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RUSSIAN COSMISM, GLOBAL CRISIS, SUSTAINABLE DEVELOPMENT

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Abstract:

The article is based on the scientific report by O.L.Kuznetsov and B.E.Bolshakov at the General Meeting of Russian Academy of Natural Sciences (December 6, 2012). The scientific report caused a great interest, and many scientists suggested to open discussion in the press on this subject. The article reveals the natural-scientific and humanitarian mechanisms of global crisis and a transition way to sustainable development on the basis of world scientific heritage and, first of all, fundamental ideas of outstanding thinkers and scientists of the Russian scientific school or Russian cosmism. The work is performed within the project of RFBR № 12-06-00286-a.

Keywords: sustainable development, Russian cosmism, global crisis, "nature – society – man" system, noospheric LT-language, design and management, transition to noosphere.

Earth is a cradle of the Mankind, but one can't always stay in the cradle. Cosmoplanetaric civilization is our common future.

K.E. Tsiolkovsky

Transition to Noosphere is pre-laid by the cavalcade of cosmic and geological history of Earth's biosphere, development of scientific thought as planet phenomenon. The Noosphere is our common Case.

V.I. Vernadsky

Introduction

The theme requires comprehensive and in-depth exposition, but within the limits of the article we would deal with just some questions:

1. Why a man needs sustainable development?
2. Global crisis, fundamental contradictions and the Russian scientific school's message;
3. What is world philosophic-scientifical schools and their view of the future of the Mankind and Common Case of the Mankind?
4. The necessity and possibility of a special language creation in order to describe laws in the "nature-society-man" system;
5. The starting point of the noospheric language for a standard describing, uniting, and discovering of new laws in the "nature-society-man" system;
6. Global crisis and multistage transfer to the noospheric sustainable development.

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1. Why the Mankind needs sustainable development?

At the International conference on sustainable development that took place in June 2012, the UN Secretary-General, Ban Ki-moon, declared: *"The planet is in the state of an unprecedented crisis. We have to admit our modern model of the global development is irrational. It is necessary to find a new way for the advancement"*.

It is well-known that every "new" thing is a well forgotten "old" one. V.I. Vernadsky wrote: *"We continually observe in the science history that one or another thought stays unnoticed for some time, but then it opens an inexhaustible influence on some new conditions. It is necessary to take into account social environment conditions, mood, and habits of intelligent people" [7]*.

Through our deep conviction today such a "well forgotten new" should be the fundamental ideas of the Russian school of Cosmism.

Why do we think so?

In the beginning of the XXI century the Mankind found itself at the Great Change, the transfer of the Planet Earth to the qualitatively new cosmic-geological condition accompanied with a change of the world civilizations. Industrial civilization comes through the decline phase, and that has been marked by the cluster of global cyclic crises.

Scientists, experts, politicians, and businessmen, mainly followed by an old-fashioned industrial paradigm, were not able to make the right diagnose of spatio-temporal crisis scales and offer an effective strategy of their overcoming.

A lot of "diagnoses" are known that are the ground of the world crisis. Among them typically pointed out:

- an excessive anthropogenic load leading to an ecological catastrophe and demanding the control of dynamics of population and consumption of resources;
- transnational corporations' expansion led to the poverty, hunger, unemployment.

However, these factors are just results of more deep reasons.

2. Global crisis, fundamental contradictions, and the Russian scientific school's concept

We fix that the modern world experiences a systemic multidimensional crisis. Its projections are cosmoplanetaric, climatic, spiritual, ecological, technological, product, energetic, monetary, demographic, and scientifically-educational, the crisis of Man and a chrematistic[1] world of him. All of them are consequences of the defined contradictions. What are they?

[1] Chrematistics is the notion introduced by Aristotle in the 4th century B.C.E., meaning profit by any cost at the expense of others.

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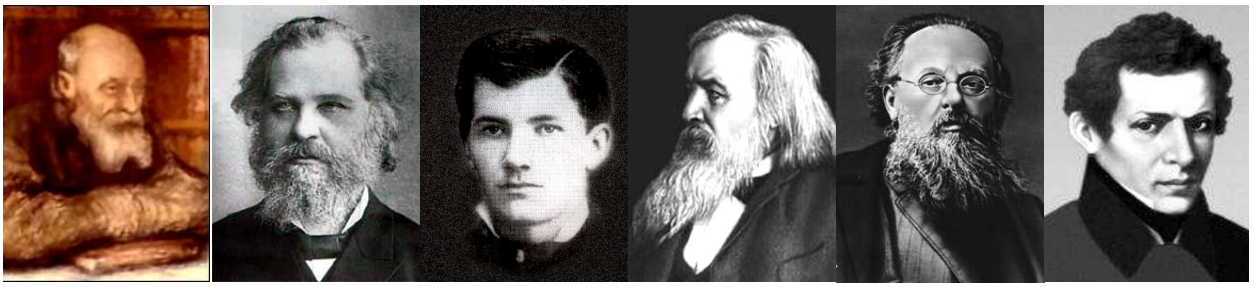
- In the first pace, the contradiction between spatial limitedness of the Earth, its resources and the necessity of the Mankind development preservation in an unlimited perspective;
- In the second place, the contradiction between the mortality of an individual and geological eternity of the Life as a cosmoplanetaric notion.

It is clear that the solution of these fundamental contradictions is racking for any separate country and also is the Common Case of the Mankind. However, this is the Case that is the main message of the Russian scientific school: M.V. Lomonosov, A.N. Fedorov, N.A. Umov, N.I. Lobachevsky, D.I. Mendeleev, S.A. Podolinsky, K.E. Tsiolkovsky, V.I. Vernadsky, K.A. Timiryazev, A.L. Chizhevsky, A.F. Losev, P.A. Sorokin, P.A. Florensky, N.D. Kondratiev, L.N. Gumilev, P.G. Kuznetsov, N.N. Moiseev, and other eminent scientists and philosophers (pic.1). Each of these introduced an unvalued contribution into thought development of the Mankind. All of them unite according t their philosophically-scientific views on the future of the Mankind and the Common Case of the Mankind.



N.F. Fedorov (1827 – 1903) | N.A. Umov (1846 – 1915) | S.A. Podolinsky (1850 – 1891) | D.I. Mendeleev (1834 – 1907) | K.E. Tsiolkovsky (1857 – 1935) | N.I. Lobachevsky (1792 – 1856)

V.I. Vernadsky (1863 – 1945) | K.A. Timiryazev (1843 – 1920) | A.L. Chizhevsky (1897 – 1964) | L.N. Gumilev (1912 – 1992) | R.O. Bartini (1897 – 1974) | P.G. Kuznetsov (1924 – 2000)

Pic. 1. Outstanding representatives of the Russian scientific school

3. What are the world philosophical-scientific schools, and how do they see Mankind's future and Common Case of the Mankind?

There are a lot of philosophical and scientific schools in the world.

And all of them answer the disturbing questions. Among them one can point out two principal questions:

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1. *What is the specific school that represents the future of Man and Mankind in tote?*
2. *What are the goals does the school suggests to achieve as Common Case of the Mankind?*

The answers on these questions serve as one of the bases for world schools' pointing out.

Among them are:

- Western scientific school (Europe, USA, Canada, etc);
- Eastern philosophical school (Egypt, India, China, etc);
- Russian philosophical-scientific school (Russian Cosmism).

We shall consider how each of them deals with the fundamental questions.

Western scientific school answers resting upon the conservation laws (mass, force, energy, etc) opened by physics for the last 300 years. The laws are correct for closed systems[2] (according to energy flows), and living systems (including Man and Mankind) do not refer to them. Basing these laws Western scientific school considers global system as closed one which resources weaken according to rising of population growth. That's why the school considers the future of the Mankind as limiting of population. As the Common Case of the Mankind population rising dynamics control is supposed with the aim of environment protection from the anthropogenic overload. This global control is realized by "zero" growth strategy, ок the strategy of "gold" billion, or the strategy of "600 000" that evokes a global spatio-temporal rupture between the "elements" of the world system, that means the global crisis [12, 14].

Eastern philosophical school[3] does not limit growth. It is based on belief that the future is in Constant Life on Earth and in Cosmos. Meanwhile the Common case is seen as doctrines' and concrete practices' universal observance. According to the school, they provide Constant Life on Earth and in Cosmos [1].

Russian philosophical-scientific school (or Russian Cosmism) unites the best characteristics of Western and Eastern world schools. Uniting Belief, Knowledge, Understanding, and Skill, it gives its own answer. It is based upon the common laws of open systems, pointing out among them Life conservation laws. Life is seen as a cosmoplanetaric notion. *Life is such a form of organization that implies struggle with entropy (chaos) growth* [3, 4 – 8, 10, 13, 15, 18 – 22].

Russian scientific school sees the future of man and Mankind in fundamental contradictions' solution in behalf of Life Development, and the Common Case of Mankind – in struggle with all

[2] The notion "closed system" and its connection to the notion "open system" is considered in the work: Bolshakov B.E. Science of sustainable development. The book I. – M.: RANS, 2011.
[3] This means, classical philosophically-religious schools: Zoroastrianism, Buddhism, Al-Farabi, Confucius, Lao-tzu, Mahavira, etc.

forms of entropy growth by formation of Man who is able and realizing his ability to creativity in the name of Life Development in all forms of its manifestations.

Staying a universal after its approbation by the UN in 1987, sustainable development concept is rather political than scientific one, and is exclusively made on the base of Western scientific school conceptions without accounting key ideas and results of other world schools, without accounting an unprecedented world crisis, its cosmoplanetaric measure, the necessity of elaboration of the strategy of the overcoming the Great Crisis of Mankind thought which was discussed by Russian Cosmists; with the aim of Mankind transfer to the new quality – a noospheric civilization of sustainable development.

Without Russian scientific school fundamental results' accounting, the notion "sustainable development" becomes a question: is it a myth or reality[4]*?*

What is the point of the results?

