonian terms. For, as we have seen, Bergson understands time as a "virtual qualitative multiplicity." Being virtual, or immaterial, time cannot be seen, but that does not entail that it is not real or that it cannot be experienced in other ways. Barbour's desire to make time into something concrete and material, points to an inability to think time in its mobility and continuity, which might well hinder the prospect of solving cosmological problems that justifies his theory of time.

Barbour clearly adheres to "the fiction of the instant," which is characteristic of much of contemporary cosmology [PM, 2002: 26]. Immobile instants are fictions, because they are never observed; rather, they are intellectual abstractions from mobile reality. Barbour considers movement to be an abstraction from timeless snapshots; but if we take our experience of nature into account — and a vast majority of scientists would themselves agree that we should — then arguably snapshots should be considered abstractions from moving reality. Russell claimed that logical necessity compels us to a conception of "instants without duration" [as cited in PM, 2002: 6). Barbour's conception of change as mere reconfiguration of objects responds to the same logical necessity. But for Bergson, reality cannot be directly known by means of logic. It must be grasped by intuition, which can comprehend movement and change, intrinsic aspects of reality, for what they are.

Lastly, Barbour's concept of time capsules and his account of motion as a series of snapshots that are played in the brain are unsatisfactory. How can movies be played in the mind if there is no movement in the universe? How are we to explain the nature of this experienced movement? Bergson's point that a series of immobile snapshots is something quite different from movement is compelling. Barbour's heap of triangles, as he himself states, is just a heap, with no motion or time. Similarly, the snapshots in the brain are, arguably, just snapshots. The leap from these snapshots to a moving picture can arguably never be made, not even in the mind, and thus presents a challenge to Barbour's account of our experience of time. If Barbour cannot take the leap, then he cannot explain our impressions of movement and our experience of reality; if he somehow takes the leap, proving that there is in fact

motion in our mental representations, he will have to admit that there is some motion in the universe, even if just in brains. To explain this motion, he will face the same challenges he tried to escape by postulating timeless instants. Ultimately, Barbour's cosmology is another "Platonism of the real" [PM, 2002: 36] and it is plausible to think that Bergson would find it "too wide for reality."

Smolin and The Rebirth of Time

In *Time Reborn* (2013) Lee Smolin suggests, against Barbour, that we must bring time as a real phenomenon to the forefront of theoretical physics and cosmology. For Smolin, it is no wonder that much of modern physics posits a timeless universe [2013: 12]. This is in great part due to a scientific attitude, in vogue since Galileo, in which understanding the universe is equivalent to uncovering its timeless mathematical laws [Smolin, 2013: 13]. The scientist who works on this assumption is, from the outset, taking timelessness to be a constituting principle of the cosmos and is therefore prone to fitting it into the model presupposed. The very search for a theory of everything would be the ultimate expression of this attitude [Smolin, 2013: xxi]. Smolin criticizes this impulse harshly and blames it for the schism between General Relativity and Quantum Field Theory [Smolin, 2013: 19]. He suggests a fundamental change in attitude, proposing that the laws of physics, like everything else we observe in the physical world, are constantly evolving and, therefore, the quest for a theory of everything as it is currently pursued should be abandoned [Smolin, 2013: 123]. In his picture, everything — laws of physics included — is perpetually changing. Time is a fundamental reality that cannot be dismissed or transcended [Smolin, 2013: xxxi]. Our experience of the world, our perception of change, our feeling of being in the present, and all other human perceptions related to temporality, are thus not mere illusions.

Smolin's central philosophical argument in favor of the reality of time is based on the need to avoid what he calls "the cosmological fallacy" [2013: 97]. To commit the cosmological fallacy is to try to arrive at a law or principle that we can successfully apply to every situation of the universe as well as to the universe as a whole. The fallacy consists in thinking that there are certain principles external or prior to the universe that could explain it. It is a fallacy for two reasons. Firstly, there can be nothing external to the universe, for the universe is no more than the sum of everything it contains and nothing is left outside of it to explain it. Secondly, because even if we did arrive at an ultimate unified timeless law that would explain all physical phenomena in the universe, we would still have to answer what Smolin calls the "Why these laws?" question, which for Smolin should be answered in any acceptable cosmological paradigm [2013: 97]. In Smolin's words: "To make laws explicable, we must consider them as much a part of the world as the particles they act on… They become explicable only when they participate in the dance of change" [2013: 121]. Thus, for Smolin, laws can be either (a) timeless, external to the universe, and inexplicable, or, (b) temporal, intrinsic to the universe, and explicable.

Searching for laws of the second kind, Smolin proposes a theory in which laws themselves evolve, called "cosmological natural selection" [2013: 123]. In this picture, new universes are constantly being created from black holes and each new universe has a different set of physical laws [Smolin, 2013: 123]. Some universes have an initial set of laws that allows them to "survive" and to produce life; other universes have laws that lead them to collapse [Smolin, 2013: 123]. According to Smolin, this picture facilitates the answer to the "Why these laws?" question: our universe has these laws because these were the laws that allowed it to survive and to generate life; had the laws been different, we might not be here to try to

discover them [2013: 123]. The rationale is the same as the one we find in natural selection among biological species. Only the fittest of universes survive.

In summary, Smolin's central argument is that a universe where laws are temporal allows them to be intrinsic to the universe, rather than external to it, and explicable, rather than inexplicable. This argument resembles Bergson's appeal for precision in philosophy. Timeless laws are external to the universe and inexplicable because they are abstractions of the intellect. They do not fit reality, which is a ceaseless process of change. They result from the spatialization of time, from envisioning time as a line that is given all at once, with timeless laws "hovering above" temporal events. Smolin wants laws to reintegrate reality and partake the fluidity of the universe.

However, Smolin's theory that the laws of nature evolve and his "cosmological natural selection" have a few important drawbacks from the point of view of philosophy, which Bergson's thought helps to reveal and could help to overcome.

