



http://spinor.kiev.ua/english/comp_eng.htm

Spinor International Ltd. was registered at the end of 1991. Among founders - citizens of Ukraine and France. The main field of activity of the firm - development of various means allowing to significantly reduce or to completely remove a negative influence on consumers of various electronic devices, first of all such as personal computers, TVs, mobile phones, radar stations etc. Representative offices operate now in many large cities of Ukraine.



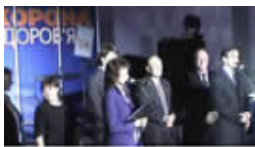
*Yours faithfully, President
"Spinor International" LTD-
Anatoliy Pavlenko*



Assembly business circles for the personal contribution to revival of spirituality, a national science and culture it is awarded Prezident Anatoly Pavlenko the award "Saint Sofia"

We equip workplaces of the operators PC and other electronic engineering devices of protection from a torsion components of electromagnetic radiations "FORPOST-1".

We organize seminars, lecture.



patents



United States Patent Pavlenko, 6,548,752 April 15, 2003 et al System and method for generating a torsion field Inventor: Pavlenko; Anatoliy R. (Kiev,UA); Pavlenko; Olexander A. (Kiev,UA)

United States Patent Pavlenko, 6,563,043 B2 May 13, 2003 et al System and method for generating a right torsion field Inventor: Pavlenko; Anatoliy R. (Kiev,UA); Pavlenko; Olexander A. (Kiev,UA)

Patent for invention (N23759a): "Device for human protection against negative impact of videoterminals, TVsets, and other domestic technique

Declarative patent (N28544a): "Device for human protection against impact torsion fields of geopathogenic zones of Earth

Declarative patent (N29839a): "Device for human protection against negative impact of videoterminals of PC, TVsets, and other domestic technique

Patent for invention (N29839): "Device for human protection against negative impact of videoterminals of PC, TVsets, and other domestic technique

Declarative patent (N37822a): "Device for human protection against impact of geopathogenic zones of Earth

Declarative patent (N38626a): "Device for human protection against torsion fields of cell phones

Declarative patent (N38659a): "Device for heating of heat carrier

Declarative patent (N40190a): "Device for car drivers and passengers protection "Declarative patent (N40850a): "Device for human protection against negative impact of videoterminals of PC, TVsets, and other domestic technique



Ceremony of rewarding has taken place at the Internat"FORPOST-1" the best invention of Ukraine 2002-2005 in nomination

"Protection of Environment" tional Specialized exhibitions "Public Health - 2004" in Kiev Spinor International Ltd. is a member Kiev Chamber of Commerce and Industry and the Chamber of Commerce and Industry of Ukraine, a collective member of the Kiev branch of the International Academy of Bioenergytechnologies

We maintain constant contacts with foreign companies and organizations, such as the International Institute of Theoretical and Applied Physics of the Russian Academy of Natural Sciences, the Russian Federation, Moscow, AMTECH Systems International, LTD, Alpha-E, LTD, TORTECH, USA, Illinois, PARAMED s.c., Poland, Warsaw, the Lagoon – B, Republic Bulgaria, Burgas, the Russian-Balkan bridge, the Russian Federation, Moscow, Israel Center of HI - TEC in Alternative Medicine "ALTERNATEVA", Tel Aviv, Sinadu d.o.o., Beograd, Yugoslavia, etc.

The staff includes skilled, highly professional people, including candidates of technical sciences, professors, academicians of the International Academy of Bioenergytechnologies. The main target of our activity is the development of the preventive protection devices, allowing to minimize a negative influence on people of electromagnetic radiation of various nature and their information components, the environment (geopathogenic zones).



**You can contact employees of Spinor International Ltd.
by:**

http://spinor.kiev.ua/english/cont_eng.htm

post: of. 98, #1, Svyatoshinska sq., Kyiv-115, 03115, Ukraine;

telephone: +38 (044)4528866 +38(044)3318820;

E-mail: forpost1@mail.ru

The fundamental bases of technological breakthrough.

Akimov A.E. director of the International institute of theoretical and applied physics RANS, academician RANS.

http://spinor.kiev.ua/english/other/akimov_eng.html

The majority of undoubtedly fair analytical estimations of a condition development of end XX century were reduced to ascertaining going deep global crisis. If such global crisis has arisen in a history of mankind for the first time, that, probably, for mankind there would be a weak hope - either on a miracle, or on an opportunity to live to three generations, instead of two. However crises in a history of mankind during last 12-15 thousand years arose repeatedly.

The first global crisis has arisen during a neolith. As the basis of existence of mankind of has exhausted collecting also the population of the ground making according to archeologists of the order 3 million the person, was reduced almost in 2 times. When threat of disappearance of the person as a kind on the Earth, it was quite real. However it has not taken place. The wheel was invented, instruments of agriculture, the mankind has passed to a settled way of life and on a short interval of time in has some times increased the number, - crisis was overcome. Break in new technologies always in a history of mankind remained a primary factor of overcoming crises. But last centuries, as against times of a neolith, technologies were born from new scientific paradigms, from new knowledge.

From told very important conclusions follow. If to trust laws of a history development, that, having got in a condition of global crisis, the mankind inevitably will find new knowledge (F.Engel's fairly wrote, that public needs move a science more, than hundreds universities) and on the basis of this knowledge will create the sum technologies which will make base of new rise of a civilization. The question consists only in when also who will create a new physical paradigm and how many it is required to time that on the basis of this paradigm were developed technologies on new physical principles.

With satisfaction it is possible to ascertain, that the new physical paradigm already is created and actively there is a process of creation of the sum technologies.

During last three hundred years the science knew two universal fields. This gravitational field and an electromagnetic field. The importance universal fields is well visible on an example of electromagnetic fields. As it became clear in the twentieth century, it is difficult to name any technical, scientific or household problem which could not be solved with the help of electromagnetism. It is electric power industry, electrotransport, a radio communication, computer facilities, navigation and many other things. In our apartments where we would not turn a sight, we inevitably see any electromagnetic device, - a refrigerator, the TV, a vacuum cleaner, a microwave and so on. When the ill person comes in a study of physiotherapy, it(he) finds out there a lot of the various equipment which majority is made with electromagnetic devices. Rare exception among this equipment are, for example, a stretcher, souls Шапка, mustard plasters and bloodsuckers. For last three hundred years it was not possible to open any universal a field which could give so impressing sphere on a variety of his(its) practical application as in case of electromagnetism.

In the beginning of the twentieth century the French scientist E.Kartan postulated existence in a nature torsion fields, - the fields produced by the angular moment of rotation [1]. Before opening a back a nature torsion fields connected to rotation of massive objects. Within the framework of such approach torsion fields are considered as display of a gravitational field for massive objects with rotation [2]. Later, with opening a back - quantum analogue of the angular moment of rotation, it was understood, that torsion fields at a quantum level are derivated spin, as against the electromagnetic field produced by a charge, and the gravitational field produced in weight. From these positions torsion fields are represented by the same independent physical object, as electromagnetic and gravitational fields.

To middle of the seventieth years theoretical researches on torsion fields have resulted in formation of the independent unit of theoretical physics which has received the name Theory Enshtein-Kartan (thermal power station). Practically all experts working within the framework of thermal power station, proceed from the initial point of view, that torsion fields are only specific display of gravitational fields. The most known experts in this theory are in Russia E.S.Fradkin, D.M.Gitman, V.N.Ponomarev, J.N.Obuhov, in USA R.T.Hammond, in Germany R.T.Hel', in Italy B. de Sabbota and K.Sivaram, in Israel M.Karmeli and others.

Thermal power station has remained the theory which has not resulted in applied problems as in thermal power station it was proved, that torsion fields are weak and can not create the observably phenomena or effects. Only in 80 and 90th years, with G.I.Shipovym's creation of the theory of physical vacuum (TPV), it was shown, that the thermal power station is the phenomenological theory, first of all in connection with phenomenological character of geometry of E.Kartan. In TPV the fundamental theory torsion the fields, basing on geometry Ricci was constructed.

E.Kartan, postulating torsion fields as object produced in the density of the angular moment of rotation, for their introduction used geometry in which there were no corners, m.e torsion fields in E.Kartana's representation actually not rotation. From these positions torsion E.Kartana's fields represent the certain mathematical abstraction, not having physical sense. In the theory of physical vacuum of G.I.Shipova geometry Ricci containing angular coordinates that specifies the rotation determining a nature torsion of fields is used.

The theory torsion fields in TPV does not impose any restrictions on size of a constant of backs - torsionnyh of interactions, i.e. torsion fields can have intensive display. It is useful to pay attention what even in thermal power station for dynamic torsion (for torsion sources with radiation) are not present restrictions on a constant of backs - torsionnyh of interactions. It does not prove, that torsion fields have strong display. Here it is important, that the theory not demands obligatory a constant of backs - torsionnyh of interactions. In these conditions the answer to a question: this constant small or big, and, hence, possible effects weak or strong? - can be received only by direct experimental measurements.

What is the physical vacuum in the most simple interpretation? We shall Imagine some limited volume of space from which air is removed. In traditional understanding in this volume there is nothing is and there is a vacuum. However in modern understanding is a technical vacuum since this volume in strict physical sense is not empty. We admit, that we managed to remove from this volume all elementary particles and to shield it so, that in this volume particles from the outside can not get. But also in this case, from the point of view of modern physics, it is impossible to assert, that the considered volume is empty. In this volume of space in any points can appear so-called virtual electrono-positronye pairs. Objects of substance - pairs can not be born from anything. The matter and if we do not fix her directly in the specified volume from which virtual pairs are born can give rise to them only, hence, it is any specific matter which is not observably in a usual condition. This specific matter also has received the name physical vacuum. Except for birth pairs, the physical vacuum proves in a number of experimentally observably phenomena. It is known, that the physical vacuum is the reason of occurrence so-called Lembovski shift in superthin structure of radiation of atom of hydrogen and defines so-called Kazimir effect.