The origin of Russian Cosmism School was a peculiar answer to the Russian scientific thought about "inevitability of thermal death (the end) of the Universe" that appeared in world society after R.J.E. Clausius dealt with energy preservation and entropy growth principles [8, 10, 18, 19]. In essence, the works of Russian Cosmism are upon the look for an answer to the global question [3 -6, 8, 15, 18 – 20].

The first of works was one of the outstanding philosopher N. Fedorov "Common Case Philosophy" (1875) maintaining that *"Man would then become a Man when overcome Death"* [18].

In essence, the work gave a stimulus for Life Development as cosmoplanetaric notion alternative ideas' search. In 1880 a well-known work of S.A. Podolinsky "Man's labour and his attitude to energy distribution on the planet", was issued [15]. S.A. Podolinsky showed that *"A man is the only known nature power that is able to increase Sun energy part by a volutional act, called labour. Sun energy is accumulated on Earth. Brainwork is materially cosmic and gives the only way; with the help of more perfect machines and technologies it makes physical labour a more productive one rising Mankind energetic budget, decreasing entropy rise, and removing the threat of the Universe end"*.

The work of S.A. Podolinsky attracted attention of K. Marx, and he asked F. Engels to make a response [5]. Unfortunately, F. Engels didn't have an opportunity to read the whole text of the work (more than 100 pages) and that's why he gave the answer to its brief report in the Italian

[4] Kuznetsov O.L. Nature – society – man system: myth or reality (report at the Second International conference on sustainable development fundamental problems in the "nature – society – man" system)//Electronic journal "Sustainable innovative development: projecting and management": volume 8, edit. №3 [Electronic resource], access regime: www.rypravlenie.ru, free.

newspaper La Plebe[5] (page 3). F. Engels pointed out "*that Podolinsky has made a really big discovery that a Man accumulates energy like a plant, and disperse energy like an animal".* But in the work "Dialectics of Nature" F. Engels writes that *"the assessment should be overseen"*. We have analyzed arguments of F. Engels and came to the conclusion that S.A. Podolinsky was right – labour measure is a physical dimension of energy [L^5T^{-4}], and an efficiency measure is capacity [L^5T^{-5}] [5, 10].

In times of K. Marx and F. Engels these notions were not enough developed. We would not point this out if F. Engels's opinion did not break the development of the fundamental economic category "labour" – value substances in terms of universal figures. So far several well-known economists referring to F. Engels, consider that labour should not be measured in energy units. Hoewever, V.I. Vernadsky, K.E. Tsiolkovsky, P.G. Kuznetsov admired by S.A. Podolinsky's work [6, 7, 8, 20].

In 1986 the UN Secretary-General connected the definition "sustainable development" with free energy rise on the planet and in this way supported the S.A. Podolinsky's discovery, made 100 years before sustainable development concept was adopted in the UN. To the point, *S.A. Podolinsky's discovery is a fundamental basement of sustainable innovative development*. Non-acceptance of this basement makes sustainable development problem lacking in legal scientifically-natural basements [10].

One of the conquences of entropy growth law is planet emission. It is certainly to raise a question: where emissed by planets energy "disappears"? How does it begin to function again?

Without an answer to this question "the circulation does not succeed". This means *finiteness* of movement, and that contradicts movement undestroyeness postulate. The Russian physicist N.A. Umov offered a key by the third thermodynamics law's implementing. The law showed the existence of processes in Nature that are aimed against entropy growth [10, 19]. Unfortunately, the law was not adopted by the western physicians[6].

The development of Cosmos movement eternity is contained in philosophical and scientific works of a genius philosopher K.E. Tsiolkovsky who came to the conclusion that dissipative and antidissipative processes in Space are reversible. As consequence, *perpetual youth in Universe* is in perpetual Time-Space [20]. Mankind has not yet realized the genius thought of the world

[5]Detailed analysis of F. Engels's critics of S.A. Podolinsky's views one can read in the work: Bolshakov B.E. Labour measure problema: analysis of F. Engels's critics of S.A. Podolinsky's views//RANS Bulletin: volume 10 №2. – M.: RANS, 2010.

[6] For information purposes: One should not mix up up theorem of Nernst developed by Plank, with the law of N.A. Umov [19]. Theorem of Nernst does not have any connection with the law of N.A. Umov.

astronautics founder, but every time dealing with another "world end" prediction, it is useful to appeal to Great scientist's heritage. So we did, observing the 155-anniversary of K.E. Tsiolkovsky at the round table of the Second International conference on fundamental sustainable development problems in 2012[7]. We cite two didactic quotations from K.E. Tsiolkovsky's works:

1. *"The first thing we can say about the Reason is that it is not only something top in the Universe, but also does not have anything common with substance" [20].*
2. *"It is a huge mistake of Mankind not to give a half or one third of its reaches in order to support inventors, philosophers, and science" [20].*

The discovering of the periodical system of chemical elements by the Great D.I. Mendeleev has shown that two interconnected movements are processes of dissipation (dissociation) and antidissipation (synthesis) of chemical elements creating spiral movement of the Perpetual Life of substance in Time and Space when the process of dissociation is changed by the synthesis process creating a chemical basis of cyclic development of the Perpetual Life of substance in Universe [6, 20].

Unfortunately, for the last years D.I. Mendeleev's name is not mentioned as an author of the periodic system of chemical elements in the western scientific literature [10, 11].

At the same time without the periodical law of Substance, discovered by D.I. Mendeleev, it is very difficult to give an explanation of the *Live Substance's* cyclic development law on our planet and in Cosmos.

In essence, description, analysis, and synthesis of empirical generalizations in the basis of cyclic Substance Life development law, almost all works of the outstanding scientist, and philosopher V.I. Vernadsky are devoted. His 150-th anniversary would be celebrated in 2013 by the world scientific community. Analyzing and synthesizing biogeophisicochemical material of cosmoplanetaric life through the whole period of time of its existence, V.I. Vernadsky makes impirical generalizations. Among them are:

1. Live substance is an open cosmoplanetaric system. It is "transformator and storage" of cosmic (first of all, sun) energy [6, 7].
2. Live substance is a geologically persistent process that lasts on Earth for about 4 billion years. Facts of abiogenesis are not known in geological history of earth in spite of a lot of catastrophies of various scales [6, 7, 20, 22]. Every living thing comes from a living one (principle of Redi).

[7] In detail one can read in electronic journal "Sustainable innovative development: projecting and management" (edition №3 (2012), articles of O.L. Kuznetsov, A.F. Braginsky, B.E. Bolshakov).

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3. The main difference of Live and Inert substance is in opposite direction of their evolution: *«Live substance raises free energy of biosphere (the first principle of biogeochemistry). All nature processes in the field of natural inert objects – except for radioactivity – decrease free energy of the environment (biosphere)"[6]*.
4. Interconnection of Live and Inert substance under the effect of radiation energy flow provides a cosmoplanetaric cycle – a cycle of energy flows (power), its geological eternity [5, 10].
5. Live substance of V.I. Vernadsky unites all the variety of organisms and notions of cosmoplanetaric Live, all its forms through allgeological history of our Planet in Cosmos. *Live substance and Life are one thing* [6, 7, 8].
6. The difficulty in organic Life understanding is that Live Substance is not an object, but the process, a cosmogeological antidissipative wave process of biosphere transfer to noosphere [5, 6, 7, 8, 10].

In this connection V.I. Vernadsky wrote: *"In the last millenniums an intense growth of civil Mankind influence on biosphere change. Under the scientific thought and man labour influence, biosphere gradually transfer to a new condition – noosphere. This one is a natural process coming out as Law of Nature" [6, 7]*.

Is there a physical principle managing this process? Is that possible to find such a law of live system movement that is valid in all forms of its manifestations?

The answer to these questions gave an outstanding scientist Ervin Bauer (1890 – 1937). He justified and supposed the principle of live systems existence that he define as the principle of *stable non-equilibrium* [4, 5, 10].

The principle says: *"All and only live systems never are in balance and perform constant work against balance thanks to their free energy"*. In the capacity of outcomings of the principle "gives" main notions of Life: metabolism, growth, reproduction, and others [4].

E. Bauer didn't come to entropy size as V.I. Vernadsky, but chose a new essential variable named it "outer work" [5, 10].

The principle of stable non-equilibrium is a distinctive anti-entropy postulate. Live system must continually make the structure, organization defined by the change of remoteness distance from the balance, more difficult [4, 10].

In accordance with E. Bauer: "We deal with not a controversy to thermodinamics laws, but with other laws that consist in fact that something settled by thermodynamics does not logically realizes "for 4-th billion years" [4, 5, 10].

It is naturally to ask the question: *"Is there a law with two outcoming differently directed processes (as projections to different coordinate systems): entropy growth of Clausius and free energy growth of E. Bauer, V.I. Vernadsky".*

Such a law exists. Its author is also an eminent representative of Russian Cosmism, P.G. Kuznetsov [3, 5, 10, 11].

In the process of research P.G. Kuznetsov succeeded to ascertain a "spatio-temporal bridge" from I. Kant, G. Lagrange, J. Maxwell to S.A. Podolinsky, V.I. Vernadsky, E. Bauer, and show that in constantly changing world the *quality* with power dimension (energy flow) stays unchanged. P.G. Kuznetsov has firstly introduced the *power conservation law as General law of Nature* expressed in spatio-temporal language that unites natural, social, and spiritual processes into one global "nature – society – man" system. The law is both in base of entropy growth processes of Clausius, and in free energy growth of E. Bauer, V.I. Vernadsky; in base of change of lifeless and life nature including all it forms among which Mankind is. P.G. Kuznetsov firstly has succeed to show that in the base of Mankind development laws is General law of Nature, quality with power dimension conservation law. He has firstly shown that the principle of "development conservation" of V.I. Vernadsky, E. Bauer is a projection of power conservation law into a particular coordinate system "Life as a cosmoplanetaric notion" and is provided by the constant useful power growth speed with interconnection with environment. He showed that this is true for any social structure and pattern of ownership. *He has firstly succeeded to bring the ideas of his Great predecessors, the ideas of Russian Cosmism, to a maximal costiveness and consider them in terms of goals that could be managed* [8, 9, 10, 11].