Firstly, the idea of a temporal law is a controversial one. Laws are arguably necessarily timeless, since they are arrived at by means of abstractions from change and movement. A law that is constantly changing is arguably not a law at all. Additionally, Smolin's laws do not exactly evolve or change through time, and thus are not as temporal as he depicts them. In Smolin's picture, different universes have different sets of laws, and each universe survives to the extent that its laws allow it to survive. But within each newborn universe, laws are unchanging. Once a universe is born with its set of laws, it is precisely this set of laws that will determine whether it will survive or not, and thus the laws themselves will not change. Over time, the universe as a whole, with all of the sub-universes that it contains, evolves through the process of natural selection. However, the laws pertaining to each universe are as timeless and immune to evolution as the currently accepted laws of physics, which Smolin criticizes, and therefore each universe would be justified in searching for its own private theory of everything. It is true that Smolin forgoes an ultimate timeless law, valid for the whole of the universe and all of its sub-parts. But he does not fully embrace change within each of the nascent universes.

It is true that Smolin's theory of cosmological natural selection indeed facilitates an answer for the "Why these laws?" question. The inhabitants of any given universe can ask the "Why these laws?" question and obtain the same answer, namely that the laws are what they are because, had they been different, their universe would have collapsed. Nevertheless, the question "Why these laws?" remains unanswered when applied to the entire set of universes that are generated, that is, to the totality of things that exist: why is it that things are configured in such a way that new universes are constantly being generated and then selected based on their laws? Why is it this way rather than another way? Why these laws or circumstances? Perhaps to answer this question Smolin would have to introduce a universal principle of evolution, a principle that would arguably be an intrinsic property of the reality of time advocated by him. However, being universal and absolute, such principle would also be external to all of the universes that evolve according to it, i.e., it would remain constant and unchanged by all else that happens. It would be timeless, i.e., unchanging and valid for all time. Smolin recognizes this dilemma, which he calls "the meta-laws dilemma" [2013: 243], but he leaves it unresolved, claiming that "the direction of 21st century cosmology will be determined by how the meta-laws dilemma is resolved" [2013: 245]. Ultimately, the temporal universe proposed by Smolin and the timeless one he argues against run into a similar dead end. Timelessness and externality are harder to escape than Smolin claims, and, unless he can answer the meta-laws dilemma without appealing to a timeless principle, he

will fail to show that the rebirth of time offers advantages over the current framework. This is where Bergson's philosophy of time might be of help.

Smolin uses spatialized notions of evolution, understanding adaptation as the result of a purely external process of natural selection. Smolin's meta-laws dilemma can perhaps be answered with the help of Bergson's account of duration and evolution as intrinsically creative processes. The fact that Smolin cannot solve the meta-laws dilemma reveals that he is still somewhat trapped in timeless thinking, for the need to solve this dilemma is in itself not very different in kind from the need for a theory of everything to which Smolin so ardently objects. Were Smolin to embrace duration and evolution as agents of invention and constitutive forces of the universe, this problem would be resolved. The "meta-law," or the ruling principle for all individual evolving universes, would be pure invention. In other words: it would be *time*. This would constitute a true rebirth of time. Perhaps Smolin, more than any other contemporary cosmologist, would be able to appreciate Bergson's definition of the vital impetus as a tendency, rather than a law. The fact that Smolin's cosmology is halted at the need for a "meta-law" that regulates evolution shows that he suffers from the usual resistance to accepting novelty, the trademark of temporality, as an intrinsic feature of the universe. He cannot fully embrace time as invention.

Conclusion

In its attempt to evade the dead end it is currently facing, contemporary cosmology keeps running into new ones. The currently accepted timeless model exemplified by Barbour's work and the temporal model proposed by Smolin both engender paradoxes that are equally hard to overcome. In the end, if one wants to choose between timelessness and temporality as they are presented in these works, one has to choose between one set of unresolved paradoxes and another.

I hope to have shown that the task of developing a new cosmology can only be undertaken as a joint effort of cosmologists and philosophers, which was my initial motivation for bringing Bergson into the discussion. Barbour's and Smolin's proposals, although plausible from the point of view of science, have serious drawbacks from the point of view of philosophy. They cannot escape the temporality and the timelessness they respectively argue against. Bergson claimed that science always operates with an "unconscious metaphysics" [Pearson & Mullarkey, 2002: 36]. It is precisely because Bergson brings this unconscious metaphysics to the foreground that his philosophy can be so useful to cosmology. It would be interesting to see what a cosmology entirely based on Bergson's philosophy would look like and whether it would avoid the issues faced by Barbour and Smolin.

I align with Karl Popper, for whom philosophy loses all interest when it is severed from its original cosmological impulse, the impulse to understand the world and our place in it [1998: 7]. The converse observation can also be made, that cosmology loses all interest and plausibility when severed from its original philosophical impulse. Cosmologists have been historically more resistant toward philosophy than philosophers to cosmology. This is exemplified in the meeting between Bergson and Einstein at the *Collège de France* in 1922, which is beautifully revived in Jimena Canales' most recent book, *The Physicist and the Philosopher*. As Canales notes, Bruno Latour and many philosophers before him have drawn attention to the fact that, while Einstein declared an unbridgeable gulf between the time of the scientist and that of the philosopher, Bergson considered Einstein's work carefully and attempted a reconciliation of both times, to which he devoted his *Duration and Simultaneity* [as cited in Canales, 2015: 357].

Our contemporary cosmologists are not philosophers. They are theoretical physicists who solve puzzles from the point of view of science and observation but who often neglect fundamental philosophical problems in structuring their theories about the universe. Barbour and Smolin offer wonderful philosophical insights in their books, but there is a larger role to be played by philosophy in cosmology, and the many problems found in their proposals, of which I have listed the ones I consider most important, support this point.