In standard interpretation the physical vacuum is represented by complex quantum dynamic object which proves through fluctuations. At such approach the scientific description of physical vacuum is under construction on S.Vajnberga's theory, A.Salama and S.Gleshou. The theory of physical vacuum of G.Shipova is constructed on the strict fundamental bases. This theory gives the analytical description of physical vacuum on the basis of three vacuum equations: A.Ejnshtejna's equation, equation Gaizenberga and equation Yanga-Millsa, representing structural equations of geometry of R.Vajntsenboka. The theory of physical vacuum of G.Shipova has allowed to understand structure of a universe from new positions. A reality by which part all of us are, divided on seven hierarchical levels.

The best level of hierarchies of a reality - Absolute "anything" - is a level which within the framework of the theory of physical vacuum has no strictly analytical description. The decision of this problem - business of the future theories. However there are bases to consider, that this level of a reality contains the information which defines necessity of generation of the following level of a reality which defines a way (laws) how this birth which also defines properties of the following level of a reality should be held. This following level of a reality was named G.I.Shipovym initial torsion a field. Initial torsion the field is a special form of existence of a matter which represents the quantum whirlwinds which are not having

energy and not carrying energy. These quantum whirlwinds cooperate information. In absence of energy of interaction of quantum whirlwinds in initial torsion a field speed of transfer of indignation in the environment of this level can be infinity equal only. In initial torsion a field the information which defines necessity generation of the following level of a reality which also defines a way (laws) how this birth should be held should contain, and also defines properties of the following level of a reality. This level of a reality is known in modern physics as physical vacuum. Physical vacuum, probably, rich enough on number of elements making it and on the structure. The physical vacuum, as well as initial torsion a field, contains ring vortical structures which also do not transfer energy and in which also indignation is distributed instantly, i.e. with the speed equal to infinity. Among properties at physical vacuum the information which defines the mechanism of birth from him virtual pairs concrete instead of what has got, particles and antiparticles should contain. These particles which have been born from physical vacuum, form the following level of hierarchy of a reality - plasma. Properties of a set of such particles as electron, a proton and a neutron, and also properties of physical vacuum with which they cooperate, define occurrence concrete instead of what has got the atoms formed from the specified particles. These atoms and molecules formed by them in different phase conditions make the following three levels of a reality - gases, liquids and firm bodies.

In this structure of seven levels of a reality four bottom levels were named G.I. Shipovym objective physics which is a subject of studying within the framework of standard physical directions. Two top levels him were named subjective physics. A number of theoretical experimental results testify, that these two levels together with a level of physical vacuum are responsible not only for many physical phenomena and processes, but also play a paramount role in consciousness of the person. It is possible, that Absolute "anything" is a level connected with global display of Spirit as space factor. The level of Spirit should have the creative and strong-willed beginning. Inevitability of existence of the creative beginning, Spirit is defined by that all vertical structure and properties of all horizontal levels all over again should "be formulated" at a level Absolute "anything". Inevitability of the strong-willed beginning of Spirit of a level Absolute "anything" is defined by that there should be a pulse which would start the mechanism of creation of the specified levels of a reality. In a result appeared, that the theory of physical vacuum, as well as the constructed physical models, not only give the basis of creation of physics of consciousness, but also allow to approach to physical representations of a role of Spirit.

In the beginning of 80th years in Russia phenomenological models of physical vacuum which appeared further adequate to conclusions of the theory of physical vacuum were constructed. That these models do not contradict known experimental results was important.

At construction of models of physical vacuum it was recognized expedient to return to P. Diraka's models in its a little bit changed interpretation. This approach can be counted justified if it will allow to formulate the conclusions which are directly not following from standard representations.

At the same time, taking into account, that the vacuum is defined as a condition without particles, and proceeding from model classical J. Frenkelja's back and I. Ternova [4,5] as ring wave package (following terminology Belinfante of a circulating stream of energy), we shall consider(examine) vacuum as system from the ring wave packages appropriate *электронам* and to positrons, instead of actually *электронно-позитронным* to the pairs bearing(carrying) the information on properties of these particles.

At the made assumptions it is uneasy to see, that the condition of a true electroneutrality such field vacuum will be answered with a condition when ring wave packages *электрона* and a positron will be enclosed each other. If thus backs of these enclosed ring packages are opposite, such system will be *самоскомпенсирована* not only on charges, but also on classical a back and to the magnetic moment. As the weight of rest of wave packages is equal to zero such systems will have a gravitational neutrality. Such system from the enclosed ring wave packages we shall name *фитоном*. Dense packing *фитонов* will form the material environment - physical vacuum.

Let's consider the most important in the practical attitude cases of indignation of different external sources of physical vacuum within the framework of the constructed model. It will help to estimate realness of the advanced approach.

1. Let a source of indignation is the charge - q . If the vacuum has fion structure action of a charge will be expressed in charging polarization of physical vacuum. This case is well-known in quantum electrodynamics. In particular, *Лэмбовский* shift traditionally speaks through charging polarization *электронно-позитронного* physical vacuum.

2. Let a source of indignation is the weight - m . As against the previous case when we have collided(faced) a well-known situation, the hypothetical assumption here will be stated. Indignation of physical vacuum in weight m will be expressed in symmetric fluctuations of elements *фитонов* along an axis on the centre of object of indignation. Such condition of physical vacuum can be characterized, as a gravitational field (G-field).

If the mechanism of gravitation is really connected to longitudinal spin polarization of physical vacuum in this case it is necessary to recognize, that the nature of gravitation is those, that antigravitation does not exist.

3. Let a source of indignation is classical back.s - s we shall assume, that action classical a back on physical vacuum will consist in the following. If the source has backs backs φ моное which coincide with orientation a back of a source, keep the orientation. Thus backs φ моное which are opposite a back of a source, under action of a source will test inversion. In result physically the vacuum will proceed(pass) in a condition of cross spin polarization. This polarizing condition is possible to interpret as a spin field (S-field) a field produced classical спином, i.e. торсионное a field, - in other interpretation дальнедействующее спиорное a field if to take into account, that торсионное the field can be submitted through a pair спиорных fields. The formulated approach is conformable to representations about fields of torsion, as a condensate of pairs фермионое.

Polarizing spin conditions SR and SL contradict interdiction Паули. However according to the concept of academician M.A.Markova [7], at density of the order планковских fundamental physical laws can have another, distinct from known a kind. Refusal of interdiction Паули for such specific material environment as physical vacuum, we admit(allow), probably, not in a smaller measure, than in the concept of quarks.

According to the stated approach it is possible to speak, that the uniform environment - physical vacuum can be in different phase, more precisely, polarizing conditions - EGS conditions. This Wednesday in a condition of charging polarization proves as an electromagnetic field (E). The same Wednesday in a condition of spin longitudinal polarization proves as a gravitational field (G). At last, the same environment - physical vacuum in a condition of spin cross polarization proves as spin (торсионное) a field (S). Thus, EGS - to polarizing conditions of physical vacuum correspond(meet) EGS fields.

In the beginning of 80th years in A.E.Akimova's works it was predicted and existence of a special class torsion fields - электроторсион fields [9] is experimentally confirmed. In middle of 90th years the author of the theory of physical vacuum G.I.Shipov has given a strict substantiation at a fundamental level электроторсион fields [3].

The model of polarizing conditions of physical vacuum has allowed to establish rather important circumstance. Already it was marked, that торсионное the field is fixed in cases when the physical vacuum passes in a condition of spin cross polarization. However it is possible to formulate more general(common) approach, leaning(basing) on criteria синергетики. Will consider, that торсионное the field is fixed always when the physical vacuum is in спиное a nonequilibrium condition.

It is uneasy to see, that at charging polarization of physical vacuum charging splitting φ моное results and in spin spatial splitting. As a result of a back appear not compensated, that will be equivalent to occurrence торсионной components in an electromagnetic field. If gravitational and торсионные fields are shown in " a pure(clean) kind " electromagnetic fields always contain торсионную to a component that is the important fundamental fact. Торсионное the field is observed both in an electrostatic field, and in electromagnetic radiation.

Misunderstanding of this circumstance frequently resulted to that many phenomena психофизики, produced by electromagnetic sources, tried to explain the electromagnetic phenomena. In this connection it is necessary to note works of researcher Tszen' Kan'chzhenja, of inventor Hideo Uchida etc. So, in experiments Хидео Учуда [8] it was established, that the device developed by him(it) reacted to inclusion of the generator on frequency 13.0 ГГц at экранировке the registrar and at metal заглушке on an output(exit) of a wave guide. To explain this phenomenon it is possible, knowing, that the electromagnetic signal in a wave guide raises торсионный a signal on the same frequency which is not shielded.

Is pertinent to note also, that reaction of operators of a biolocation to electromagnetic radiation, probably, is connected to the specified property of an electromagnetic field to derivate торсионную to a component.

G.I.Shipovym's creation of the fundamental theory torsion the fields [3], allowed to prove an opportunity of intensive display torsion fields, and, hence, an opportunity of supervision of strong effects, and from here an opportunity of the decision of the broad audience of applied problems(tasks), was one very important party(side) of new revolution in physics. The important making part of new revolution in physics was creation in 80th years in Russia for the first time in the world torsion generators [9], - the devices generating static торсионные fields and wave торсионные of radiation. For twenty years of development and perfection torsion generators some laboratories, which now are incorporated in structure of the International institute of theoretical and applied physics (Russia, Moscow) have created more than twenty torsion generators of different designs.