In common with P.G. Kuznetsov[8] we have developed world outlook, theoretical, methodological, and technological bases of sustainable development management in the "nature – society – man" system. Beside mentioned names, we consider other names of eminent scientists and world-known searchers that are not mentioned here, including: M.V. Lomonosov, N.I. Lobachevsky, K.A. Timiryazev, S.V. Kovalevskaya, A.S. Khomyakov, V.V. Dokuchaev, V.M. Bekhterev, I.I. Mechnikov, A.A. Bogdanov, A.E. Fersman, A.L. Chizhevsky, P.A. Florensky, P.A. Sorokin, L.N. Gumilev, V.V. Rosanov, N.D. Kondratiev, A.D. Nechvolodov, R.O. Bartini, A.F. Losev, N.I. Vavilov, I.R. Prigozhin, I.M. Zabelin, I.I. Gvay, A.I. Oparin, A.L. Yanshin, L. LaRouche, N.N. Moiseev, V.P. Kaznacheev, I.P. Kopylov, N.P. Bekhtereva, F.A Gareev, A.A. Akaev, A.E. Armensky, B.A. Astafiev, M.I. Belyaev, S.U. Glaziev, A.A. Kudryasheva, N.V.

[8] Kuznetsov O.L., Kuznetsov P.G, Bolshakov B.E. Nature-society-man system: sustainable development. – M.: Noospere, 2000.

Maslova, A.N. Nikitin, A.E. Petrov, A.I. Subetto, V,S, Chesnokov, E.B. Chizhov, Y.V. Yakovetc and many others.

Of course, during the development of sustainable development projecting and management scientific bases [10], the heritage of Western scientific school has also been used including eminent philosophers and scientists, such as: Nicolaus Cusanus, M. Kopernik, J. Kepler, Galileo Galilei, G. Leibniz, I. Newton, I. Kant, G. Hegel, J. Lagrange, J.R. Mayer, R. Clausius, J. Maxwell, Ch. Darwin, K. Marx, F. Engels, J.H. Poincaré, A. Einstein, M. Plank, E. Schrödinger, G. Kron, S. Hawking, R. Penrose, and many others.

Each of them had brought an unvalued contribution into world scientific thought development that has become the heritage of the Mankind, its scientific heritage. It is extremely *necessary, but insufficient* to use it in sustainable development fundamental problems decision.

Non-registering the world philosophically-scientific heritage of Russian scientific school to solve fundamental controversies facing Mankind, it is *almost impossible* to overcome the world crisis and provide the transfer to Global sustainable development.

Synthesis of scientific knowledge of "nature – society – man" system's laws, is needed [5, 7, 9, 10, 14].

"The problem is that today, 25 years later, sustainable development is still a universal concept, but is not a compulsory one for an everyday realization in practice". This is the consideration of the Upper level Group under the UN Secretary-General (the leader is the President of Finland T. Halonen)[9].

Why does sustainable development concept not become a compulsory if it is a universal one?

Compulsory is something that has Law as a basis. There are two types of questions:

1. *Laws of Right* — these are wrote laws that can be canceled by certain circumstances.
2. *Laws of Nature* — these are science-opened laws that can't be cancelled by any circumstances.

If a law of Right is broken, a Man suffers. If a law of Nature is broken, Mankind suffers.

For these sufferings localization it is necessary to establish communication between laws, express them in one language, and learn to *apply right* [10].

[9] Bolshakov B.E. Report at the Second International conference on sustainable development fundamental problems//Sustainable innovative development: projecting and management (vol. №3 (2012)).

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4. The necessity and possibility of a special language creation In order to describe laws in the "nature – society man" system

"For a too long time scientists of natural and social sciences declared without hearing each other, almost in different languages. It's time to unite disciplines, to find a common language".

(from the report of Upper level group under the UN Secretary-General, 21.06.2012)

In the second part of XX century, in spite of intense development of object knowledge and languages of physics, chemistry, biology, geology, scientific society felt the necessity of subsidiary languages' creation. The languages should allow uniting different processes of physical, biological, social systems at phenomenological level [3, 5, 6, 9, 10, 19, 20].

Present scientific knowledge of laws of ecology, economics, social sphere, culture, science, techniques, education and other spheres of Life, are not proportional and expressed in different languages. This makes it difficult to perform them in one coordinate system and ensure an effective management of sustainable development on the basis of law [10].

Paradoxical situation emerged

In 1987 the UN experts has already declared: "We are able to coordinate an activity of Man with laws of nature". However, what laws these are – has not been mentioned. Meanwhile, science knows different laws of change. According to one, entropy growths, and the world moves to chaos. According to other, free energy growths and the world moves to noosphere.

Where World, Civilization, Man move: to Chaos or Noosphere (order)?

The question disturbs everybody. At the conference that took place on 17 of October 2012 in the Europe Institute of RAS, most scientists considered that the modern, late-industrial civilization retrogrades. Life development as a cosmoplanetaric notion is the alternative to degradation – that is the transfer to a new, more developed noospheric civilization. We share this point of view. However, we consider that is time for the second fundamental question that also disturbs everyone.

How to provide Life development — the movement to Noosphere in extremely difficult conditions of the unprecedented global crisis?

In his incomplete work "Scientific thought as a planet notion" [6], V.I. Vernadsky pointed out several conditions of transferring to noosphere. Let's enumerate them:

- widening of spatio-temporal bounds of biosphere and staying out in cosmos;
- sharp communication and exchange of countries' transformation;

- discovering of new energy sources;
- scientific thought and scientific research freedom from pressure of religious, philosophical, and political structures and suitable for scientific thought conditions' creation;
- thoughtful system of upbringing and education and workers' welfare rise;
- reasonable transformation of initial Earth's nature with the aim of making it able to satisfy all the material, aesthetic, and spiritual needs of numerically growing population;
- increase of not only development rate, but also space widening without development speed lose.

Let's take attention to the fact that these thoughts were written in 1943-1944 years when the Second world war had not been ended yet, and the world was in global crisis.

However, the genius V.I. Vernadsky has then seen the Great Break of Mankind thought that we would have to live through during the transfer to the world noospheric civilization.

Certainly for noospheric future creation, not only common vision of the problem is needed, but also scientific construction and management tools based on Life as cosmoplanetaric notion development laws [5, 6, 10, 11].

In practice, Mankind has created a lot of different natural and artificial languages. Universal laws, principals, and notions are described with the help of the languages with the use of different language measures.

What measures present?

1. Measure in ordinary life is Word, Work, Consciousness;
2. Measure in religion is Doctrine;
3. Measure in art is Colour, Sound, Image: composition and harmony;
4. Measure in philosophy is Synthesis of Quality and Number;
5. Measure in mathematics (measure of multitude) — Generalization of the notion "Length": Point, Segment, Area, Volume, etc.;
6. Measure in physics is a measuring Unit (Si system, CGS, etc.);
7. Measure in synergy is Entropy;
8. Measure in ecology is bioresource Loses;
9. Measures in economics is Money;
10. Measure in politics Authority, Power;
11. Measure in social sphere is Quality of Life;
12. Measure in informatics is Byte.

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How these measures are connected?

Here we come to the Question that is at the agenda. This is so-called "Damned question" of Nicolaus Cusanus (1454), G. Leibniz (1697), M.V. Lomonosov (1750), K.E. Tsiolkovsky (1906), V.I. Vernadsky (1944), P.G. Kuznetsov (1967), N.N. Moiseev (1988).

How a communication between natural, social, and spiritual measures should be established with the use of the Integrated language accessible to consciousness of a man?

How Nature – Society – Man laws should be measured?

If there is a possibility of the problem decision?

We shall try to briefly show which languages could be used to express general development laws of the "nature – society – man" system.

First, the algebraic and differential equalizations' language.

Second, the interdisciplinary language of thermodynamics and synergy.

Third, the spatio-temporal measures' language (LT-language).

Algebraic and differential equalizations' language

In the second part of the XX century, in spite of an intensive development of object knowledge and languages of physics, chemistry, biology, geology, the scientific society felt the necessity of additional languages' creation. The languages would allow "uniting" different processes at physical, biological, social systems at the fenomenological level [3, 6, 9, 10, 19, 20].

The attempts of findings of philosophical approach to the "uniting" problem were undertaken by Alfred North Whitehead (1929) in the work "Philosophy of process". Problems of difficult systems' studying has today come out at first boundaries. The necessity of new interdisciplinary languages search for socio-natural systems processes' description was also dictated by the implacability of the second thermodynamics start of Clausius to biological processes development description. The outstanding work of Ch. Darwin "The origin of kinds by natural selection" (1859) [4, 6, 16].

Their disagreement with explanation of Life on Earth evolution with the use of the second start of thermodynamics prominent scientists and practitioners expressed in different years: physicist N.A. Umov (1901), botanist K.A. Timiryazev (1903), K.E. Tsiolkovsky (1914), V.I. Vernadsky, E. Bauer, M. Plank, P.G. Kuznetsov. Gradually in the 1940-50s a new paradigm of thought is forming. This one is a science of cyclic self-organization of difficult dynamic systems[10]. The examples are shown in figure 2.

[10] Kuznetsov O.L. Nature-society-man system: philosophy of development through interconnection. – M.: RANS, 2011.