Cosmology is arguably the science that relies most heavily on philosophical theories and thus the one that holds the most potential to foster an approximation between science and philosophy. Because the concept of time is the keystone of contemporary cosmology, such an approximation seems inevitable. Without a philosophy of time as rich as Bergson's, cosmology is likely to keep running into dead ends.

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Cosmology and Politics in Ancient Greek Thought

A review of: Dominic O'Meara. *Cosmology and Politics in Plato's Later Works*. Cambridge University Press, 2017. 157 p., illustrated

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The political dimension of Plato's cosmological thought has been extensively explored as such and in its relation with Greek culture, but there remains a question of methodology. Which context will be more appropriate for Plato's works? Shall we focus on their metaphysical features (most conspicuous in Aristotle and Plato's immediate heirs in the Old Academy), or, alternatively, place them in a dialectical context (as in the case of the Skeptical Academy of Arcesilaus and Carneades)? Or, maybe, we have to plunge them in the depth of Greek cultural life and compare with technological advances of Greek civilization? This latter approach, having done properly, would be a real innovation, capable of, as it appears, presenting a fresh look at the familiar matters. This is exactly the task of a new project launched by Dominic O'Meara in the book under review. Plato's cosmological and political ideas are successfully discussed here in their relation with ancient crafts, arts, and various peculiarities of social life of the Greek polis.

Keywords: philosophical cosmology, creationism, myth, religious festivals, western legal tradition

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In his new book, Dominic O'Meara, one of the most famous contemporary Platonic scholars and the author of a philosophical masterpiece *Platonopolis* (2003), examines the order of the world in its relation to the order of a human community. It consists of seven short thematically related chapters, subdivided into two parts, concerned with the *Timaeus* (addressing the figure of the world-maker and the concepts of the structure and the beauty of the world), on the one hand, and the *Statesman* and the *Law* (dedicated to various aspects of legal and political science in Plato's later works), on the other.

However, first of all, why Platonic heritage requires interpretation and why Plato's writings provoke a multiplicity of interpretations, never definite and never final? "What is it in the Plato's writings that creates the need to interpret them, and to interpret them in ever-renewed ways?"

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(p. 2). And the answer Dominic O'Meara gives is that, predominantly, the philosophy of Plato is open to the future: the dialogues, situated in the past, provoke our on-going philosophical reasoning, the figure of Socrates, although a part of the past, drives us to think about the possible and impossible ideals, and the doctrines of Plato himself, "always inadequate to the best method… await, in their provisional past, a more adequate future." (p. 9).

The first part of the book deals with the *Timaeus.* The first chapter of this part, entitled "A Feast to the Goddess," is concerned with the great Athenian festival, dedicated to the *polis'* patroness, the goddess Athena (for more details, see Neils 1996). The dramatic setting of the *Timaeus* is this festival, which takes place each summer. Foreign guests, including Timaeus and Hermogenes, came from Italy to see the Panathenaea and to meet their Athenian friends, Socrates and Critias. The meeting, according to O'Meara, took place in Athens still at the height of her political power, before or in the earlier stages of the disastrous war with Sparta, that is to say in late 430s. The setting, terminology and structure of the *Timaeus* strongly suggests that the meeting is staged by Plato as a banquet, a feast of speeches, in honor of the goddess Athena, with Socrates appointed as its *symposiarch*. Socrates spoke the day before, having discoursed on the question of the best political order. Now it is time for Timaeus and then Critias and Hermogenes to offer their speeches (in this order). The sequence is not accidental and approved by the banquet master, Socrates, according to the speeches' appropriateness. After his opening talk about the best state the second speaker, Timaeus, is supposed to tell a story of the making of the cosmos and human beings. These discourses will be followed by Critias' complete story of ancient Athens and its victory over Atlantis, briefly summarized in advance (26c6), and Hermogenes' version of the same story about Atlantis with special emphasis on the military victory. The surviving writings of Plato contain a summary of Socrates' talk, the great discourse of Timaeus and an incomplete speech of Critias (preserved as an independent dialogue). These observations are important, according to O'Meara, for understanding of the structure of Plato's work. For one thing, it clearly shows that the *Republic* cannot be the first part of this sequence, although some commentators think so, because the dramatic framework of the *Republic* is the feast of Bendis, which took place in the Piraeus ca. 412. (i.e. later then the dramatic date of the *Timaeus*). But how and in what manner our philosophers are supposed to praise the goddess? In the third speech of the sequence, Critias praises Athena as the founder of ancient Athens, who gave to the city its best location, its institution and sciences, etc. (*Timaeus* 23d5, 24c4), although the events recollected are placed outside the real history. The fourth speech by Hermocrates continues the story of Critias and especially focuses on the military victory of ancient Athens over Atlantis, another legendary state, founded by Athena's rival deity Poseidon. Dominic O'Meara suggests that if the figure of Hermocrates evokes a real person — the Syracusian leader who contributed to the victory over Athenians in Sicily in 415–413 — then his military skills makes him the most appropriate person to tell the story about the legendary war. It is clear now why Socrates in his first speech says that he cannot praise the city sufficiently (19d1): having described in his introductory talk a model city from the philosophical point of view, he is now assigning more specific tasks to the speakers that are more competent in these matters. However, what about the second speech, the only one to survive as a whole, the one told by Timaeus? How this extensive discourse intends to praise the goddess? In the next three chapters O'Meara answers this question, and "in order to explore more fully the implications of Timaeus' cosmological account for the concept of an excellent state" in Chapters 5 to 7 makes use of "other texts written by Plato probably after the *Timaeus*, the *Statesman* and the *Laws*, to the extent that they might offer something like a substitute." (p. 23)

Surely the demiurge, who is explicitly named the father (*Timaeus* 23c3) and the savior (48d4), must be Zeus, but not quite so, because Zeus, surprisingly, is named among the traditional gods who are obviously inferior to the demiurge (41a1). Apparently the demiurge, according to Heraclitus' famous saying (fr. 32 DK), "does not wish and wishes to be called by the name of Zeus" (p. 28). On the one hand, the speaker of the dialogue constantly associates Athena with her mighty father, who exerts absolute supremacy, deliberates and decides, assigns specific tasks to different gods, and could also (as the demiurge of the *Timaeus*) retire to his proper place. He emerges victorious over all sort of world's disorders, personified in the Titans and the Giants, rules justly and wisely, etc. (pp. 32–33) On the other hand, the demiurge of the *Timaeus* is a reformed divinity, morally and metaphysically perfect, the cause of good, not evil. This definitely distances him from the traditional deities of Homer, Hesiod and the tragedies.