Developed торсионные generators form two lines of devices. Into one number(line) enter торсионные the generators creating static торсионные fields of different intensity, a different spatial configuration, with different spatial periodicity and with different radius of action. Into other number(line) enter торсионные the generators creating wave торсионные radiations of different intensity, different frequencies (in ranges of frequencies from shares зерца up to hundreds гигагерц), different spectra of frequencies, with different kinds of modulation, different ways of addressing of the information to different objects. Are developed universal торсионные generators which, except for wave torsion radiations, can create static торсионные fields and торсионные currents. In a number of practical situations there is necessary simultaneous use torsion generators of different types.

For 20 years large-scale works on use torsion fields and torsion generators for creation torsion energy sources, торсионного transport, торсионной metallurgy, torsion systems of transfer of the information and communication(connection), torsion systems of medical diagnostics and for other numerous applications [10] were executed. On a number(line) of directions of application torsion fields their realizability and practical efficiency was experimentally shown. On some directions, for example, recyclings of waste products of nuclear manufactures with use torsion technologies, are a scientific substantiation and preliminary experimental results. On some directions there is a fulfilled technology.

The big efficiency торсионных technologies and simplicity physical and the means realizing these technologies, appreciably are defined(determined) by singularity of properties torsion fields. I shall list their basic properties: it is important to note, that all properties torsion fields were predicted theoretically and confirmed experimentally.

1. A source torsion fields is classical backs or macroscopical rotation. Торсионные fields can be derivated by torsion of space or as consequence(investigation) of indignation of physical vacuum which has a geometrical or topological nature and also to arise as integral a component of an electromagnetic field. Торсионные fields can самогенерироваться.

In all specified cases the question is about torsion the fields produced at a level of substance. However according to the theory of physical vacuum, exist initial торсионные fields which are derivated Absolute anything. Just as an initial material of the world of substance elementary particles - are born from physical vacuum, in turn, the physical vacuum is born from initial торсионного fields.

2. In quantumс торсионного fields are тордионы. There are bases to consider(count), that тордионами are low-энергю нейтрино with energy about units эВ. It is a special class нейтрино.

3. As торсионные fields are derivated classical спином and at their influence on those or other objects at these objects as a result of influence their spin condition (a condition nuclear or nuclear спинов) can change only.

4. As against sources of the electromagnetic and gravitational fields creating fields with the central symmetry, sources торсионного fields - create fields with axial (axial) symmetry.

Спилирующий the object creates in two spatial cones polarization which in one direction corresponds(meets) left торсионному to a field - SL, and in the friend right торсионному to a field - SR. Except for it, there is an area торсионного fields as a disk. Perpendicular rotation to an axis. In the specified areas as cones there is axial торсионное a field (That), and in a disk - radial торсионное field (Тэ). Each of these torsion fields can be right (TaR, TaL) and left (TrR, TrL).

5. As against electric, same торсионные charges the same classical backs (SRSR or SLSL) are drawn, and heteronymic (SRSL) - make a start.

6. Stationary спилирующий the object creates static торсионное a field. If at спилирующего object is any неравновесность: change of angular frequency of rotation, presence for massive objects прецессии, нутации or the moments of higher order, non-uniform distribution of weights concerning an axis of rotation such dynamic спилирующий the object creates wave торсионное radiation.

7. Static торсионное the field has final radius of action ≈ 0 on which interval intensity торсионного poorly varies (remains almost constant) fields. Conditionally by analogy to electromagnetism though physics of processes here another, this interval ≈ 0 can be named a near zone. Wave торсионное radiation is not limited to an interval ≈ 0 and his(its) intensity does not depend on distance.

8. For torsion fields the potential is identically equal to zero that corresponds(meets) to their not power character. It is one of the factors determining, why торсионные signals (торсионное influence) are transferred информационно, instead of energetically, i.e. without carry of energy and with superlight (infinite) speed.

9. Environment through which are distributed торсионные radiations, the physical vacuum is. In relation to торсионным to waves the physical vacuum behaves as the holographic environment. This Wednesday торсионные waves are distributed through a phase portrait of this hologram. It is the second basic physical factor, which explains information (not power) character of signaling, and also indefinitely big speed of signaling.

10. The constant of backs - torsion of interactions for static torsion with torsion Кармана by existing estimations is less than fields, than 10-50, i.e. for such fields existence of observably(notice) effects is impossible. For wave torsion fields with torsion Кармана (dynamic torsion) the constant of backs - torsionnyh of interactions theoretically is not limited. For torsion fields with torsion Риччи or Вайценобока also are not present restrictions on size of a constant of interactions, and consequently, and on intensity of display of these fields. For torsion fields with the torsion, produced as component of electromagnetic fields (электроторсионные interactions), the constant of interactions has the order 10 in a degree -3 - 10 in a degree -4 [3]. It is the theoretical estimation experimentally confirmed with professor R.N.Kuz'minym.

11. As the constant электроторсион interactions (10 in a degree -3 - 10 in a degree-4) hardly is less than constant of electromagnetic interactions ($\sim 7.3 \cdot 10$ in a degree-3) in natural conditions such торсионные influences can cause observably(notice) changes only in those objects in which there are nonequilibrium conditions, for example the phase transitions weakening electromagnetic communications(connections).

12. Топсионные fields pass through natural environments lost-free. It is the natural factor if to take into account, that quanta torsion поля are нейтринно.

13. Speed torsion waves is theoretically equal to infinity. Superlight speeds are not something unusual to physics. They were present at the theory of gravitation of Newton, they make bases of the concept тахионов. Without them there would be no theory of spontaneous infringement of symmetry Голдстоуна. Superlight speeds for the first time were observed experimentally by N.A.Kozyrevym [11], are confirmed with two other collectives, and at quantum level Цейлинеэром [12] later. It is useful to note, that without communication(connection) with топсионными fields Совет физиками more than ten years back were marked, that spin indignations in the spin environment are distributed so, that they cannot be shielded. In this case there is an opportunity of creation of underwater and underground communication(connection), and also communication(connection) through any other natural environments.

14. All bodies of an alive and lifeless nature consist of atoms which majority have nonzero nuclear or nuclear classical backs. Taking into account, that all bodies are in a magnetic field of the Earth, presence of the magnetic moments of atoms and nucleus which are consequence(investigation) of presence specified classical спинов and charges, arises прецессия which derivates wave топсионное radiation. Thus, all bodies have own топсионными fields (radiations).

15. As different bodies have a different set of chemical elements, a different set of chemical compounds with different stereochemistry, - different spatial distribution in bodies of these atoms and chemical compounds all bodies have strictly individual, characteristic топсионными fields (radiations) characteristic frequency and spatial - frequency топсионными fields.

As though there was no unusual property torsion fields, they not only are necessary for accepting, but also strictly since these properties are the objective reality given to us by a nature it is necessary to be guided by them, that, besides, is confirmed experimentally.

Many properties torsion fields as soon as they are formulated, almost automatically allow to specify under their maintenance(contents), what property can form a basis for any concrete application torsion of fields. Singularity of properties, and consequently. And displays torsion fields it is possible to illustrate on one example. Not only from time of training in high school, but also from study at school it seems to all, what the physics knows all about the mechanics. In particular, it is spoken about inertia much, that such inertia however does not speak. The physics in orthodox interpretation not only does not know, that such inertia, but at all can not explain, whether forces of inertia internal or external in relation to moving bodies are. In ТФВ it is shown, that inertia is a display torsion fields in the mechanics [13]. From here directly follows, that if it is possible to operate топсионными fields then, it is possible to operate and forces of inertia and on this basis to create universal движители, not using jet draft or the factor of friction.

Let's take into account, that the mechanics of Newton is based on геометрия Эвклида, and топсионные fields use as the basis геометрия Риччи, - геометрия of torsion. Then it is obvious, that for systems with rotation it is impossible to use the mechanics of Newton just as, for example, it is impossible to use the mechanics of Newton for the description of the objects, moving with околосветовыми in the speeds. In this case it is necessary to use the theory of a relativity based on Римановой of geometry. For systems with torsion instead of the mechanics of Newton it is necessary to use the special mechanics,- топсионную the mechanics. Bases топсионной mechanics were created by Russian физиком-theorist G.I.Шировым. As in the quantum mechanics the phenomena, impossible are observed within the framework of the mechanics of Newton, and in топсионной to the mechanics effects, impossible from positions of the mechanics of Newton are observed. The most unusual factor is the opportunity not only theoretically, but also practically to create the systems moving due to internal forces.

Since first half 80th years the big attention was given experimental researches and applied works on changes of properties of various substances at action torsion fields on these substances in their different phase conditions. An example of such works is research of influence torsion waves on расплавы metals.

Were developed torsion technologies of reception of some alloys which are patented. It was possible to find modes torsion influences on resulting to crushing grains, and in some cases, varying a crystal lattice.

The "know-how" silumin, mixes of aluminium and silicon [14] is developed torsion. As against standard "know-how" silumin, in torsion technologies are not used additives for increase of durability of this metal and special chemical additives for linkage of gases in silumin. At use torsion technologies only due to action torsion waves of specially chosen spectrum pushing out gas and increase of durability in 1.3 time and plasticity in 2.5 times is observed. The simultaneous increase of durability and plasticity at use torsion radiations from the point of view of standard technologies is impossible. These technologies in 2000 were shown in Taejon (South Korea).

In connection with an acuteness of a global energy crisis and impossibility of the radical decision of this crisis by such ways as use of energy of the sun, a wind, thermal sources etc., frequently arise offers to use for these purposes energy of physical vacuum. Among физиков-theorists there are two various points of view.

One point of view is reduced to the statement, that since the physical vacuum is an object with the minimal energy statement of a question on reception of energy from physical vacuum is represented deprived sense.