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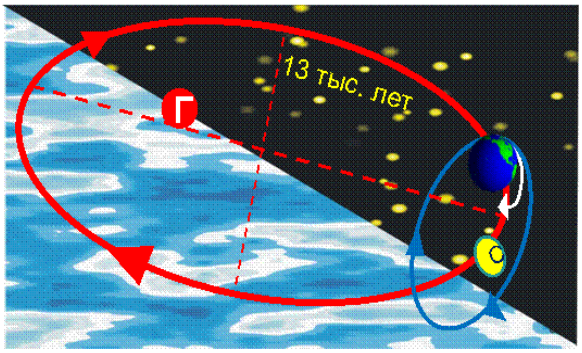
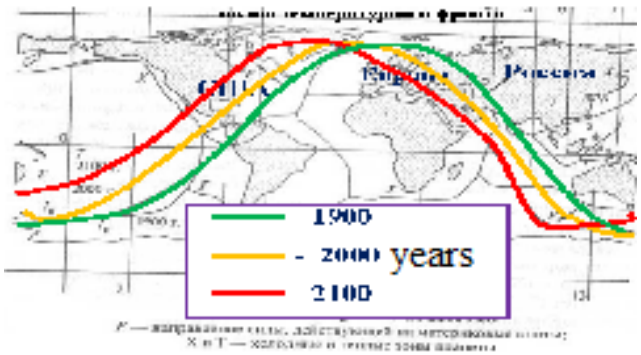
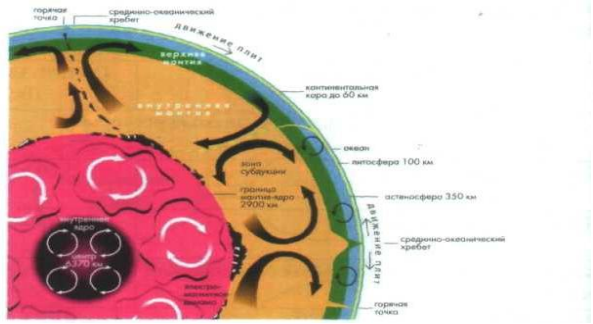


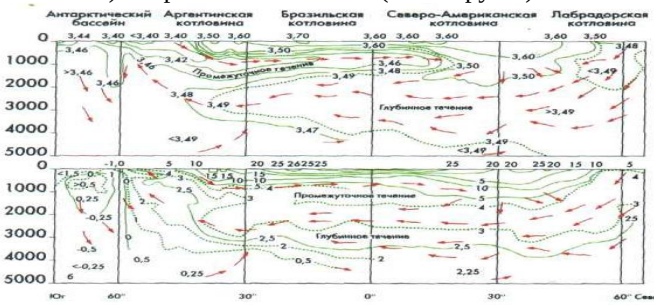
a) cosmoplanetaric cyclicity of Earth



b) temperature front wave (I.P. Kopylov)



c) Cyclicity of self-organization of inner layers of Earth (Korn, Pauell)



d) Cyclicity of density streams in Atlantic ocean (Vust)

Pic. 2. Examples of cyclic self-organization of dynamic systems

Interdisciplinary language of synergy

Interdisciplinary science of self-organization got a strong impulse after the appearance of the book of German scientist H. Haken, “Synergetik: Die Lehre vom Zusammenwirken”, and numerous works of Russian scientific schools’ eminent representatives dealing with self-organization questions: T.T. Moiseev, S.P. Kurdyumov, G.G. Malinetsky, S.P. Kapitsa, and others [11][11].

The world around appears as a hierarchically built system of spheres (covers) developing by one algorithm with the help of fluctuations inclined to growth and bifurcation processes overcoming.

These processes typically last not for a long time. After bifurcation point passing, the system gets to a new condition, a new attractor that lasts for a long time. During this periов the system self-organizes, i.e. reduces appearing fluctuations itself [13, 21].

Historical events in Russia (1917, 1991) showed that the choice between the attractors getting the social system after bifurcation, has principal meaning.

[11] Kapitsa S.P.,Kurdyumov S.P., Malinetsky G.G. Synergetics and future prognoses. – M.: Ectorial URSS, 2001.

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LT language[12]

One of the principally important and perspective approaches of socio-natural processes description was spatio-temporal measures' language. Logic of such a language, its philosophic and physical-mathematics basis has first been considered in works of eminent Russian scientists, R. Bartini and B.E. Bolshakov [2, 3, 5, 9, 10].

The methodology and principles of the use of LT-language with the aim of creation of sustainable development scientific basis in the "nature – society – man" system, are given in the monograph and textbook of O.L. Kuznetsov and B.E. Bolshakov [10].

Universal measures' use gave the ability of considering notions of different subject areas as project area with invariant, allowing transformation according to defined rules. All basic notions of the "nature – society – man" system began to be considered as a group of transformations with invariant. Universal laws of nature expressed in spatio-temporal measures stood as invariant [10, 11].

Projecting logic developed into tensorial projecting methodology of projecting of future noospheric world as a scientific instrument with the right use of universal laws of nature for development management in the "nature – society – man" system [5, 10].

5. Noospheric language principalities for new laws of "nature – society – man" system standard description, uniting, and discovering

The idea of noospheric language belongs to V.I. Vernadsky. He wrote: "The starting point of an exact scientific knowledge is spatio-temporal language. To express different formulas of movement is to express them in universal spatio-temporal language. Time is not only inseparable from space, but also is another expression. Time is filled with events so really as space is filled with substance and energy. *We study not space and time, but space-time* [6, 7]. From the all mentioned it follows that the noospheric language should be spatio-temporal or, shortly, a noospheric LT-language [5].

Noospheric LT-language[13] is a multidimensional spatio-temporal language that unites laws of different scientific paradigms, establishes the connection between natural, social, and spiritual measures, and using the Universal language accessible to human consiousness, gives a possibility to generate new knowledge of the system "Cosmos – Earth – Biosphere – Mankind – Man" laws.

Noospheric LT-language includes:

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[12] Bolshakov B.E. Law of Nature or how Space-Time works. – M.: RANS, 2002;
Chuev A.S. Physical worldview//in work of O.L. Kuznetsov, B.E. Bolshakov [10].

[13] Noospheric LT-language is a scientific language for special scientific and informational management guaranteeing system's creation including: LT-informatics, virtual LT-machine, outstanding LT-technologies of projecting and modeling of non-linear processes in normal, crisis, and conflict situations, and other goods of noospheric sustainable development industry in global, regional, and local levels.

- The measurability principle of N. Cusanus: "Mind and spirit is a measurement and commensuration" (1454) [10];
- Phoronomy of G. Leibniz: "Everything corporal from incorporeal and the other way" (1711)[14];
- The discovery of mass dimension L^3T^{-2} (J. Maxwell, 1855) [10];
- Project geometry of N. Lobachevsky, F. Klein, O. Veblen [10];
- Empirical and theoretical generalizations and notions of Russian Cosmism [6, 7, 8, 9, 10, 11, 15, 19, 20];
- Discovered by science laws, written in any language [3, 4. 6, 7, 8, 9, 10, 15];
- Tensor methodology of G. Kron (1956) and A.E. Petrov (1985, 2007) [10, 11];
- LT-dimension theory of B. Brown (1941) [2];
- Bidimension kinematic LT-quantities system[15] of R. Bartini (1965) – P.G. Kuznetsov (1973), published in DAN of USSR with the support of academicians M.V. Keldysh, N.N. Bogolubov, B.M. Pontekorvo [2, 3, 5, 10, 11];
- The works of Scientific school of sustainable development on the base of LT-language (1979 – 2012) [5, 10, 11].

There is a "golden" rule of controversies solution: *if the answer to a question is absent then it is necessary to another measuring system that serves as a basis of transfer to a more developed noospheric civilization* [9, 10].

Transfer to Noosphere is a cyclic regularity raise of spatio-temporal bounds of an effective use of its possibilities by Mankind [5]. As V.I. Vernadsky pointed out, this process is accompanied not only by tempo raise, but also by widening of space that transfers power with an increased speed [6]. The transfer is to a new Quality with a bigger spatio-temporal dimension.

Is it possible to express this process by the *universal spatio-temporal measure*, providing proportionality, coregularity, and harmonization of the transferring to noosphere process? Noospheric LT-language gives such an opportunity. Here a universal spatio-temporal measure is

[14] Bolshakov B.E., Kuznetsov O.L. Development of physicophilosophical ideas of M.V. Lomonosov in Scientific school of sustainable development//RANS Bulletin. – M., 2011.

[15] LT-dimension is a qualitatively-quantitative dimension with quality defined by name, LT-dimension and measuring unit, and quantity – by the number meaning of quantity as terms of measured size to its measuring unit. LT-dimension is defined as a production of integer-valued degrees R and S of length L and time T, with R and S – integer positive and negative numbers from minus to plus infinity. The dimension "power", for example, has the LT-dimension $[L^5T^{-5}]$. The dimension "mobility" is $[L^6T^{-6}]$.

defined as a product of integer degrees of length L^k and time T^i or as L^kT^i-dimension according to the dimension volume formula of R. Bartini – P.G. Kuznetcov[16]:

$$D^n = [L^k \times T^i], \quad (1)$$

with D^n – LT – is a dimension of L^kT^i-dimension, defining its sum spatio-temporal measurement (n = k + i) and dimension. Here k, i – are integer numbers from -∞ to +∞. L^k – k-is a measuring extent, T^i – i-measuring duration.

LT-dimension of biosphere $D^{10} = [L^5/T^5]$ – power. The transfer to a new quality with a bigger spatio-temporal measurement is a transfer from quality (LT-dimension) $D^{10} = [L^5 / T^5]$ to quality $D^{12} = [L^6 / T^6]$ *and upper*.

This new quality is, first of all, connected with power from source to the goal transfering speed raise: $[L^5T^{-5} \times L^1T^{-1}] = [L^6T^{-6}]$.

Here necessary explanations are needed.