The demiurge 'makes' the world not 'creates' it. He gives order, goodness and beauty to a pre-existent chaotic milieu (p. 34). Quite on the contrary, the traditional cosmogony of the poets is explicitly a divine genealogy, a sort of natural development of the ordered cosmos out of the primordial chaos to the effect that the most primitive deities, such as Erōt, Gē, Ouranos, etc. finally manifest themselves in Zeus and other younger deities. Apparently, in the traditional cosmogony Zeus does not 'make' the world.

The word 'dēmiourgos' has a variety of meanings, from a craftsman and an artisan to a public servant like a statesman, lawgiver and the founder of the cities. (p. 35) All these functions are visible in the demiurge of the *Timaeus*: as an artisan, he makes the world according to a certain model, and, as a good ruler, he "deliberates about what to do, seeks the best option, gives speeches to his subordinates, delegates tasks, legislates,… as if the variety of professions and trades… which had filled Athens during the great period of the reconstruction of temples had left their mark on Timaeus' speech," etc. (p. 35–36) This explains why, in his account of the creation of the world, Plato in the *Timaeus* does not follow a strict chronological order. Presenting instead his version of cosmo-genesis in an axiological order, he starts with the highest causes, the demiurge and his model and finishes with all the 'necessities' which constitute the body of the cosmos. His intention, according to O'Meara's observation, is signaled by the fact that in the *Timaeus* 34b10 he especially notes that he should have told about the making of the soul first, prior to a description of the formation of the body: "The mixed 'birth' of the world, offspring of a noble father [demiurge] and a needy mother [necessity], prefigures the birth of the ancient Athens from divine parents, Hephaistos and Athena, children of Zeus, and from the earth of Attica, as recounted by Critias in his speech," who had omitted to be sure the most salient features of the myth about attempted sexual relation of Hephaistos with his sister, probably reinterpreting this affair and giving it a new nobler sense: the Athenian are now born of the divine parents, the sources of all sort of wisdom and order, without sexual engendering, in imitation of the goddess Athena's birth from the head of Zeus (p. 39).

A good and beautiful model of the world is discussed in Chapters 3 and 4. Inspired by the paradigm, the philosopher-king builds the perfect state as a painter, who creates his masterpiece "in the image and likeness of the divine" model (*Republic* 500e–501b), just, beautiful and moderate. (p. 43–44) Or he does this as an architect — a city-planner who first creates a model or a plan of his building project and then supervises its actual realization. (p. 48 f.) In the same manner, the demiurge of the *Timaeus* is depicted first fixing a goal of his work, then moving to the paradigm to be used in order to achieve this goal, and finally building the real world based on a prefigured model. The goal is of course to make the most

perfect and complete (*teleōtatos*) world. Precisely for this reason the model of this world is exceptionally difficult to describe (*Timaeus* 50c). The world must be an ensouled animal, all-inclusive in a sense of inclusion of all the main animal genera, from the heavenly race of gods to all kind of terrestrial living creatures (39e7–40a2). The body of the world is made of four elements indissolubly bound by the demiurge by means of a geometrical proportion (so is fire to air as air is to water, and air is to water as water is to earth). The elements themselves are indeterminate pre-elements ("triangles", 48b) "structured into determinate bodies by means of a variety of geometrical shapes and bound to each other by geometrical proportions." (p. 53) These have their origin elsewhere: they must have come from above, from the Forms, which constitute the model of the world. The world is a unique animal, self-sufficient, just, and perpetual. It was first given general specifications, then drawn up in more details as a geometrical model; the task of building was entrusted by the architect to his craftsmen (the young gods), responsible for all minute details of the construction. Are the Forms thought up by the demiurge? Are they independent of him, or subordinate to him? These questions traditionally puzzle the interpreters of Plato, both ancient and modern. Dominic O'Meara suggests that "if the demiurge is a part of Platonic myth, a story told by Timaeus in honor of a reformed Zeus, a story designed to give expression to metaphysical and ethical/political principles which Plato wishes to defend, then there is perhaps less need to go so far as to draw the conclusion that the demiurge, like the architect and legislator, must have thought up his model. Perhaps it may suffice here… to say that… a world, a city or a soul, if it is to function well, must do so according to same general functional principles (the model), which will always be valid" (p. 58).

There are two important difficulties with this account. The first one concerns the problem of pre-cosmic imitations of the model (p. 58–61). The second concerns the 'place' in which the world is made. (p. 61–63) Indeed, it appears that, according to Plato, a disordered chaotic milieu the demiurge uses for creating the ordered universe, has already contained imitation of the model. Especially this concerns the traces (*ichnē*) of fire, water, earth and air, mentioned in the *Timaeus* 53a. This "traces" however, according to O'Meara's suggestion (p. 60), are traces of the elements themselves, not of models of the elements (as some interpreters claim). In a sense, they are raw material used by the artisans to create the building blocks to be used for future construction. Now, in order to build something worthy the artisan needs not only the materials, but also a proper place and instruments, a well-equipped workshop, so to say. The Platonic notions of a place (*chōra*), a foundation (*hedra*), and especially of a 'receptacle' (*hypodochē*) and a 'nurse' (tithēnē), have received various interpretations. O'Meara notes however that the image of receptive matrix (*ekmageion*, *Timaeus* 50c) seems to refer to technical rather than biological production. So, as previously, it is better not to press Plato too hard on this point. Instead of looking everywhere for deep metaphysical meanings or biological associations, we may simply observe that, after all, speaking about 'building bricks', 'casts' for molding, etc. he is consistently developing his image of a divine architect.