Other point of view recognizes that noninteracting, being elements of physical vacuum, have energy which is infinite. As it was specified by a number Russian fisics, including academician J.B.Zel'dovicha [15], about this infinite energy usually overlooked, declared its not observably and counted energy, for example, particles, from it indefinitely high level, naming this level zero. For energy of fluctuation of physical vacuum estimation is known. A.Uilera [16] who can be considered as the bottom border of this energy which is equal 1095g/sm^3 . For comparison we shall note, that the nuclear energy is estimated by density of a nucleus 1014 g/sm^3 , and the energy received at burning of petroleum it is estimated by density about 1 g/sm^3 .

If energy of physical vacuum is beyond all bounds great, increase of consumption of energy for needs of the Earth, leaving for the staff of a problem of thermal balance, due to use of energy of physical vacuum can not affect his condition in any way.

Recognizing that the theory supposes an opportunity of reception of energy from physical vacuum, the problem consists in detection of physical principles which need to be put in the basis of construction of the equipment for the decision of this problem and the subsequent search of technical decisions of the appropriate commercial device. The marked physical principles are a subject of search of some research groups. However I while do not know, that this problem was solved by someone. In too time many devices which, according to their inventors, have efficiency more than 100 are known?

Usually psychological force of the school physics asserting, what efficiency is more 100? Can not be, it appears more strongly the data received in higher educational institutions. In any standard rate of thermodynamics it is strictly proved, what for the closed systems be never valid efficiency can more than 100? However, if the system open and by virtue of it can receive energy from an environment such system can have as much as big efficiency. Proceeding from this if any inventor asserts, what it has invented installation from efficiencies more than 100? That is no sense to discuss a question, there can be it whether or not. Actually there are only two questions. The first question consists in, whether the technique is correct and whether the equipment for definition of efficiency of installation adequately is used. In a plenty of cases declared by inventors of efficiency it is more 100? Is consequence of incorrectly chosen measurement technique or incorrectly chosen or incorrectly used equipment of measurements.

If measurements of efficiency of installation were executed correctly and efficiency really more than 100? That from this fact automatically follows, that this installation is open and in this case it is necessary to find the answer to the second question: on what channel and what kind of energy acts in this installation? When as a result of researches it is possible to establish this channel and a kind of acting energy after inclusion of the revealed energy in the general balance of energy of installation its efficiency becomes again less than 100?

Thus, when as a result of measurements of characteristics of installation efficiency more than 100 is fixed? That it is the direct instruction that we insufficiently well know work of this installation. In this connection the opinion sometimes expresses, that for open installations, probably, it is more correct to use the term effectiveness ratio, instead of efficiency. If nevertheless to use a standard terminology installations of electrostatic, magnetic, electromagnetic and thermal type which have efficiency up to 500 now are known? In most cases the question is the sizes declared by inventors in patents. In one patent was, the device with $KPD=3000$ for example is declared? However, as a rule, the independent expert appraisal does not confirm so high figures. It can be consequence of concealment of any know-how by inventors or no-technology those or other installations.

In Russia and in a number of the countries of the CIS the attention of inventors is stressed on thermal installations from efficiencies more than 100? From known designs of such installations there are separate copies of such installations from efficiencies up to 400? However only for one design of thermal installation which serial samples have passed some years back an independent expert appraisal, it was confirmed with efficiency more than 120? The last year in Russia the serial sample of similar installation from efficiencies 150 was shown? For all types of installations from efficiencies more than 100? There is a general feature, all of them have as the main thing an element with rotation with special requirements to characteristics of rotation.

Since spiral movement derivates torsion a field that is fixed by measuring instruments torsion fields it allows to count, that interaction torsion with torsion fields spin klusters (klaster of fiton [18]) physical vacuum results fields of installation to that the small part of energy of fluctuation of physical vacuum transfers object which derivates to sion a field of installation, i.e. to a water spiral. Due to it growth of temperature of water also is observed. For the external observer it is perceived as waters. Considering, that the mechanism of reception of energy for heating water is based on torsion effects, taking into account also, that this mechanism is realized through spiral, vortical process, and work of installation is connected to extraction of the additional energy, the given thermal heating installation has received the name torsion vortical generator (TVG).

Torsion the vortical generator has two energy sources: it is the electric system giving energy for work of the electric motor, necessary for waters through installation, and the physical vacuum giving energy for heating of water. Further when efficiency of such installations will be essentially raised, it will be possible essentially to increase quantity of the energy taken from physical vacuum, the part of energy taken from physical vacuum will be presented possible to use for maintenance of the energy necessary for work of the electric motor, transforming received thermal energy in electric. Necessity for use of the electric system and such thermal installation in this case will disappear becomes an independent energy source. It will mean revolution in power. Thus it is no important, whether there will be such installation thermal, electric, magnetic or any another on a design.

The important direction of the works connected to physical vacuum and torsion by fields, were fundamental and applied medical and biologic researches. Special value works on studying influence static torsion fields and wave torsion radiations on objects of wildlife of different levels had, and also works on studying own integrated and characteristic torsion fields of objects of wildlife of different levels. Last direction of works became possible due to creation of high-sensitivity quantum systems of registration torsion radiations which allowed to register frequency spectra of these radiations.

For a long time were performed works on formation of a databank of spectra torsion radiations of different fabrics at different diseases in different stages. On the basis of it the opportunity to create the equipment which allows to carry out diagnostics of a state of health of the person has appeared, measuring characteristic spectra torsion frequencies of separate groups of cells of any parts of bodies of the person or his fabrics and comparing them with the appropriate spectra of healthy cells or cells to some extent pathologies.

The developed system of diagnostics of the person on the basis of his registration torsion fields (the system torsion diagnostics (TORDI). For correct understanding of its work has received the name is necessary to make a number of remarks. One of consequences of the theory van Hoven is the conclusion: for reception of the full information on any system this system is necessary for destroying. But destruction of fabrics of the person for reception of the information on their condition is an inadmissible payment for data on health of the person. However to the specified criterion van Hoven procedure of the minimal action when cells do not collapse, and can satisfy the atoms of these cells being initial sources registered torsion of spectra, are translated in a nonequilibrium condition with the help of external revolting influence. For a correct choice of frequency revolting torsion presence resonant torsion frequencies of various bodies of the person is necessary to take into account influences.

System TORDI is the plant. Nevertheless it is important to understand, that the scientific and technical potential incorporated in this model, farly from being it is exhausted and still there will be for a long time his more and more perfect updatings.

In the conclusion it is necessary to pay attention to that. That works on torsion to technologies are not limited to the mentioned above directions. Actually carried out development cover all branches of a facilities, including the industry, an agriculture and medicine, and also all problems connected to a life of the person.

Concrete torsion technologies are harbingers of the introduction of mankind per one era noospher technologies which will change our life more, than all scientific and technical revolutions of XX century. It is paramount important the opportunity is, using the sum torsion technologies to resolve all problems which have resulted mankind to global system crisis of a civilization. F.Engel's was right, when wrote, that if the society has needs they move a science more, than hundreds universities. The need of mankind to leave from system crisis has caused a new scientific paradigm (the theory of physical vacuum), which has allowed to begin creation of the sum technologies on new physical (torsion technologies), capable to specify a way and a way of an output from this system crisis.

The literature

1. Cartan E. *Comptes Rendus. Akad.Sci., Paris, 1922, v.174.*
2. В.И.Мельников, П.И.Пронин. Проблемы стабильности гравитационной постоянной и дополнительные взаимодействия. *Итоги науки и техники, сер. Астрономия, т.41, Гравитация и Астрономия, ВИНТИ, М, 1991.*
3. Г.И.Шипов. Теория физического вакуума. *Наука, М., 1997.*
4. И.М.Тернов, В.А.Бордовицын. О современной интерпретации классической теории спина. Я.И.Френкеля. *УФН, 1980, т. 132, вып. 2*
5. В.Г.Багров, В.А.Бордовицын. Классическая теория спина. *Известия ВУЗ, сер.физика, 1980, №2.*
6. F.I.Belinfante. On the spin angular momentum of mesons. *Physica VI, 1939, v-6, No.9.*
7. M.Markov. The very early universe. *Proc of the Nuttfield Workshop, Eds. G.V.Gibbson, S.W.Hawking, S.T.Siklov, Cambridge, 1988.*
8. Hideo Uchida. A method apparatus for detecting a fluid. *Patent England, No 5 11662, May 24, 1978.*
9. А.Е.Акимов. Эвристическое обсуждение проблемы поиска новых дальностей. EGS-концепции. МНТЦ ВЕИТ, препринт №7А, Москва, 1992.
10. МИТФФ РАЕН, TORTECH USA, Горизонты науки и технологий. Сб.Трудов под редакцией академика РАЕН, А.Е.Акимова, ФОЛИУМ, М., 2000.
11. Н.П.Козырев. Астрономические наблюдения посредством физических свойств времени. В сб. Вспыхивающие звезды. Международный симпозиум в Бюрокане, 1976, АН Арм. ССР, Ереван, 1977.
12. BouwmeesterD. et.al. *Nature, v.390, 11 dec, 1997.*
13. Г.И.Шипов. Теоретическое и экспериментальное исследование инерционной массы четырехмерного гироскопа. МИТФФ РАЕН, препринт № 10, М., 2001 .

14. Абрамов А. А., Акимов А.Е. и др. Способ коррекции микроструктуры металлических литейных сплавов. Патент №RU2107105, 1998.
15. А. Д. Долгов, Я.Б.Зельдович, М.В.Сажин. Космология ранней Вселенной. Изд.Моск.Унив., МП 988.
16. Дж.Уилер. Предвидение Эйнштейна, М., Мир, 1970.
17. Convegno InternazionalerQuale Fisica per 2000, Proc. Bologna, 1991. see: The Manual of Energy Derices and Systems. Complied D.A.Kelly, D.A.K. WLFUB, Burband, California, 1986, Publ. N1269/F-289.
18. Дятлов В.Л. Поляризацонная модель неоднородного физического вакуума. Инст. математики СО РАН, 1998

**About physical nature of the biological field.
Torsion model of a cell (hypothesis).
O.G. Gavrish**

Our definition of the main feature of the biological field does not have in its contents any analogue with the fields known to physics (although, of course, it does not contradict them).
A. G. Gurvich.
Principles of analytical biology and cell fields theory.