It is not clear immediately that in modern "universal" science a standard description of the notion "Universal law of Nature" is absent in universal spatio-temporal language satisfying the demand of LT-dimension sufficiency [5, 8, 10]. This disadvantage is removed in the noospheric LT-language.

Universal law of Nature is not just a sum of unknown natural sciences in laws' world. This is that UNIVERSAL that unites scientific knowledge about real world laws. The essence of "universal" is the notion of invariant as something that preserves in depth of observed changes in the "Cosmos – Earth – Biosphere – Mankind – Man" system. In philosophy this is the principle *"everything changes quantitatively, but stays qualitatively unchanged in defined spatio-temporal bounds"*. In natural sciences, additional limitations are added to the invariant notion[17]. The limitations are connected with qualitative and quantative dimension of the basic properties' group; and all other properties are relatively derivative. In the LT-system such basic properties are "multidimensional length" $[L^R]$ and "multidimensional duration" $[T^S]$, connected with each other by $[L^RT^S]$-quantities as qualitatively-quantative essences.

Universal law of Nature – is, first of all, a preservation of quality the inner changes of which are only qualitative. Quality[18] is defined by LT-dimension of a quantity preserving measuring units, summing

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[16] Dimension is a measurement in terms of space (for example, third dimension is a third measurement). In the work of R. Bartini [2] the dimensional volume D^n is defined as: $D^n = c^{\gamma} \cdot T^{n-\gamma}$, with n – a sum of indicators (integer numbers) of dimensions in formula of dimension; c is a fundamental term l/t; T is a dimension radical; n, γ are integer numbers. In noospheric LT-language a dimension volume is rather LT-dimension by the formula (1). The notion of LT-dimension D^n or LT-dimension volume unites three qualitative parameters $[L^kT^i]$ - dimensions: measuring unit (cm/sek), sum regularity (n = k + i) and the dimension of $[L^kT^i]$.

[17] *Invariant in physics* is a law, principle that does not changes in transfer from one object to the other in a defined class of objects. In the LT-system such a principle is the LT-dimension proportionality principle. *Invariant in mathematics* is a function from transforming dimension coordinates that does not change its meaning in the given totality of the dimension's transformation (Mathematical encyclopedia: editor-in-chief I.M. Vinogradov, vol.2. – M.: Soviet encyclopedia, 1979; Physical encyclopedia: editor-in-chief A.M. Prokhorov, vol. 2. – M.: Big Russian encyclopedia, 1998).

[18] *Quality* is something that has only quantitative differences [9,10]. In the LT-system of dimensions each quality is a defined class of real world systems with spatio-temporal bounds of $[L^RT^S]$ -dimension. There is the same number of

measurement, and spatio-temporal bounds of its [L^RT^S]-dimension, unchanged. The transfer from one quality to another one is a change of spatio-temporal bounds, the transfer to another LT-dimension with another dimension. Standard form of the universal law of Nature belongs to P.G. Kuznetcov and looks like follows [5, 9, 10]:

$$D^{R+S} = [L^R T^S] = const. \quad (2)$$

The notions "Universal law of Nature" and "law of subject area" should not be mixed up.

Searches have shown [5, 10] that there is something common, but there are also differences.

Universal law of Nature is an invariant of *qualitative specificity of LT-dimension* that demands *to preserve* measuring units *unchanged*, sum measurement and its dimension that is preservation of immutable LT-dimension of spatio-temporal dimension.

A law of this or that area, for example, a physical law, is invariant of *quantative specificity of LT-dimension* demanding preservation of measured number dimension meaning according to all its allowed transformations in the coordinate system given by law's formula.

Searches have shown [5, 10] that different subject areas' laws are projections of Universal law of Nature in one or another specified coordinate system. Laws of physics, chemistry, biology, ecology, technology, economics, social sphere, education, psychology, law can be expressed in the noospheric LT-language. In this meaning the Universal law of Nature is a class of laws uniting the majority of concrete laws of different subject areas satisfying the demand of harmony, that is spatio-temporal proportionality or LT-dimension sufficiency.

It follows that Universal laws of Nature are so much as invariants-qualities expressed in LT-language. Today in the LT-system there are counted number, but by scientific thought development, their number will raise, wider and deeper covering the "Cosmos – Earth – Biosphere – Man – Mankind" system. Together with concrete laws of subject areas expressed in noospheric LT-language, a system of Universal laws of Nature – Society – Man appears.

However, one should not mix up the notions: "Universal law of Nature" and "Total law of Nature".

The notion "total" is that unites ALL UNIVERSAL LAWS of Nature or the quality that preserves in all universal laws of Nature expressed in noospheric LT-language.

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dimensions and qualities. As in the LT-system the number of dimensions is potentially endless, so real world qualities are also potentially endless. According to J. Maxwell's offer, physical dimension is designated in square brackets [L^RT^S], underlining its quantative specificity. Quantitative specificity of an LT-dimension is fixed by absence of brackets. The quantity with a definite [L^RT^S]-dimension can be shown in different projections with the use of different coordinate systems establishing quantative correlations (formulas) in the given quality [9, 10]. For example, energy dimension E with E dimension $[L^5T^4]$ an be quantatively defined with the use of different dimensions:

Mechanical energy: $E = F \cdot S;$ $E\,[L^5T^4] = F\,[L^4T^4] \cdot S\,[L^1T^0];$
Relativistic energy: $E = m \cdot c^2;$ $E\,[L^5T^4] = m\,[L^3T^2] \cdot c^2\,[L^1T^1]^2;$
Quantum energy: $E = \hbar \cdot \nu;$ $E\,[L^5T^4] = \hbar\,[L^5T^3] \cdot \nu\,[L^0T^1].$

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The idea of "total invariant – quality" we find in the notion of R. Bartini "self-image" that he used as a way of Space perception through the establishment of unique object's prototype (Space) with himself [2]:

$$A \equiv A,\ A \cdot (\frac{1}{A}) = 1. \quad (3)$$

In the noospheric LT-language we have "single quality":

$$[L^0T^0] = [L^RT^S]^{+1} \cdot [L^RT^S]^{-1} = 1. \quad (4)$$

In the LT-system a single quality $[L^0T^0] = 1$ is a somewhat "genome" uniting all dimensions – qualities.

Such "total invariant – quality" that preserves in each Universal Law of Nature is dimentionless dimention $[L^0T^0]$. It is defined by the composition of dual dimensions that are straight and reverse ones.

In our work "Development of physicophilosophical ideas of M.V. Lomonosov in the Scientific school of sustainable development" (RANS Bulletin, issue №2, 2011) it is shown that physicophilosophical prototype of this dimension are spiritual(Principium by G. Leybnitc) and physical (Principium by M.V. Lomonosov) monads' notions. Mathematics prototype of "*Prototype*" are fundamental mathematics constants that are irrational numbers Φ, e, π. Physical prototype of $[L^0T^0]$ is *immaterial*[19] *time flow*[20].

So, Total law of Nature is a single quality uniting spiritual and physical, rational and irrational "Principium".

Its standard for of writing is:

$$[L^0T^0] = const = 1. \quad (5)$$

Easy to notice that *"Principium"* can be various. However, all of them can be shown by three groups of dual LT-dimensions.

Group 1 consists of dual spatial dimensions:

$$[L^RT^0]^{+1} \cdot [L^RT^0]^{-1} = [L^0T^0] = 1. \quad (6)$$

This group is called *material* as there is no matters without length.

Group 2 consists of dual time-like dimensions:

$$[L^0T^S]^{+1} \cdot [L^0T^S]^{-1} = [L^0T^0] = 1. \quad (7)$$

This group is called im-material. Time-frequency flows are applied to it including: sounds, colours, smells, emotions and other.

Group 3 unites spatio-temporal dimensions:

$$[L^RT^S]^{+1} \cdot [L^RT^S]^{-1} = [L^0T^0] = 1. \quad (8)$$

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[19] Author's term "im-material" or without matter.

[20] The notions "time" and "time flow" should not be mixed up. In the LT-language time flow is defined by the term: $\frac{[L^0T^1]}{[L^0T^1]} = [L^0T^0]$. The notion flow is the term of a dimension to a time unit: $\frac{[L^iT^k]}{[L^0T^1]}$.

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This group is called materially–im-material (or materially-wave).

Three groups of dual dimensions make *Total laws* expressed in the noospheric LT-language.

Laws of preservation in the "Cosmos – Earth – Biosphere –Mankind – Man" system discovered for the last three hundred years (including: G. Leibniz – M.V. Lomonosov's monad $[L^0T^0]$; laws of Galilei $[L^1T^{-1}]$, $[L^1T^{-2}]$; J. Kepler $[L^2T^{-1}]$,$[L^3T^{-2}]$; I. Newton $[L^4T^{-4}]$; J.R. Mayer, A. Einstein, M. Plank $[L^5T^{-4}]$; J. Maxwell $[L^5T^{-5}]$; V.I. Vernadsky $[L^6T^{-6}]$; K.E. Tsiolkovsky, R. Bartini, P.G. Kuznetsov $[L^RT^S]$), *have LT-dimension nature with raising spatio-temporal measurement and spreading along LT-dimension symmetry axle of the LT-system.*

Energy preservation law is written as: $[L^5T^{-4}]$ = const.

As it is known, energy preservation law has its effect in the conditions of energy flows' absence (E) in and out of the system as $\dot{E} = 0$. Energy preservation law is closed for energy flows (power – energy in time unit).

At the same time all life systems are a sustainable development management object (including social, technical, economic, ecological systems). The systems are open to energy flows[21], they have special possibilities to act in time, and apply to system class with LT-dimension of power $[L^5T^{-5}]$.

LT – dimension of power $[L^5T^{-5}]$ preserves in the class of open for energy flows systems [5, 8, 9, 10].