Good is, according to Plato (*Timaeus* 64e, 87c), 'resides' in beauty, which in its turn manifests itself in measure and symmetry (p. 67–68). Beauty does not itself create the good. Rather, it characterizes the world when the world achieves its goal, which is the good (p. 76). The goal is achieved and the good realized through the structuring of the universe and the world-soul according to mathematical proportions, which are beautiful themselves. The model realizes the world, but the beauty of the model, concludes O'Meara, is different from the beauty of the world: the world is unique in its reality, and the model is not just another world (p. 78).

Chapters 5–6 deal with the political philosophy of Plato's late dialogues. The meeting described in the *Statesman* took place just before the trial of Socrates; therefore, the dramatic date of the dialogue is 399 BCE. As in the *Timaeus*, the conversation happens during the Panathenaic festival. An unnamed guest from Elea (unnamed, according to O'Meara's suggestion, because after the generation of Zeno there probably were no significant representatives of the Eleatics worth mentioning) discusses with Socrates' namesake (=young Socrates) the question of political order. The basic metaphor employed in the speech is this of a new robe (*peplos*) weaved for the goddess Athena. Young girls weave a new robe for the goddess under the direction of an elderly woman. This *paradeigma* (*Statesman* 277d–278e), that is to say an illustrative example, designed to elucidate a more complex subject matter, is developed by an older instructor for his younger student in order to explain the peculiarities of political philosophy. The politician is not just a good or responsible citizen. He possesses special expertise, which helps him to manage things well. The political art (*tekhnē*) is compared then with the skills employed by a trainer of group sports. Indeed, a trainer of this sort, unlike the one coaching individual athletes, is developing a comprehensive program aimed at some common good, which cannot however account for personal needs of specific members of the team. In the same vein, the legislator designs laws as general rules, applicable to all citizens, irrespective of any peculiarities and circumstances which may occur in a given situation (*Statesman* 294e ff.). The law, which in Greece was almost exclusively associated with statutes (so that even customary behavior, practiced for many generations, was routinely attributed to an ancient and often mythical lawgiver), is therefore not a foundation of the good state. A wise political leader is concerned with the specific needs and does this according to his expertise. In the absence of an experienced statesman, law (which guarantees social stability) must remain unchanged, as in the story about Solon, who left Athens for ten years precisely in order to prevent his fellow-citizens from changing a new political regime which he has previously established. Quite on the contrary, in a well-designed state its 'open-texture,' to use a term coined in modern times by Herbert Hart (1961), undergoes constant transformation (=is weaved as a *peplos* for the goddess) by people skilled in the political science, working under the direction of a wise man, who decides, in Aristotle's words *poia poiois harmottei* (*Ethics Nicom*. 10.9., 1181b7), what kinds of law are suited best to what sorts of folk. Since these skills are difficult to imitate, borrowed constitutions are rarely implanted successfully in a foreign soil (*Statesman* 293e; 297c ff.). This is however the subject of the greatest of Plato's dialogues.

In his *Laws* the Athenian guest (maybe Solon or somebody of his status, according to O'Meara's suggestion, p. 107) discusses the ways political science could help to establish and run a new *polis,* which, according to Plato's scheme, is governed by the Guardians of the law, who maintain the pre-established order, and the Nocturnal Council, which is largely responsible for whatever changes the state undergoes. Also the members of the Council travel extensively to see what is going on abroad, presumably for security reasons but also in order to exchange and accumulate ideas, vital for the political science. The most successful of them they adopt home. This is clear. Less obvious is a link O'Meara establishes between some ideas expressed in the *Laws* and the Athenian festival of Dionysus (p. 113–114).

What kind of science is first introduced and then elaborated by the Guardians? They must know the good on which the goal to be achieved in their political planning depends. In addition, they must have a model be imitated. The ideal state has special spatial organization: the land must form a circle with the acropolis in the middle. There must be sufficient territory and resources to support its limited population, which would make the state self-sufficient

(*Laws* 737d, etc.). The land, which remains common property, is subdivided into twelve region and distributed equally among five thousand forty households. Some inequality is allowed only in the case of mobile goods, etc. The physical organization of the polis is reflected on the spiritual level. Religion is also determined in clear spatio-temporal terms. The center is occupied by the temples of Hestia (Hearth), Zeus and Athena, each of the twelve regions and tribes are consecrated to a god of traditional religion. These gods, as well as the paradigm state itself, are not named to account for the future regional specific. "The organization of the religious space, where a differentiated multiplicity is brought to unity, mirrors the way in which land and population are distributed in the state" (p. 121). Time is also made sacred: religious feasts dedicated to specific gods take place regularly throughout the entire year (*Laws* 828b). The precise religious calendar is not fixed for the model state: this also remains a discretion of the future lawgivers. Moreover, the organization of the paradigm polis reflects the order of the universe (the one described in the *Timaeus*). The sacred land, dedicated to the gods, is of spherical shape, circular and self-sufficient like the cosmos; the state as everything in the cosmos is designed according to geometrical proportions; the sacred territory of the state corresponds to the cosmic order with the earth (Hestia) in the center, the moon and the sun (Athena and Zeus), located next to it, and the planets and the fixed stars found on the periphery as separate villages which encircle the acropolis; and through the religious festivals the people and the gods are engaged all year round in elaborated astro-choreography (p. 123).

Well, here is the story told by Dominic O'Meara. To conclude, the book is superbly written and well produced. Readers interested in the history of ancient philosophy, cosmology and political thought will find it indispensable.