The initial variant of the hypothesis about physical nature of the biological field was published as an annex to monographs [11, 12], in a magazine variant - [13] and also given as a report on the conference "Physics of biological systems" [14]. This article is the further development of ideas about the nature of the biological field.

I.

The modern biology paradoxically ignores the fundamental principle of the nature structure - its essential integrity. This caused a deep crisis in both the biological science and the spheres which try to depend on biology in their functioning. In particular, in medicine. Excessive use of analytical methodologies, especially on cellular and sub-cellular research levels, resulted in practically complete neglect of integral approaches. Although for about 150 years we understand that the cell is a morphological, functional and hereditary unit of living substance, the absence of the idea about the cell as a whole has been characteristic for biological science until these days. Nevertheless, many scientists of the XX century profoundly developed the ideas of the holistic ideology in biology in their works. Professor A. G. Gurvich (1874-1954) is undoubtedly one of them. In his works he puts the deep understanding of living manifestations integrity. In this context his theory of the biological field [1] deserves the special attention. Let us dwell on the principal moments of cell fields conception - the latest A. G. Gurvich's ideas about the biological field.

1. A.G. Gurvich associated the field source with the cell center - nucleus, lately - with the chromatin [2].
2. According to his ideas, the cell field has the vectorial and not force character. This notion is proved by the fact that molecules (molecular complexes) acquire new orientation, change their form or move in the field using the potential energy they accumulated participating in the cellular metabolism and not at the expense of the field energy. A molecule possessing excess energy is in the excited state and is liable to the field influence. At the same time a significant part of the accumulated energy turns into kinetic one. When this excess energy is used, and the molecule returns to the nonexcited state, it is not influenced by the field any more.
3. The cell field being a result of nonequilibrium processes is dynamic by its nature.
4. The cell field is anisotropic and specific.

The last years have seen a constant increase of interest to A. G. Gurvich's works. Unfortunately, this interest is mainly of superficial character and often leads to the distortion of his ideas, some authors even arrogate their own thoughts to him. For example, this is the only explanation to the appearance of the idea circulating in scientific and popular scientific literature and allegedly being suggested by Gurvich that cell fields are the ones generated by the cell (chromosomes) of photons. In this connection we should state that A. G. Gurvich did not reduce biological field manifestation to mitogenetic radiation [3], which he had studied for more than thirty years. Moreover, he examined this idea in his final work, however rejecting it [2, p.164]. Having profound knowledge in physics, Gurvich understood clearly that any of the fields known at that time did not correspond to the properties of the field discovered by him and did not consider it possible to speculate on this topic.

There is also the terminological aspect concerning the accurate use of notions. About 15-20 years ago L. V. Belousov proposed not to use the term "biofield" for the conceptions developed by Gurvich. There are at least two reasons for this. Firstly, Gurvich himself used exceptionally the term "biological field" in his works. Secondly, A. G. Gurvich substantiated the term "biological field" with strict scientific definitions and logical structures, in contrast to an indistinct notion "biofield", which is used for various

fields that exist in alive systems and frequently used in declarative way.

More than 50 year have passed since A. Gurvich developed the conceptions about a biological field. For the last 15 years the principles of the "fifth" physical interaction - the field of momentum - have been theoretically formulated and experimentally proved. It is determined that fields of momentum are the essence of the field of rotation - torsion fields [4,5]. Torsion fields properties (in particular, energy, vectorial, axial character of their manifestation) astonishingly coincide with the properties of cell fields discovered by A. G. Gurvich. This work tries to formulate a simple model of a cell on the basis of ideas about a defining role of torsion interactions in the biological field realization.

II.

Properties of cellular structure elements and torsion fields.

1. Chromatin. Chromatin, which basis is the chromosomal DNA interacting with numerous proteins as well as RNA, has clearly defined periodic rhythm. The regular periodicity property of a natural process is evidence that it is an integral phenomenon. Indeed, rhythm of chromatin transformations on the next organizational level determines the cellular cycle from a division to division for fissionable cells and more specialized cycles for differentiated cells which do not fission.

The principles of chromatin molecular organization are highly important for us. It is well known that DNA forms spiral structures. Proteins in chromatin factually "control" the molecular complex organization ensuring its dynamics. Since a spiral structure is a key element in the structure of the chromatin on all levels of its organization, elements of rotatory movement are necessarily present in any dynamic transformations of the chromatin. Such transformations constantly occur during the entire cellular cycle - replication of a chromosomal DNA, genes transcription, and principle rearrangement of chromosomes during mitosis.

One of the important consequences of the physical vacuum theory [4] is the statement that any object polarizes vacuum and in that way creates in space a definite field structure possessing a torsion component. In other words, any object, except other fields, creates a torsion field around itself. Naturally, molecules and submolecular formations are not exceptions in these terms.

If a molecule or submolecular formation has the property to be in characteristic rotatory motion, then it is quite probably that it is a source of dynamic molecular torsion fields. It is important for us that every chromosome is unique in its structure. Moreover, in a specific space region - inside its cell - any individual chromosome is practically unique. This is a prerequisite of the fact that the fields generated by every chromosome during its motion express its properties in all their completeness and are not averaged.

2. Ion channels in the nuclear membrane and in the external plasma membrane.

As we know, ions have a definite spin. Ion channels ensure purposeful movement of ions, i.e. spinning objects, through a membrane. Every kind of ion channels is specific, i.e. ions of generally one kind and mainly in one direction move in it. Moreover, the important role of spiral structures of protein and nonprotein nature in the formation of transmembrane channels is well known [6]. Thus, there is a chance that the structural organization of membrane ion channels can ensure ion selection in accordance with their spin orientation as well as promote the acquisition of additional angular momentum by an ion.

It should be mentioned once more that the principles of spiral organization are widely used in the structure of biological macromolecules. They are exclusive for nucleic acids and important for proteins structure.

3. Protein molecules - ferments.

As everybody knows, ferments and their substrates participating in biochemical processes have property to acquire spin polarization and pass to the excited state. This property is widely used in EPR-research (electronic paramagnetic resonance) in biology and medicine. It seems really important that these are protein molecules that are the object of biological field action, according to A. G. Gurvich's opinion. These are they that being in the biological field action create "nonequilibrium molecular constellations" - the most significant dynamic formations in a cell. These are protein molecules-ferments that are the source of mitogenetic radiation - secondary chemiluminescence - the phenomenon which role is described below.

4. Mitogenetic radiation [3] is a superweak ultra-violet radiation in the 190-300 nm range. It was discovered by A. G. Gurvich in 1923. The exceptional importance of the mitogenetic radiation for animate systems was shown in numerous Gurvich's works in the 20s - 40s of the last century. Being of photon nature, the mitogenetic radiation has a torsion component [4]. It is an integral, addition (according to N. Bor) constituent of a cell field, however, in no way exhausting its manifestation. It is important to emphasize that the mitogenetic radiation plays an important role in both intracellular and intercellular interactions.

Sources of torsion fields in the external environment and their interaction with the cell torsion fields.

Surrounding cells and inanimate objects. The surrounding cells take part in the formation of an actual biological field of a given cell. External torsion influences on a cell are quite extensive and various. Among the inanimate objects we should emphasize the role of the water and substances dissolved in it generating very mobile dynamic system capable to transfer information vitally important for animate cells.

The water due to its unique properties, speaking figuratively, constantly feels the breath of the Universe. Its rhythms and field interactions influence biosphere processes mainly via the water.

The crystalline structures constituting the biogeocenosis (for example, rocks) and organisms and closely interacting with the living matter play an important role. For example, clamshells, inorganic crystalline structures in bone tissue, etc. contribute with static torsion fields.

III.

Peculiarities of DNA composition and functioning in respect to its supposed torsion features.

There are all reasons to believe that unique and specific DNA molecules, which are a part of chromosomes (chromatin), plasmids, and viruses, play a key role in the appearance, development and existence of life. DNA in animate organisms, being practically always in a complex with proteins, exists mainly in a form of variously organized spirals. Let us state some important properties of spirals.

A spinning object usually creates polarization near the poles along the axis of rotation, this polarization corresponding to the torsion fields of different directions. Correspondingly, the torsion field generated near one pole is the right one, near the second pole - the left one (see Fig. 1).

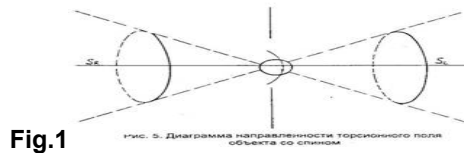


Fig. 1. The illustration from the work [5] showing the direction of the torsion field of an object with a spin.

The axial character of the field is obvious - the polarization occurs in the spacial cones located along the axis of rotation of an object.

Another situation occurs in the case of coiling-uncoiling of a spiral. The spiral during its coiling as well as during its uncoiling has the same rotation direction on its both ends. Naturally, a torsion field generated by a dynamic spiral in both directions will be the same (!), while the space polarization direction - "right-left" - will depend on whether the spiral is coiling or uncoiling (Fig.2).

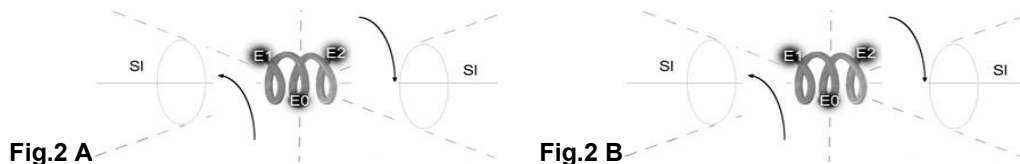


Fig.2. The torsion fields generated during the uncoiling of the spiral (A) and its coiling (B).