In the noospheric LT-language power preservation law [5, 8, 9, 10] – is a statement that in an open for energy flows system the full power N is equal to the sum of active (useful) power P and lose power G with preservation of $[L^5T^{-5}]$-dimension:

$[L^5T^{-5}]$ = const (preservation of system's quality with power dimension);

$N(t) = P(t) + G(t)$, $[L^5T^{-5}]$; (9)

$P(t) = N(t) \cdot \eta(t) \cdot \varepsilon(t)$, $[L^5T^{-5}]$;

$\varphi(t) = P(t) / N(t)$, $[L^0T^0]$;

with N(t) – a full power of the system with LT-dimension $[L^5T^{-5}]$;

P(t) – an active (useful) power of the system with LT-dimension $[L^5T^{-5}]$;

[21] To the open for energy flows systems such systems have attitude that have the quality of life systems' non-equilibrium including biological, economic, social, technical, and ecological systems, able to consume, transform and make energy, substance, and information flows (P.G. Kuznetsov, O.L. Kuznetsov, B.E. Bolshakov). One should not mix up energy flow as ratio E/t with density of energy flow as ratio $E/(t \cdot L^3)$. Density of energy flow has LT-dimension $[L^2T^{-5}]$, and energy flow has LT-dimension of power $[L^5T^{-5}]$ and that's why they concern to different classes of real world systems.
Closed systems can comprehend in open systems, for example, "energy" $[L^5T^{-4}]$ comprehends in the "power" $[L^5T^{-5}]$ system. However, between open and closed systems there is LT-dimension rupture. In order to remove it different ways can be used. *The first way* – an opening of a closed system – is transfer to a new quality with a bigger LT-dimension. *The second way* – closing of open systems –is transfer to another quality with a smaller LT-dimension. The first way is connected with development, and the second one is connected with degradation.

G(t) – a lose power or loses of power with LT-dimension $[L^5T^{-5}]$.

Here: φ(t) – an effectiveness of full power use with LT-dimension $[L^0T^0]$;

$\varphi(t) = \eta(t) \cdot \varepsilon(t)$, *with*

η(t) – generalized coefficient of technology perfection;

ε(t) – a coefficient of presence (or absence) of a user (planning quality) [10].

Vitality principle or development preservation: "In the course of geological time, life substance exposure power raises in biosphere. … The process is still rarely taken into consideration. Later I will constantly have to deal with it" (V.I. Vernadsky) [6].

In the noospheric LT-language the vitality principle is a statement that development in open system (and any of its parts) preserves during time period T if there are necessary and enough conditions [5, 10]:

1. *quality preservation* (class of systems) with power dimension:
   $[L^5T^{-5}] = \text{const}.$ (10)
2. *non-decreasing useful power raise's preservation during time period T:*
   $\dot{P} \cdot T \geq 0; \dot{\varphi} \cdot T \geq 0, [L^5T^{-5}].$ (11)

What noospheric LT-language allows for uniting of different knowledge and natural, social, and humane sciences?

The modern world is a multilevel network (structure) of flows that develops as a result of input cycles system's interconnection. The cycles are accompanied by crises and conflicts of different range, breaking an integral process of development to divided "parts" of raise and fall that are difficult connected with sustainable development. In the numerous works of the Scientific school of sustainable development [5, 10] it is shown that it's impossible to make an example of sustainable development of a living object (including state, civilization) through the whole its Life. A well-known physical law of western science that could be a basis of sustainable development[22], does not stare in the face. Nevertheless, Life demonstrates surprising *ability to revive and preserve development* as a cosmoplanetaric process during 4 billion years, in spite of a majority of factors of destructive, and even catastrophic, outer and inner influence. This ability of every Life thing to solve the fundamental controversy between individual mortality and cosmoplanetaric eternity of Life became the basis of the *outstanding discovery of the Russian Scientific school of the universal law of cyclic development of Life as cosmoplanetaric notion* (N.A. Umov, D.I. Mendeleev, S.A. Podolinsky, K.E. Tsiolkovsky, V.I. Vernadsky, E.S. Bauer, P.G. Kuznetsov).

[22] Bolshakov B.E. Science of sustainable development. Book I. – M.: RANS, 2011. – 262.

Today there already is resumptive empirical rule discovering contents of a law during biosphere evolution[23]. We enumerate them:

- the increase of species diversity as variants for selection and further cyclic development of Life substance [6, 12, 14];
- cyclic development irregularity as one of the main conflict reasons between competitive life systems [6, 10];
- in the course of competitive struggle win and continue further development those Life systems (including socio-natural) that provide themselves a faster growth tempo of consumed power's (resources') use effectiveness [7, 10];
- the more effective consumed power use, the lower environment contamination level. "The less waste – the more profit";
- during evolution time there is a cyclic acceleration of Life substance's active power growth tempo in biosphere with geological periods' reduction (Paleozoic – 340 billion years; Mesozoic – 170 billion years; Cainozoic – 60 billion years) [6, 10];
- during evolution time there is a cyclic growth of brain from fish to Man (principle of cephalization of D. Dan) [6, 7];
- during evolution time al changes quntitavely and stays unchanged qualitatively in spatio-time cyclic bounds (quality) [10];
- during the transfer from one cycle to another, there is a widening of spatio-temporal bounds of Life active power accelerated growth by disturbance of evolution integrity [6, 10];
- during the transfer to another development level, the harmony is reached by proportionality, co-measurability, and dimensional sufficiency of a system.

Noospheric cyclic law of Life development as universal law of Nature [3, 4, 5, 6, 7, 8, 9, 10, 15, 19, 20] in the noospheric LT-language written as:

In the course of cosmoplanetaric process, *there is preservation* [5, 10]:

1. *Of quality* with spatio-time LT-dimension of power:
   $[L^5T^{-5}] = \text{const};$ (12)
   $N = P + G.$
2. Cyclic process of *non-decreasing growth tempo of* useful power with LT-measurement continual growth and preservation of LT-dimensional volume (quality) of the system in tote:
   $$P = P_0 \pm \dot{P}_1 t \mp \ddot{P}_2 t^2 \pm \dddot{P}_3 t^3 \geq 0, \ [L^5T^{-5}]. \quad (13)$$

[23] Kuznetsov O.L., Kuznetsov P.G., Bolshakov B.E. Nature – society – man system: sustainable development. – M.: Noosphere, 2000.

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Here (6) each member of the row is a cycle element. A cycle period is defined by three (sometimes four) members of the row and can be calculated according to the formula $T = t^3$ (sometimes t^4), with T – a cycle period, and t – empirically given ranging step. The analysis showed that:

- Cosmoplanetaric climatic cyclic ranging step is 11 years;
- Global crises ranging step is from 1 to 10 years;
- Man cyclic ranging step is 1 day[24].

In the works of Scientific school of sustainable development[25] it is shown that the consequence of the law, its projection, is a majority of other laws that are fair in one or other particular coordinate systems. Among them are: biological species cyclic change law, cyclic change of generations' law, cyclic change of technologies' law, cyclic economic development's law and others (table. 1)[26].

Table 1. Laws of the "ecology – economics – social sphere" system expressed in LT-language

№	Laws	Ecology	Economics	Social sphere
1.	Preservation $\left[L^R T^{-S}\right] = const$	Preservation of ecosystem $N,[L^5T^{-5}] = const$, $N = P + G$	Preservation of economic system $P,\left[L^5T^{-5}\right] = const$	Preservation of lifetime $T,[L^0T^1] = const$
2.	Change (polarization) $L^R T^{-S+1} > 0 (рост)$ $L^R T^{-S+1} < 0 (спад)$	Ecological growth (drop) $\dot{N} \times t \begin{matrix} > \\ < \end{matrix} 0$	Economic growth (drop) $\dot{P} \times t \begin{matrix} < \\ > \end{matrix} 0$	Growth (drop) of life time $L^0 \dot{T} \times t > 0$
3.	Preservation of change (dvelopment, degradation) $\hat{P},[L^R T^S] = const$, $\hat{P} = \hat{P}_0 \pm \dot{\hat{P}}_1 \cdot t \pm \ddot{\hat{P}}_2 \cdot t^2 \pm \ldots \begin{matrix} > \\ < \end{matrix} 0$	Cyclic change of species $P,[L^5T^{-5}] = const$, $P = P_0 \pm \dot{P}_1 \cdot t \pm \ddot{P}_2 \cdot t^2 \pm \ldots > 0$	Cyclic Change of technological lifestyles $\phi[L^0T^0] = const$, $\phi = \phi_0 \pm \dot{\phi}_1 \cdot t \pm \ddot{\phi}_2 \cdot t^2 \pm \ldots > 0$	Cyclic Change of generations $T,[L^0T^1] = const$, $T = T_0 \pm \dot{T}_1 \cdot t \pm \ddot{T}_2 \cdot t^2 \pm \ldots > 0$

All they are interconnected and can be expressed in the noospheric LT-language providing possibility to manage transferring process from one quality to another one, crisis withdrawal

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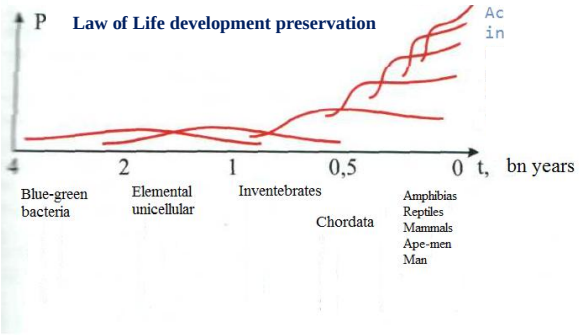
[24] The analysis we made, showed that periods of different cycles T and their ranging step t (that is independent variable in the equalization (7)) are interconnected that is well observed in the table 2. Moreover, under the influence of accelerating development process the global cyclic periods can non-lineary change with slowing ranging step from 10 to 1 year.