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Yuriy Kondratyuk's Name Was Written in Her Heart

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The paper is to render homage of memory to a historian, tireless explorer of the local history, researcher of the biography and works of Yuriy Kondratyuk Dr. Nadiya Kocherha. The paper represent facts, telling the story of rehabilitation Yuriy Kondratyuk's (real name — Alexander Shargey) good name as scientist and inventor, and the popularisation of his ideas at Poltava Yuriy Kondratyuk National Technical University.

Keywords: Yuriy Kondratyuk, history of astronautics, local history, cosmonautics and aeronautics (aviation) in Poltava, philosophy of cosmism

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On Friday 22 June 2018 our dear colleague, friend, pedagogue and established scholar, active member of Poltava cultural and social life, loving and beloved mother and grandmother, a person of big heart Nadiya Kocherha passed away after a brief illness.

Nadiya Konstyantynivna Kocherha (née Korobeynyk) was born in village Kruta Balka, Novy Sanzhary District, Poltava Region, on 13 April 1950 to her parents: father — Kostyantyn Oleksandrovych and mother — Mariya Hryhorivna. From her mother — a humble village school teacher (who taught Russian language and literature) — she adopted the great love for books and learning, culture, history of her native land, the inexhaustible aspiration for discovering and knowing everything new and previously unknown. She read extensively since her childhood. Her mother recollected that little Nadiyka had read all the books not only in the school library, but also in the village public library. Throughout her life, Nadiya Konstyantynivna Kocherha was a great lover of books; keeping abreast of new literature she had always surprised her colleagues with her erudition.

In 1973 Nadiya Konstyantynivna graduated from Historical Faculty of Poltava Volodymyr Korolenko State Pedagogical Institute; later, having accomplished her postgraduate studies at Kyiv Taras Shevchenko State University, she successfully defended her PhD thesis in history. Since 1978 the locus of her pedagogical and creative career had been Poltava Construction Engineering Institute that is now known as Poltava Yuriy Kondratyuk National Technical University. Having gradually advanced the steps of professional ladder, in 1991 Dr. Nadiya Kocherha became head of the department of Ukrainian Studies: it was the first department of such kind in Ukraine, and it had been created on her initiative. Dr Kocherga's active position that she had always held in the life of the university predestined her promotion to the position of pro-rector in humanitarian aid and educational work (1997–2004). In 2015 Dr. Kocherha resigned from the position of head of department, but continued to work henceforth in the

position of associate professor, and also performed her duties of Rector's adviser. Her selfless labour in the field of education had been highly appreciated and rewarded with Certificate of Honour from The Verkhovna Rada of Ukraine, Certificate of Honour from The National Academy of Sciences of Ukraine and The Little Academy of Sciences of Ukraine; she was decorated with honorary titles of *High Achiever of Education of Ukraine*, *Veteran Teacher of Ukraine*, and many other awards and decorations. Dr. Nadiya Kocherha was laureate of regional Makarenko prize, Kotliarevs'kyi prize, and Korolenko prize for workers in the culture and education area.

Dr. Kocherha's true passion was the museum work. Since 1985 she performed the duties of Institute museum director. The museum exposition had already existed, but with her effort it was cardinally reshaped, considerably supplemented and expanded, which enabled in 1998 — by then already — the university museum (in 1994 Poltava Construction Engineering Institute was transformed into Poltava Technical University) to gain the statues of People's museum. Present exposition of the museum represents in an organic unity all of the two hundred years of Poltava tradition of education, starting from the foundation of Institute of Noble Maidens (1818), the buildings of which — that had been designed by a reputed Russian architect Louis Charlemagne, and constructed in 1832 — in 1930 became home to Poltava Agricultural Construction Engineering Institute of which the present Technical University that bears the name of one of the most celebrated pioneers of astronautics Yuriy Kondratyuk is the immediate successor.

Dry lines of nearly official obituary can barely reflect the role that Dr. Kocherha played in the university life. There can scarcely be found any established teacher or administrator in the university who had never asked her for help or assistance doing a text proof-reading or corrections with respect to Ukrainian grammar, an excursion around the University museum or historical and cultural sites of Poltava and Poltava region for conference participants or guests of the University, for her aid in organising student self-government in a faculty or campus life, and many other various requests. She had never refused. Dr. Kocherha herself had always been an enthusiast organiser and factually founded a number of university traditions: conducting of regular thematic educational events with students, she had also developed a conception of educational work that laid the foundation stone for creating University student parliament in the late 1990s; and the words of the University hymn is also a piece of her invention and the work of her genius.

Aforesaid merits and achievements however do not directly connect Dr. Nadiya Kocherha with the area of philosophy and cosmology, unless the name of the University that had become dear to her. But as a matter of fact, the name of Yuriy Kondratyuk our University bears, to a great extent, thanks to Dr. Kocherha; as well as her own name today can rightfully be listed among the names of scholars whose continuous effort enabled Yuriy Kondratyuk (Alexander Shargey) to take the place — he had truly deserved — in the history of science and technology, beside the other famous theorists of space travel science and engineer-inventors.

As a researching historian Dr. Nadiya Kocherha had a wide range of interests that laid primarily in the field of local history. Besides the enormous work in area of the history of Poltava educational institutions that had already been mentioned above, another focus of her studies was on the cultural history of Poltava region: *e.g.*, from her pen (in collaboration with Dr. Viktor Revehuk) flowed two books on Volodymyr Korolenko and his life in Poltava [Revehuk & Kocherha, 2003; Revehuk & Kocherha, 2014]; she also wrote about painters Vasiliy Volkov and Ivan Zaytsev, who taught at Poltava Institute of Noble Maidens and Poltava Cadet Corps, and on Poltava connections of Volodymyr Vernadskyi, etc.