A - during the uncoiling of the right spiral the rotation of E1 and E2 elements with respect to the central area of the spiral (E0) polarizes equally the space in both external cones creating the right torsion fields.

B - during the coiling of the right spiral the rotation of E1 and E2 elements with respect to the central area of the spiral (E0) occurs in the opposite direction than during the uncoiling, and in this case the space in both external cones polarizes creating the left torsion field.

DNA unwinds completely in the process of replication (doubling), although not the whole at once. It is considered that the process of complete spiralization of chromosomes occurs in the initial stage of mitosis - in prophase. As we will see below, the spiralization (becoming compact) of chromosomes is apparently fully completed by the beginning of metaphase. Nevertheless, at the end of prophase the chromosomes of a dividing cell can be observed in an electron microscope. During the spiralization of chromosomes the torsion field has the direction which collides with the torsion field of the nuclear membrane. As a result, the cell nucleus disappears by the end of prophase, and chromosomes appear to be in the cytoplasm. With metaphase completed, the chromosomes begin to migrate to the poles of a dividing cell, and to all appearances, the processes of chromosomes despiralization starts. However, there are some reasons to consider (see part 5) that this is the despiralization of chromosomes beginning in metaphase that is a reason of the beginning of their migration to the poles. In telophase the chromosomes having accumulated near the poles of a dividing cell actively experience the despiralization restoring the previous orientation of the torsion field. This results in the formation of a membrane of a new cell of each daughter cells around the compact area of the chromosomes experiencing despiralization in telophase.

It is very likely that definite rotation movements associated with the unwinding and winding of DNA helix structures occurs as well during the genes transcription, although they evidently do not play a

decisive role in the formation of a cell field. It should be stated that the process of replication as well as other processes in the cell are highly ordered and repetitive. As it is shown on the *Xenopus* (frog) eggs extracts in the work [7], eukaryotes experience the formation of compound protein complexes, so-called pre-replication centers (Fig. 3), immediately after the completion of division and the beginning of nucleus formation. Later they transform into replication centers, which define places of chromosome DNA fastening in a cell nucleus and in essence fulfill the replication in the S-period of interphase. There is logic in the supposition that replication centers are situated in a nucleus according to the law, and their oscillation has a species-specific character. In this way one can define a specific peculiarity of a configuration of generated torsion fields, in other words, specificity of the biological field of a given type of a cell, tissue, and species.

Fig. 3. Visualization of the pre-replication centers in the *Xenopus* eggs extracts, photographs from the work [7]

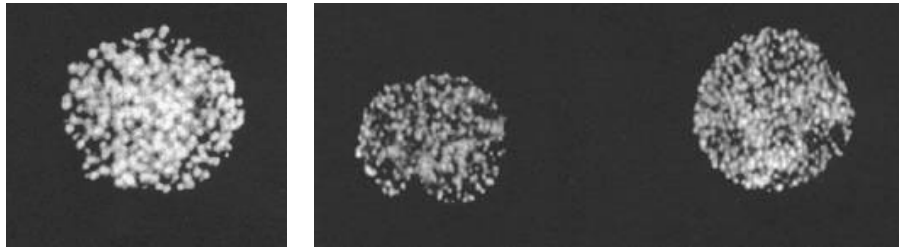


Fig. 3

The pre-replication centers are compound protein complexes that appear after the completion of mitosis by self-assembling. They transform into functional replication centers after the formation of the nuclear membrane. In the work [7] the pre-replication centers were visualized with the help of monoclonal antibodies with fluorescence mark.

A double spiral does not uncoil completely at once, but the uncoiling and replication of definite DNA segments called replicons take place. The replication may occur in several replicons simultaneously. The synthesis of DNA complimentary threads inside a replicative fork proceeds simultaneously with the despiralization of a double spiral.

The movement rate of the replicative fork of bacteria is known. For *E. coli* it is 800 pairs per second [6, p. 408]. Consequently, nucleotides of an uncoiling chromosome of *colibacillus* rotate around the axis of a double spiral with a minimum frequency of 80 Hz. At the same time the replication of an *E. coli* chromosome completes in 40 minutes. This process is longer for the majority of cells. However, there are some cells, including eukaryotic ones, whose replication passes much faster.

The principle moment in this reasoning is the fact that every chromosome in a cell and, correspondingly, every DNA molecule forming it is unique. (Of course, except polyploids, whose number of chromosomes is multiple. This however does not influence the character of a biological field of a polyploid cell to some extent, because multiple chromosomes are isomorphic in their structure, spatially close and similarly situated). After the doubling in the S-period of metaphase, sister chromatids still constitute the whole till the end of metaphase when chromosomes begin to migrate towards the pole of a dividing cell. However, after chromatids divided and spatially accumulated near the opposite poles, the cell cannot preserve itself as the whole any more, and in telophase the formation of two newly appeared cells is accomplished.

Therefore:

- DNA, its structural elements possess a (static) torsion field;
- The typical property of DNA structural elements is an ordered rotatory movement with a define frequency conditioned by a spiral principle of nucleic acid organization and realized in the processes of chromatin spiralization-despiralization.

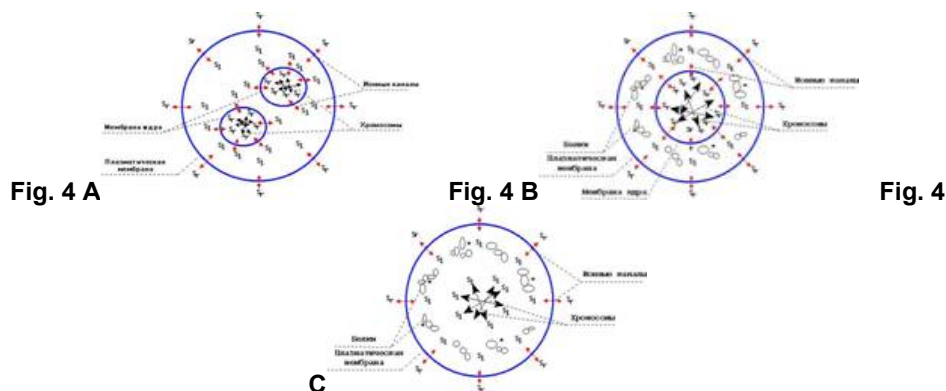
On the bases of above said, we can make a supposition that DNA molecules, which are the basis of the chromatin, in the process of their functioning generate specific torsion fields, which play a key role in the existence of all living substances.

IV.

A torsion model of a cell.

A phenomenological torsion model of an animate cell can be formulated on the basis of its above-mentioned properties.

A model of cellular torsion interactions must include sources of intercellular torsion fields of proper biological nature and elements sensitive to the influence of such fields, in our case, first of all - protein molecules-ferments.



A self-coordinated dynamic field created by a chromosomes assembly (Fig. 4 and 5) plays a determinative role in the formation of a cell torsion field. (As we know [4, 5], torsion fields of the same orientation attract each other, ones of the opposite direction - repel.) The complex torsion fields associated with the nuclear membrane and external plasma membrane and generated by functioning ion channels play a subordinate role. The ion channels of an external plasma membrane can acquire an independent significance in nuclear-free cells - for example, in mature erythrocytes. Thus, the source of the torsion field in a cell - chromosomes and membrane ion channels form a concentric system of imbedded fields. In its action area inside and near a cell there are protein molecules - ferments (and probably other molecules) which are in excited state. Protein macromolecules pass into excited state acquiring spin polarization when they experience biochemical transformation. Having got into the action area of a cellular torsion field, molecules transform, change their form, orientation spending excess energy obtained from chemical reactions. Molecules form intercellular dynamic structures peculiar to an animate cell during the interaction with a field. Having spent their excess energy and transformed into nonexcited state, molecules are not influenced any more by the cellular torsion (biological) field. Since the dynamics of the chromatin is different in various periods of the cellular cycle, we need to consider at least four different periods: chromosomes despiralization in telophase of mitosis; the phase of relative rest of the chromatin in the G1 period of interphase, chromosomes spiralization in prophase of mitosis, and chromosomal rearrangement during mitosis (see part 5).

1. After the end of short period of metaphase chromosomes begin their migration to the cellular poles. At the same time it should be mentioned that this happens irrespective of whether the chromatin spindle in a cell is present or absent. There are reasons to believe that the beginning of chromosome migration towards the poles is concerned with the beginning of chromosomes uncoiling - despiralization. We will dwell on this in more details in the next part, and now we will note that chromosomes uncoiling accompanies the stages of anaphase and telophase till the end of the latter. The despiralization is most intensive and full in telophase (Fig. 4 A). At the same time uncoiling chromosomes form near the poles (regions where they are compactly arranged by the end of telophase) a "right" torsion field, which collides with an internal "left" field of the plasma membrane generated by the functioning ion channels. The "right" and "left" torsion fields become balanced on a definite distance and in those places membranes of sister cells nuclei are formed. Thus, as a result of interaction and balancing of torsion fields, there is the realization of the well-known law which reads about the existence of a definite proportion between the nucleus volume and the total volume of a given cell type (Fig. 4 B).

2. The active chromosomes spiralization (becoming compact) occurs in prophase of mitosis (Fig. 4 B). In the confined space a "left" torsion field is generated, it collides with a "right" torsion field of closely located internal nuclear membrane. As a result the nuclear membrane is destroyed and "resolves" in the cytoplasm. The chromosomes, which are compact, visible in an electron microscope, appear to be lying directly in the cytoplasm after the end of prophase.