[25] Scientific school of sustainable development was based on the base of RANS and sustainable innovative development chair of the International university of nature, society, and man "Dubna" (heads are O.L. Kuznetsov, B.E. Bolshakov); realizes and develops fundamental ideas of the Russian scientific school; in 2006 got the status of the Leading scientific school of Russia; masters' and aspirants' preparation is made on the base of it, the International Scientific school of sustainable development works; it is also presented with the order "Glory to Russia".

[26] Bolshakov B.E. Russian cosmism and the Scientific school of sustainable development: global scientific initiatives (report at the Second International conference on fundamental sustainable development problemsin the nature – society – man system)//Sustainable innovative development: projecting and management (issue №3 (2012)).

process with the aim of global system's further development preservation in long-term perspective (pic. 3) [5, 10].

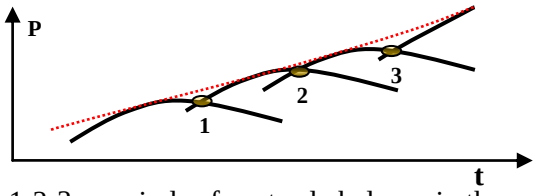


Pic. 3. Life substance of biosphere development as a quickening wave process

What are substantial peculiarities of the noospheric law of cyclic development? First of all it passed muster by cosmogeological and historical time. It expresses the substance of the Life development, but not its degradation, in spite of destructive (sometimes catastrophic) influences of external environment [5, 10].

Geological periods change was accompanied by the change of fauna and flora, change of different types of Life organization. The curve that is presented in the picture 4, demonstrates accelerating wave process of biosphere Life substance development, in the course of which it transfers to a qualitatively new condition [5, 10].

The change of one type of organization by another in the course of naturally-historical process was always accompanied by the transferring periods (cycles), that fixed spatio-temporal bound of dominating of one systems over others. That's why the transferring period is always a critical and of change. After the crossing of powers, or their time equality, a faster growth tempo follows that is of the winner part, and system's power speed lowering that is of loosing part. There is a reorientation from unsteady balance (bifurcation period in which equality of competitive systems' powers takes place) to sustainable disbalance of E. Bauer (pic. 4) [5, 10].



Pic. 4. 1-2-3 – periods of unsteady balance in the course of cyclic transfer to sustainable disbalance

In negative influences' conditions *Life development preserves* continually is there is an integral non-decreasing growth of consumed power (resources) use's effectiveness [5, 10]. Limitations follow from this definition — *law's demand:*

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1) Firstly, one should not mix up the notions “preservation”, “change”, “growth”, “development”, and “degradation”:
   - *Quality preservation* is the preservation of LT-dimension quantity, for example, $[P] = [L^5T^{-5}] = \text{const}$; *Number preservation* is a preservation of numerical meaning of P dimension, for example, P = const;
   - *Quality change* is a change of LT-dimension quantity; *Number change* is a change of a numerical quantity;
   - *Growth* is useful power (P) of Life system raise at the expense of contaminated power (resources) (N) growth;
   - *Development* is useful power (P) raise at the expense of consumed power (N) effectiveness (φ) growth, but not at the expense of its growth;
   - *Degradation* is loss power (G) growth (entropy growth) with useful power (P) decrease.
2) Secondly, there is a limitation from below (zero effectiveness growth), but a limitation from above is absent (an open system’s effectiveness can be more than one) [10].
3) Thirdly, cyclic development preservation demands an integral non-decreasing growth of effectiveness through the whole totality of Life existence cycles, but it does not excludes oscillating process in transitions between cycles [5, 10].
4) *Development is sustainable* at a defined cycle of Life system existence if during this period an integral process of consumed power use effectiveness growth takes place [5, 10].
5) *Development is not sustainable* at a defined cycle of Life system existence if during this period there is an oscillatory or permanently integral process of smooth raise and slump of consumed power use effectiveness [5, 10].
6) In transfers between cycles the development process integrity typically collapses, LT-dimension rupture appears – (spatio-temporal) crises that demand outstanding technologies of management where sustainable development is a strategic goal of crisis outcome’s management [10].
7) *The principle of sustainable development in the noospheric LT-language is a statement that development preserves in a long-term perspective T if conditions are implemented:*

$$\begin{cases} \dot{P}\cdot T = \dot{P}_0\cdot\phi + \ddot{P}\cdot\phi^2 + \dddot{P}\cdot\phi^3 > 0, [L^5T^{-5}] \\ \dot{u}\cdot T = \dot{u}_0\cdot\phi + \ddot{u}\cdot\phi^2 + \dddot{u}\cdot\phi^3 > 0, [L^0T^0] \\ \dot{G}\cdot T = \dot{G}_0\cdot\phi + \ddot{G}\cdot\phi^2 + \dddot{G}\cdot\phi^3 < 0 \ (inversion), [L^5T^{-5}] \\ \dot{N}\cdot T = const, [L^5T^{-5}]. \end{cases} \quad (14)$$

with τ – a ranging step;

T – a fixed period of sustainable development, $\tau < T \leq \tau^3$.

8) Without and out of management it is principally impossible to transfer to a new quality and provide global sustainable development in a long-term perspective that involves the system of cycles-crises of modern world civilization.

Search has shown that there is interconnection of Life on Earth and outer Cosmos management. Earth and cosmoplanetaric Life (including Man and the Mankind) are LT-dimensional, open, cyclic, resonance-timed system. There are reasons to suppose that the system is a "universal machine" amenabling to cosmic laws of Nature-Creator. *The cause of the world crisis is a conscious or consciousness, direct or indirect disturbance of these laws* [5, 10, 11].

6. Global crisis[27] and multistage transfer to noospheric sustainable development by LT-dimensional widening of spatio-temporal bounds

The presence of a universal law of cyclic development of Life as a cosmoplanetaric notion, expressed in the noospheric LT-language, gives a possibility to present the global crisis as a united LT-dimensional cause-effect system of embedded crises with defined cyclic periods and ranging step in the "Cosmos – Earth – Biosphere – Mankind – Man" system (table 2), counted for the current system's condition.

Table 2. Crises in the "Cosmos – Earth – Biosphere – Mankind – Man"[28] system

№	*Name of crisis*	*Period of cycle*	*Ranging step*
1.	*Global crisis* of Man[29] and khrematic world of his is connected with the degradation of khrematic consciousness. Future is present without khrematistic.	1 year	day
2.	*Global crisis* of generation change. LT-dimensional rupture of the integrity process of young generation's education in the interests of noospheric sustainable development.	27 years	3 years
3.	*Global crisis of technologies generation change*. The absence of monitoring, evaluation, generation, harmonization, and conversion of ideas' system in noospheric value.	27 years	3 years
4.	*Global monetary-economic crisis*. LT-dimension insufficiency of the world currencies[30] in the interests of noospheric sustainable development.	81 years	3 years
5.	*Global civilization crisis of 100-anniversary*. LT-dimension insufficiency of the modern civilization laws.	100 years	5 years
6.	*Global spiritually-ecological crisis of 1000-anniversary*. LT-dimension ruptures of belief, knowledge, understanding, and ability to manage sustainable development.	1 000 years	10 years

[27] Bolshakov B.E., Kuznetsov O.L. Global crisis and sustainable development strategy//RANS Bulletin: issue № 3. – M.: RANS, 2010.

[28] Cyclic periods and ranging step for crises 2 – 6 are variables, but for the present condition of the global system they are calculated with the use of the equalization (7).

[29] Cyclic period and ranging step for crisis № 1 are given as initial condition.

[30] LT-dimension insufficiency of the world currencies is the insufficiency of used currency's spatio-time measurement defined by the nominal currency size that is unsupported by a real power called a speculative (fictitious) capital (Bolshakov B.E. Power as a measure in economics//Sustainable development: science and practice: issue № 2(5),2010, www.yrazvitie.ru).

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№	*Name of crisis*	*Period of cycle*	*Ranging step*
7.	*Cosmoplanetaric crisis of transfer to noosphere* accompanied by climatic changes (daily observed in the form of earthquakes, volcanism, tsunami, hurricanes, floods, droughts, world ocean level changes, wave change of temperature regime of planet, naturally antropogenic catastrophies).	13 000 years	11 years

Global cause-effect chain of crises looks as follows.

In the basis there is *crisis № 1:* "Global crisis of Man and khrematic world of his".

Crisis of Man is degradation of his ability to create in the name of Life development explained by his chrematistic consciousness[31]. Chrematistic world is the world with chrematistic consciousness a dominator.

Many negative notions of the modern civilization are as, for instance, greediness, corruption, libel, fraud, betrayal, theft, violence, terrorism, and other are straight consequences and instruments of chrematistic consciousness that has caused *the crisis № 2:* "Global crisis of generation change".

The essence of the crisis is that under the influence of chrematistic consciousness, young generation upbringing and education's system degrades. The generation is oriented at false chrematistic values destroying constructive social life.

The crisis № 2 is the reason of the next *crisis № 3:* **"**Global crisis of technologies generation change". It is connected with the low effectiveness of morally and physically old-fashioned technologies generation, the necessity of their change to a new more effective technologies' generation able to make sure the transfer to sustainable development. The acceleration of the technologies change process for the last 50 years points that we approach to a somewhat jump faster than it seems. However, this process is brakes by the false chrematistic effectiveness evaluation of anti-chrematistic noospheric novations (projects, technologies) that are impossible for transfer to noospheric sustainable development[32].

Chrematistic consciousness is a source of the fourth crisis of the chain, *crisis № 4:* "Global monetary-economic crisis". Its essence is in LT-dimension insufficient monetary measure (currency) that evoked the speculative unsecured by the real power capital that by 2013 has become

[31] chrematistic consciousness is awareness oriented to profit by any price at the expense of others. Chrematistic formula: $U = \frac{S}{M} = \frac{S_0 + \dot{S} \times t + \ddot{S} \times t^2 + \dddot{S} \times t^3}{M_0 - \dot{M} \times t - \ddot{M} \times t^2 - \dddot{M} \times t^3}$ **(**with S — speculative capital defined by a special methode(work in reference 2); M — population).