Poltava however is not only — as it is usually being considered — one of spiritual and cultural centres of Ukraine; at different times it was home to a number of scientists and engineers in the area of aeronautics and astronautics. Among the first here should be mentioned the name of Oleksandr Dmytrovych Zasyad'ko, who was an artilleryman and missile constructor — first his missiles had been tested in 1818; a crater on the far side of the Moon bears his name since 1976. A few years ago, there was a paper published in *Philosophy and Cosmology,* titled *Oleksandr Dmytrovych Zasyad'ko: a Descendant of Zaporozhye Cannoneer at the Head of Rocket Technology* by Dr. Nadiya Kocherha [Kocherha, 2010]. The inventor of the knapsack parachute Hleb Kotelnikov, rocketeer Yuriy Pobedonostsev, constructor of space rockets Volodymyr Chelomey, and a number of other theorists and practicians of the space rocket area housed in Poltava. It is no accident that on academic Valentyn Hlushko's initiative the Museum of Aviation (aeronautics) and Cosmonautics (astronautics) founded in Poltava (it opened its doors to the public in 2001) [Pistolenko, 2009; Pistolenko, 2016]. However, among all these names the name of Yuriy Kondratyuk that for a long time remained either almost unknown or covered with unfathomable mystery and tabooed had become a favourite one for Dr. Kocherha.

Thirst for knowledge brought Dr. Kocherha in 1980 to Poltava Volodymyr Korolenko State Pedagogical Institute to Yuriy Kondratyuk conference of Physico-Mathematical Faculty, organised under the guidance of D. Sc. in physico-mathematical sciences, Professor Oleksandr Panteleymonovych Rudenko. By the time, with Professor Rudenko's effort, there had been created a little Yuriy Kondratyuk museum (1980) at Poltava Volodymyr Korolenko State Pedagogical University; and in 1982 there was opened a memorial plaque with Kondratyuk's high relief and inscription: "A prominent soviet scientist and inventor, one of the first engineers of space travels Yuriy Vasilievich Kondratyuk (1897–1941) studied in this house at the Second Men's Gymnasium in 1910-1916" (more precise date of Kondratyuk's death, who volunteered for the army in 1941, and was killed in action in February 1942, had been fixed later).

Rehabilitation of the academic name — as much as the recovery of the real name and biography of Yuriy Kondratyuk — Alexander Ignatovich Shargey — had become a matter of concern for a number of interested people. However, Yuriy Kondratyuk was completely rehabilitated in his own fatherland only in 1970, after American *Apollo* had landed on the Moon (1968), having used his *Lunar orbit rendezvous* (LOR). Academics Valentyn Glushko, Yuriy Pobedonostsev, Boris Rauschenbach, and others wrote about Kondratyuk. An immense research work had been done by Kondratyuk's associate, who served with him in the same regiment, and later became a design engineer of Lavochkin design office Borys Ivanovych Romanenko; as well as one of Kondratyuk's cousins, and his first biographer Anatoliy Volodymyrovych Datsenko. Even today their works remain the most complete and important studies, representing Kondratyuk's life and works. The book *The Star of Kondratyuk-Shargey* by Borys Romanenko represents an engaging story of researches and rehabilitation of the truth about the prominent inventor [Romanenko, 1998].

It is only in 1980s became known that the author of book *The Conquest of Interplanetary Space* Yuriy Kondratyuk was not a native of Lutsk Hryhoriy (Yuriy) Vasyl'ovych, but a native of Poltava Alexander Ignatovich, and his real surname was Shargey. These circumstances, of course, in the first place predestined Dr. Kocherha's interest, as a researcher in Poltava local history, to Kondratyuk's unordinary personality, his destiny, and his fate. However, this interest had not been reduced to a purely academic desk study. Speaking without unnecessary fervour, we can say that Dr. Kocherha became a passionate propagandist of Kondratyuk's

thought and ideas, she could be able to recognise in his thoughts and biography a powerful educative potency, and eventually related him with Poltava Technical University, coming to be the chief initiator and, so to say, the motor of conferring on Poltava Technical University the name of Yuriy Kondratyuk.

The University — formerly Poltava Construction Engineering Institute — has never been directly related with aeronautics and astronautics. It is notable however that it was a humanitarian scholar — a historian — Dr. Nadiya Kocherha who noticed that Yuriy Kondratyuk's engineer activities had been perfectly fit with the university profile. Kondratyuk undoubtedly was a talented inventor in area of construction engineering, technology and energetics: a cup for conveying elevator, the biggest wooden grain elevator "Mastodon", wooden pendant bridge, ferroconcrete tube tower, ferroconcrete tower-type pile driver, a project of the biggest wind power station on the mount Ay-Petri, and many other things: all those things were the works of Kondratyuk as a theorist of space travels, and all those things were the real embodiments of his *earth* philosophy [Romanenko, 1998: 27–28]. It was no accident that one of his manuscripts on the theory and practice of space flights Kondratyuk expressively called *To Those, Who Will Read in Order to Build.*

Another thread that connects Kondratyuk's name with the name of our university is his genealogy: the fact that his mother Ludmila Lvovna, née Schlippenbach, was brought up at Poltava Institute of Noble Maidens[1]. Thus three subjects, three histories interwove for the historian and explorer of the local history Dr. Nadiya Kocherha, which were not of a mere interest for her, but sank deeply into her heart and mind: Poltava, Yuriy Kondratyuk, and Poltava Institute of Noble Maidens. There began since then the years of unremitting toil, researches, new acquaintances…