Fig. 4. The model of cell torsion fields at the end of telophase (A and B) and prophase (B). Sl - "left" orientation of the torsion field; Sr - "right" orientation of the torsion field. In the "left" intercellular torsion field molecules of ferments (proteins) generate dissipative molecular structures ("nonequilibrium molecular constellations") with the peculiar ability to self-organization. Being in excited state, nonequilibrium molecular structures interact with a cellular torsion field.

A - uncoiling of chromosomes completes at the end of telophase; the equilibrium is established between the "right" torsion field of chromosomes and "left" torsion field of the inner side of the plasma membrane on a definite distance inside the cell. Cell membranes with corresponding ion channels orientation are formed in this place.

B - the final stage of telophase after the isolation of sister cells.

C - spiralization of chromosomes is completed by the end of protophase; chromosomes are seen in a light microscope; the "left" torsion field of coiling chromosomes collides with the nucleus membrane

torsion field generated by ion channels resulting in the destruction of the cell membrane; chromosomes appear to be lying in the cytoplasm.

3. There is an undoubted interest in the question of the character of the cell field during relative rest of chromosomes after they have completely despiralized at the end of telophase and have not entered yet in the synthetic phase, i.e. in the G1 period of interphase. This period can be relatively short for actively dividing cells, while it is quiet long for the cells of the tissues where divisions occur seldom or even ceased.

As it has been stated above, in this period the chromatin is in relative rest, and chromosomes transformations do not have such strict direction as it is in two previous cases (The periodical transcription of the same genes complexes apparently definitely contributes to the common field of the cell, however, as it has already been mentioned, this most likely does not significantly influence the cell field). Generally speaking, the processes taking place in the chromatin in this stage must be symmetric: the spiralization should be balanced by the despiralization, a movement in one direction - by a movement in the opposite one. However, at the same time the character of the cell field - external field shell - "right" - should be preserved. How can it be imagined?

Firstly, by the use of the notion about the pulsation in the form of travelling waves, which is rather common for natural periodical processes. The change of day and night is a wave travelling over the Earth's surface, the seasonal temperature change is a wave pulsating from the pole to the pole, the blood moves through the organism by the undulatory impulses as a result of heart beats.

Secondly, by the use of data about the internal structure of a cellular nucleus extrapolating it for the G1 period of interphase. As it has been mentioned above (See Fig. 3), pre-replication centers are formed in a developing nucleus at the end of mitosis [7]. These centers transform to valid replication centers after the renovation of the nucleus membrane. Thus, the following conclusions can be made from this: 1) replication centers are most likely situated at the periphery of the nucleus since they are connected with its membrane; 2) these centers influence the realization of rotating motions of the DNA helix, since they participate in its winding-unwinding during the replication.

There is one more experimentally proved fact. In the work [8] it is shown (Fig. 5) that sister chromatids being tightly linked in metaphase are reflection symmetric to each other. It indicates that one of them has a right spiral, while another - a left one. In other words, on the level of superspiral the chromatin can possess both right and left arrangement.

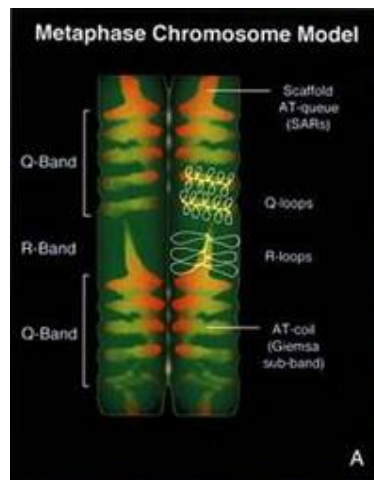


Fig. 5. Metaphase model of the chromosome [8].

In the work [8] it is shown that in metaphase the sister chromatids being tightly linked are reflection symmetric to each other. It indicates that on the level of the external superspiral one of them is in the form of a right spiral, while another - a left one.

Let us assume that the pulsation in a nucleus occurs from the periphery to the center and backwards. As it was mentioned above, on the nucleus periphery, near the membrane there are replication centers capable to realize a rotatory dynamics of the chromatin. It is not experimentally proved yet what there is in the center of the cell nucleus, however, it is logically to suppose that centromere regions of chromosomes are grouped there. Since it is well known that during anaphase of mitosis chromosomes move towards the poles in the form of pins exactly with their centromere regions along the spindle threads (if it exists), which meet in the polar regions. Therefore, the grouping of chromosomes centromeres in the central region of the nucleus does not look so improbable.

On the basis of all above mentioned we can see the following dynamics of the chromatin inside the nucleus in the G1 period of interphase (Fig. 6).

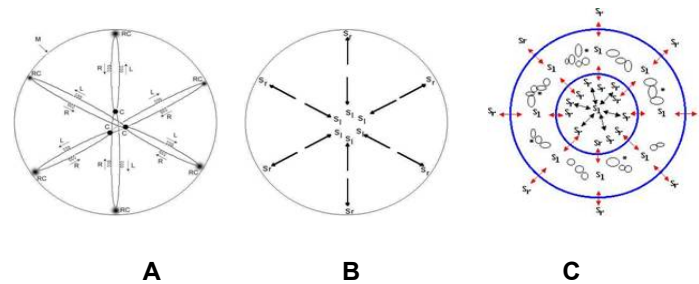


Fig. 6. Dynamics of the chromatin inside the nucleus in the G1 period of interphase.

A - diagram of chromosomes arrangement inside the cellular nucleus in the G1 period of interphase: M - the cell's membrane; RC - replication centers linked with the membrane; C - centromere regions of the chromosomes; R - "right" superspiral moving from the nucleus periphery (replication centers) towards the nucleus center (chromosomes centromeres); L - "left" superspiral moving from the nucleus center (chromosomes centromeres) towards the nucleus periphery (replication centers).

B - diagram of the polarization of the nucleus internal space by the waves of chromatin superspirals moving along the chromosomes.

C - torsion model of a cell in the G1 period of interphase.

The G1 period of interphase sees the establishment of the pulsation mode - exchange with short, as compared with the nucleus radius, waves of a superspiralized chromatin between replication centers and centromere sections of chromosomes. Moreover, "right" superspiralized waves move from the periphery to the nucleus center, while "left" ones - from the nucleus center to the periphery (Fig. 6, A). A moving part of the spiral - "the wave of spiralization" - is spiralized on its leading edge and despiralized (uncoiled) on its falling edge. At the same time it should be taken into account that a right spiral wave polarizes the space in the following way: the "left" torsion field is ahead and the "right" one is behind, while a left spiral wave does on the contrary: the "right" torsion field is ahead and the "left" one is behind. Then as a result we see a stable picture of cell nucleus space polarization in the G1 period of interphase - the "left" torsion field is in the middle, the "right" one is directed towards the periphery, to the membrane of the nucleus, as it is shown in Fig. 6, B. Thus, the torsion field of a nucleus in the G1 period of interphase is coordinated with the fields of the nucleus membrane ion channels and assures the existence of a stable torsion-biological field of the cell, as it is shown in Fig. 6, B.

The doubling of chromosomes occurs in the S period of interphase by means of nucleus replication centers. This process seems to consist of a great number of local acts of despiralization and further spiralization of now doubled DNA segments (according to the facts presented by the authors of the work [7], 100-300 replication centers are generated in the cell nucleus). It is naturally to assume the presence of pulsations during the replication similar to those in the G1 period of interphase - the impulses of running superspiral segments are associated with the function of uncoiling-coiling of the DNA helices. However, in this case the spiralization passes with significantly higher frequency. Thus, the cell field intensity increases during the cell preparation to division, but in general the character of the interphase field remains the same (Fig. 6).

In the G2 period of interphase chromosomes are already doubled, however they remain to be tightly linked and despiralized. It can be generally supposed that this period does not differ significantly from the G1 period, concerning the chromatin dynamics, see Fig. 6.

In conclusion to this chapter, the following should be noted. It seems logical to suppose that while the constituents of the torsion field preserve their general orientation character (external torsion field is "right"), it has strictly individual structure for every kind of cells. The cell field is dynamic and it changes in time depending on a location of the cell and its functions as a part of a multicellular organism.

These changes must be seen the most evidently in the process of cell division, in the process of embryogeny, etc.

Thus:

- genomic DNA functioning in a cell together with chromosomes fulfils ordered repeated rotatory movements in the process of its own cycle realization in each stage of a cellular cycle;
- it is assumed that at the same time the chromatin becomes a source of torsion fields;
- torsion fields generated by the chromatin are specific and highly dynamic; they influence intercellular protein molecules which are in excited state and ensure the vital activity of the cell interacting with external torsion fields; it can be said that on its basic level the biological field consists of molecular torsion

fields generated by the chromatin (chromosomes).

- mitogenetic radiation is an integral part of interactions in the context of the cell field.

5.

Some aspects of the biological field of mitosis.

A.G. Gurvich studied mitosis in details. These were the works dealing with the study of mitosis which became the origin of the research that resulted in discovery of the biological field and mitogenetic radiation. Some observations over the dynamics of cell division are actual till now. For example, the proof that the mitotic spindle is a nonequilibrium dynamic formation [9] and not a stable permolecular structure as it is considered to be today.

In this chapter we will consider the results of one of two published works [10], where the interaction between chromosomes - mitotic figures - during mitosis is examined, and will try to explain the observed phenomena from the positions of views developed here.

The work "Morphological changes of mitotic figures as a results of their interaction" ("Морфологические изменения митотических фигур в результате их взаимодействия") was written by Ye.Ch. Pukhal'skaya - a colleague of A.G. Gurvich.