[32] Bolshakov B.E., Kuznetsov O.L. NooKonstitution of Mankind and anti- chrematistic technologies//RANS Bulletin: issue №3, 2012. – M.: RANS, 2012.

of huge size. Its continual growth distorts the real worldview, created development illusion, strengthens risks of ineffective management and threatens to Man's future [10].

LT-dimension insufficiency of the world currencies (measures), chrematistic principles and their serving laws, are in controversy with the universal law of Nature – the noospheric law of development. All these create *the crisis №5:* "Global civilization crisis of 100-anniversary" demanding chrematistic evaluation orientations' change to noospheric anti- chrematistic values with the help of sustainable development strategy realization on the base of civilizations' partnership [21].

1 000 years ago the world was also in the spiritual ethic-ecological crisis. Then, for the crisis overcoming radical religious transformations strengthening spiritual Belief power were enough. Chrematistics was not dominating. Today the world has sharply changed. Chrematistics has taken a dominating place in the world. There has again appeared spiritual ethic-ecological crisis. However, now just religious transformations are not enough. New radical measures are needed that allow possibility **to unite energies of BELIEF, SCIENCE, ART, AND MANAGEMENT PRACTICE** on the base of fundamental laws of Nature-Creator. Establishing communication with the law, Man understands secrets of Creator's projects. Practicing it, Man becomes a CoCreator, raising his morality.

It's time to adopt *the noospheric ethic-ecological Constitution of Mankind (Noo-Constitution) as a legal form uniting spiritual, social, and natural-science laws.* Already over 50 countries support the offer, and Russia is the leader of the process[33]. The adoption of Noo-Constitution will be an adequate answer to *the crisis № 6:* "Global spiritually-ecological crisis of 1000-anniversary"[34].

However, the exclusiveness of the global crisis is in that it characterizes not only the present condition of the "Cosmos – Earth – Biosphere – Mankind – Man" system. Its another distinctiveness is in the fact that it is connected with the logical cyclic transfer of the system into a new evolutionary condition that is the notion of *the crisis № 7* **"**Cosmoplanetaric crisis of transfer to noosphere".

Mankind as an inalienable compound part of Earth's Biosphere in cosmic space has firstly collided with LT-dimensional crisis, a Great Break in transfer to Noosphere, for the last 13

[33] At the Second World conference on fundamental sustainable development problems (Dubna, 29 – 30th of October 2012) there was supported the offer of Noospheric branch of government creation in world countries and, first of all, in Russia. The branch should provide conditions for realization of Noo-Constitution as a legislative transfer basis of transfer to noospheric sustainable development.

[34] Reports at the World Summit "RIO +20" (19th of June 2012) (B.E.Bolshakov, O.L.Kuznetsov, A.V.Skornyakov, L.S.Gordina, V.N.Bobkov). In the report of professor L.S. Gordina there is the conception of Noo-Constitution and information of 50 countries supporting its realization.

thousand years. There is a change of civilization quality, a widening of its multidimensional spatio-temporal bounds defined by a multidimensional LT-dimension.

In the process of biosphere reorganization into Noosphere there is a civilizational transformation: late industrial (technogenic) civilization is replaced by a qualitatively new noospheric civilization demanding a harmonic development in the "nature – society – man" system, that is the support of LT-dimension *compatibility (proportionality)* of human activity with Life as cosmoplanetaric notion preservation law's cyclic development [5, 6, 10, 20].

An abuse of the law leads to a crisis and LT-dimension incompatibility (disproportion) of the crisis and crisis-free situation. In the noospheric LT-language a disproportion "before" and "after" a crisis is described as an LT-dimension rupture (that is multidimensional spatio-temporal) *or proper crisis.*

Multidimensional LT-rupture corresponds to *a system* of input cyclic ruptures – crises with LT-*dimensional invariants:* power $[L^5T^{-5}]$ "before" crisis and mobility $[L^6T^{-6}]$* – after crisis.

However, why exactly the mobility, but not some other LT-dimension?

Mobility is the speed of power transfer and is defined by the product of power $[L^5T^{-5}]$ and speed of its delivery to the goal $[L^1T^{-1}]$. In the LT-system the mobility dimension is on the top of dimensions' hierarchy and in the accelerating evolution process, so that it is impossible to transfer to a new quality.

Why is it impossible to transfer to a new quality unlimitedly accelerating power? Principally the law does not forbid this manipulation. Increasing power growth tempos, we shorten its delivery period, but leave its spatial measurement unchanged and get to singularity area. *To transfer from power to mobility without spatial dimension widening from L^5 to L^6 and run about the "point" of singularity is impossible.*

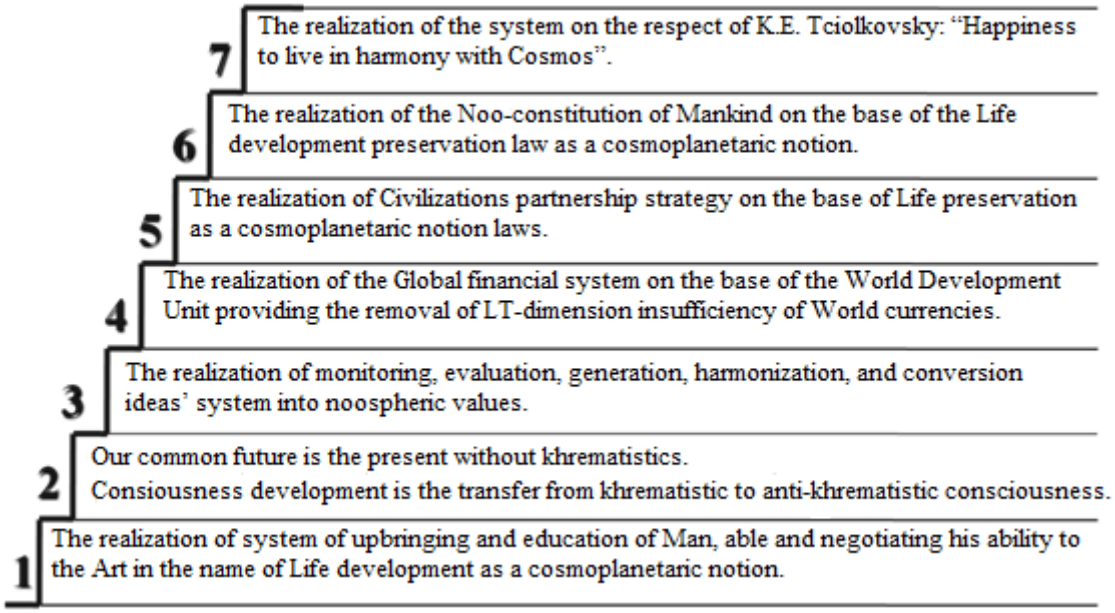
Transfer to a new quality demands the elimination of LT-dimension rupture, that is dimension raise from $[L^5T^{-5}]$ (power of biosphere) to $[L^6T^{-6}]$ (mobility of noosphere). The rupture is removed by the transfer management from "present" to "necessary" that is to the noospheric development without LT-dimension rupture. Transfer to noosphere management process has a number of qualities allowing to preserve a situation out of the singularity area:

- Non-linear widening of spatial bounds from $[L^5T^0]$ to $[L^6T^0]$;

* Mobility notion as LT-dimension $[L^6T^{-6}]$ was introduced by the outstanding Russian cosmists R. Bartini – P.G. Kuznetsov in 1973. For information purposes: it is well-known that the academician S.P. Korolev called R. Bartini his master, and American-german journal EIR (28.12.2000, №5) announced P.G. Kuznetsov a Russian Leonardo da Vinci of the XXI century.

- Non-linear speed acceleration of power transfer with preservation of mobility dimension $[L^6T^{-6}]$;
- In the process of transfer to Noosphere to the bound "unsteady balance" "power of biosphere" dominates, and out of the bound "mobility of noosphere" begins to dominate.

Non-linear transfer to a new quality is a noospheric sustainable development and is a multistage system of LT-dimensional ruptures' elimination – crises, that is presented in the pic. 5.



Pic. 5. Multistage system of LT-dimensional ruptures' elimination

Transfer to noospheric sustainable development is a multistage system of LT-dimensional ruptures' elimination. An increased LT-dimension should correspond to each step: $[L^5T^5]$, $[L^5T^6]\cdot t$, $[L^5T^7]\cdot t^2$ … $[L^6T^4]\cdot t$, $[L^6T^5]\cdot t^2$, … $[L^6T^6]\cdot t^k$ …

Here an explanation should be made.

The transfer from one step to another is connected with LT-dimensional rupture decrease. So, on the base of the noospheric LT-language in the Scientific school of sustainable development a special system of informational systems' conceptual projecting for noospheric sustainable development management, is created. The system allows realizing a phased management of transferring process from one stage to another, widening possibilities of the managed system.

There are five stages:

- Stage 1. *Possibilities' evaluation* (power) of the managed object at the initial time.
- Stage 2. *Needs' evaluation* (increased power) of an object for the projecting time period.
- Stage 3. *Problems' evaluation* as one of difference between the defined possibilities and needs for a fixed time.

- Stage 4. *Planning* of problems' solving including the development of multistage network of events that are needed and enough as for the goals achievement as intermediate, as strategic goal of the noospheric sustainable development.
- Stage 5. *Plan fulfillment control* with the use plan's detail[35].

Unfortunately, the format of the article does not allow examining this process in detail. That's why we would like to end the article with the expression of V.I. Vernadsky: *"Great Rupture: We experience not a crisis exciting weak souls, but the greatest rupture of Mankind thought that happens only once in a thousand years. Being on the rupture, getting the glimpse of the opening future, we must be happy that we have to experience that and participate in such future creation".*

We invite interested readers to discuss the topic.

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