In 1997 the centenary of Kondratyuk's birth gave a cause for international celebration according to the resolution issued by UNESCO. The first Yuriy Kondratyuk's academic biography by Anatoliy Datsenko and Vladimir Pryschepa [Datsenko & Pryschepa, 1997], appeared in print in Moscow academic publishing *Nauka*. On Dr. Kocherha's initiative Anatoliy Datsenko visited Poltava Technical University to present his book on the Day of Cosmonautics (astronautics) 12 April 1997. On 21 June 1997 — in the day of Yuriy Kondratyuk's hundredth anniversary — according to decision of the Cabinet of Ministers of Ukraine his name was conferred on Poltava Technical University. Since then — again first of all thanks are due to Dr. Kocherha's effort — Yuriy Kondratyuk's name has become not merely a label or even a brand of the University, but it has rather become a particular moral reference point, an example of academic and humanitarian selflessness, the measure with which the university life is verified and adjusted. Annual student meetings and reunions on 12 April — on occasion of the Day of Cosmonautics, and on occasion of Yuriy Kondratyuk's anniversary that falls on 21 June have become traditional for the University, as well as the practice of academic conferences and round tables within the framework of *Kondratyuk readings*. In May 2017 there was held the international academic and practical conference *Kondratyuk Innovations 21st–22nd*, dedicated to Yuriy Kondratyuk's (Alexander Shargey's) one hundred and twentieth anniversary, in course of which a monument to the great inventor was unveiled in front of the university main building. And it is quite natural that the jubilee medals of the Academy of Sciences of Ukraine were presented not only to the immediate authors of the monument — its architect Andriy Konyuk and sculptor Valeriy Holub, — but also to the *author of the idea* — Dr. Nadiya Kocherha.

[1] By the way, on his mother's line, Alexander Shargey (Yuriy Kondratyuk) is a descendant of that *ardent Schlippenbach*, whom Pushkin mentioned in his *Poltava*: a Swedish baron, who fought in the Battle of Poltava in 1709, was captured, but afterwards having become a Russian general.

On Dr. Kocherha's initiative the University developed and participated into the publishing activities about Yuriy Kondratyuk. The book *Yuriy Kondratyuk (Alexander Shargey): the Son of Ukraine, the Son of Poltava* by Anatoliy Datsenko had been published in 1997, and republished in 2000 under the aegis of the University [Datsenko 2000]. Anatoliy Datsenko also collected and published the memories about Kondratyuk that had not been previously published[2]. In 2001 the University publishing issued the book *Yuriy Kondratyuk (Alexander Shargey) in the Memories of His Contemporaries* in Ukrainian translation prepared by Dr. Kocherha, and in 2007 the *Memories* appeared in Russian [*Yuriy Kondratyuk*, 2007]. In 2017, on occasion of Yuriy Kondratyuk's one hundred and twentieth anniversary, the third edition of the same book appeared, now as a bilingual edition — in Ukrainian and English [*Yuriy Kondratyuk*, 2017].

Dr. Kocherha used the great labour and put much her energy translating into Ukrainian the aforesaid academic biography of Yuriy Kondratyuk. It was a complicated task primarily because of difficulty in finding adequate equivalents of Russian technical terms in Ukrainian. In order to prepare a quality Ukrainian translation she had got involved not only Ukrainian philologists, but had also engaged established teachers and scholars in engineering and technology: at the end of the day the activities became the testing ground in order to form Ukrainian technological vocabulary. In 2012 the book was republished: under the same cover reappeared both Russian original, and Ukrainian translation prepared by Dr. Kocherha. The foreword by astronaut Vitaliy Sevastianov was supplemented with the foreword to Ukrainian edition, written by the leading constructor of space technologies, Professor Anatoliy Afanasyyovych Rudenko. In 2017 the Ukrainian translation of the book appeared in a new edition [Datsenko & Pryschepa, 2017].

Here we should also mention Dr. Nadiya Kocherha own publications that appeared in Ukrainian, Russian, and English: *Yuriy Kondratyuk (Alexander Shargey): Philosophy of Life and Creativity as the Way to Attain the Truth* (in collaboration with Anatoliy Rudenko) [Kocherha & Rudenko, 2005]; '*Kondratyuk's Route': Philosophy of the Way 'Through Hardship to the Stars*' (in collaboration with Gennadii Aliaiev) [Aliaiev & Kocherha, 2007]; *In the 'Earthly time' and the cosmic space: Y. V. Kondratyuk (O.O. Shargey) — the way to stars* (in collaboration with Nataliya Orinich) [Kocherga & Orinich, 2014]; *Yuriyy Kondratyuk: life devoted to cosmic science* (in collaboration with Iryna Perederiy and Nataliya Orinich) [Perederiy & Kocherga & Orinich, 2015]; *Yuriy Kondratyuk (Alexander Shargey): known and unknown* (in collaboration with Iryna Perederiy) [Kocherga & Perederiy, 2017]; *Yuriy Kondratyuk's 'Expertise' as an Artefact: Within the Framework of History and Culture* (in collaboration with Ludmyla Cherednik) [Cherednyk & Kocherha, 2017]. One of her papers (in collaboration with Gennadii Aliaiev) *A Cosmist-Scientist Yu.V. Kondratyuk (A.I. Shargey): the Hard Way to Immortality* also has been published in *Philosophy and Cosmology* [Aliaiev & Kocherga, 2009].

It was no accident, perhaps, that Yuriy Kondratyuk became a kind of moral magnet for Dr. Nadiya Kocherha. Their disposition and life-philosophy was to a large extent very alike. Dr. Nadiya Kocherha did not take a fancy to utopian projects, especially those, which could hurt and crush the lives of particular people. On the other hand, it seemed there was nothing impossible or unrealistic for her — which would not be successfully accomplished, if she had only taken it into her hands — whether it was opening of a new department, or the People's museum, or student self-government, or a new speciality… She liked very much

[2] In 2000 — not long before his decease — Anatoliy Datsenko handed to the State Archive of Poltava Region nearly 1300 documents that had been found and collected by him for more than thirty years in research work on Yuriy Kondratyuk's biography.

those Kondratyuk's words that had preserved in the memoires of his contemporaries: "What a kind of idiotism 'resting'? How is it possible to remain in a complete inactivity for a long time?" [*Yuriy Kondratyuk* 2007, p. 42]. The same exuberant disposition, ebullient and tireless activity was inherent in Dr. Kocherha. And it was precisely to the point as the book dedicated to the sixtieth anniversary of hers bore the title: "I will never be tired of living and loving"…

May Dr. Nadiya Konstyantynivna Kocherha rest in peace and her memory be eternally blessed!

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