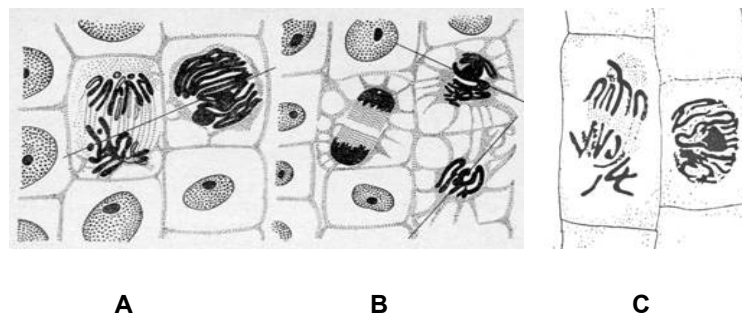


Fig. 7. Illustrations from the work [10].

The illustrations A and B of the work are signed: "The result of spireme's influence upon anaphase". B - "Symmetric telophase. The axes of neighbor spiremes do not intersect with it".

The images were received with the help of onion rootlets mer-istem. In Fig. A and B the axes of mitotic figures were depicted for the convenience of perception.

It is clearly seen that if the axis of a chromosome figure in prometaphase (spireme) crosses the axis of another mitotic figure which is in anaphase, the chromosomes of anaphase figure are strongly repelled by prometaphase chromosomes.

Now it is important to remind two things. 1. In the biological field conception by A.G. Gurvich the action of a field (including a chromosome one) was assumed as repelling. 2. At that time nothing was known about the chromatin (chromosomes) structure and no sup-positions were made about physical nature of the biological field.

The work examined interaction between mitotic figures of di-viding cells in cerebral vesicles of the triton and axolotl as well as during mitosis in onion rootlets and larch spores. It was found that during mitosis in neighbor cells and on conditions that the axis of a mitotic figure of one cell crosses the axis of chromosome figure in an-other cell, this causes the deformation of the latter (Fig. 7). Moreover, it was proved that these were the interactions between the chromosomes that caused the observed influence, and they were not at all connected with the change of turgor pressure in neighbor cells, etc.

Fig. 7, A and B show the influence of mitotic figures being in the stage of spireme (the stage of prometaphase) on chromosome figures which are in the stage of anaphase. The interaction is obviously repelling. As A.G. Gurvich wrote: "the chromosomes arrangement in diaster (anaphase - comment by the author) is violated as if influenced by a strong wind" [9, p. 258]. The repelling action of the chromosome field on the neighbor telophase is observed as well during the influence of the mitotic figure which is in the stage of prometaphase (Fig. 8).

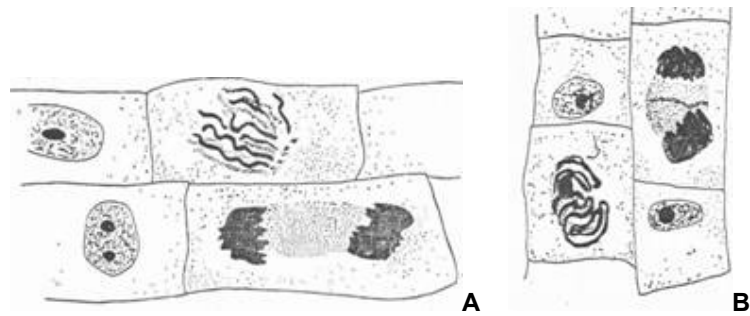


Fig. 8.

The results of spireme influence on the neighbor telophases [10]

If examined attentively, it is seen that chromosomes in telophase repel on the condition that the axis of the mitotic figure of the chromosome of a neighbor cell in the stage of prometaphase is directed at them (the same results are obtained with meristems of onion rootlets).

However, one can observe a different interaction, which during a close examination of images can be characterized as the establishment of a definite reciprocal orientation of mitotic figures' axes, definite "coaxiality" (Fig. 9)

However, in this case it concerns the influence of metaphase or anaphase mitotic figures on a chromosome figure of telophase or the interaction between two anaphase figures (fig. 9, D). At the same time one can observe the turn of a chromosome plate that appeared to be on the intersection with the axis of the mitotic figure of a neighbor cell.

Now let us consider how we can present events occurring on separate stages of mitosis in respect to chromosomes rotatory dynamics.

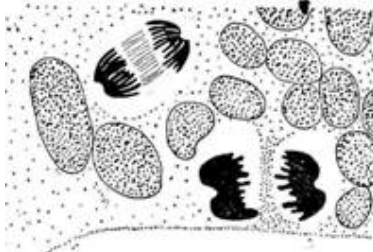
As we could see in the previous chapter, the spiralization of chromatin, which starts in the stage of prophase, causes the destruction of cell nucleus shell.

The spiralization actively continues in the stage of prometaphase (spireme), and in Fig. 7 and 8 we can observe the result of the action of the field which is composed of fields of chromosomes oriented more or less in parallels.

Fig. 9. The interaction of chromosomes plates in the late stages of mitosis - metaphase, anaphase, and telophase.

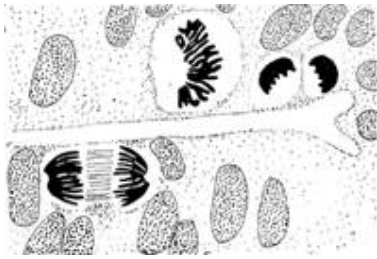


A - image from the work [10]: "A cerebral vesicle of an axolotl. The shift of one of daughter plates of telophase under the influence of properly situated metaphase"; we depicted the axes to show that this is the turn of one of daughter chromosome situated meta-phase"; we depicted the axes to show that this is the turn of one of daughter chromosome plates that causes the fracture of the axis - compare with the Fig. A, where the same image is reconstructed.



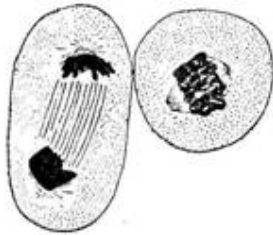
B - the reconstruction of the image from the

Fig. A; it is shown that if the axis of the neighbor mitosis did not cross the axis of the telophase figure, the latter would remain symmetric.



C - the image from the work [10]: "A cerebral vesicle of an axolotl. The asymmetric telophase influenced by metaphase is above. The symmetric anaphase which the axis of metaphase does not cross with is below".

It is seen how abruptly one of the telophase plates turned. One can assume that the extrusion of the telophase plate axis from the area of metaphase chromosome field influence is caused by the fact that from this side of the metaphase plate chromosomes with left external super-spiral are uncoiled.



G - the image from the work [10]: "Two neighbor maternal cells of larch pollen. The shift of one of daughter plates of telophase at which the axis of early anaphase is directed". The turn of the telophase plate and coordination of the direction of its axis with the axis of anaphase figure is obvious.



D - the image from the work [10]: "The reciprocal deforming action of two mitoses in one maternal cell of larch pollen"; one can see that anaphase plates of neighbor mitoses turn so that to combine their axes.

Why does this field repel the chromosome plates which appear on the intersection with this field in the stage of anaphase or telophase? That occurs because in anaphase and telophase chromosomes are already being despiralized and correspondingly possess the opposite rotatory dynamics. Thus, the key moment of mitosis is metaphase - a very short period of change from prometaphase to anaphase, to the migration of chromosomes to the poles of a dividing cell. On the basis of the above mentioned we can assume that it is in metaphase, in its final point when chromosomes uncoiling commences. Here it is important to recall (Fig. 5) that sister chromatids of a doubled chromosome are reflection symmetric, i.e. they have different spiralization of their final spirals: one - right, another - left. Naturally, during the simultaneous unraveling each of sister chromatids possesses the opposite, with respect to another one, rotatory dynamics that causes their repulsion - the movement of chromosomes from the cell equator to the poles starts. This allows to explain the deviation of chromosomes among the species which do not have the achromatic spindle during their division.

On the contrary - the rotatory dynamics of chromosomes in a de-veloped anaphase and telophase is the same - chromosomes are being despiralized. Therefore, the interaction between mitotic figures of neighbor cells in anaphase and telophase leads not to repulsion but to the establishment of acceptable reciprocal orientation of chromosome figures' axes (Fig. 9G and D).

Fig. 9 A and C should be especially considered. In both cases telophase chromosome plate is influenced by the metaphase chromosome figure. This is apparently the end of metaphase in both cases - the uncoiling of external chromosomes super-spirals has begun. In telophase the chromosomes have certainly went through the stage of external super-spiral uncoiling and are now the uncoiling "right" spirals. (It would be logical to assume that the difference in the direction of spiralization is only on the level of external, "final" super-spirals. As in the opposite situation the chromosomes despiralizing in telophase cannot renew a cell nucleus in accordance with the diagram in Fig 4 A). We do not know how sister chromatids of different species migrate to the pole - all with the "right" super-spiral in one direction, with the "left" - in opposite, or in definite proportion. However, if in the case with axolotl all "right" chromatids migrate in one

direction, while the "left" ones - in the opposite, this allows to explain the ambiguity of metaphase figure influence on telophase plates in a neighbor cell. Indeed, in Fig. 9 A the telophase plates turns so that to coordinate its axis with the axis of the metaphase figure, while in Fig. 9 B the axis of the telophase plate is expelled beyond the bounds of the cone of the influence of the neighbor cell's metaphase figure. The colleagues of A.G. Gurvich published only two works about the influence of chromosome fields. These highly interesting re-search works require subsequent study. Understanding the disputability of our considerations, we hope that the hypothetical ideas stated here will contribute to following works in this direction.

In this work we did not consider complex, coordinated evolution of chromosomes, the evolution of the chromatic figure during prometaphase - the beginning of metaphase. There are undoubtedly all reasons to believe that these movements are as well concerned with the chromosomes rotatory dynamics. However, the formulation of an integral and non-contradictory idea about biological field evolution during mitosis requires detailed and laborious research concerned with the formation of adequate ideas about the DNA spiral and chromatid construction. We would like to finish this chapter with the following words by A.G. Gurvich: "...the assembly of chromosomes forms a system aiming at an instant equilibrium. Such equilibrium however is never achieved because the proper fields of chromosomes constantly change. Thus, one cannot speak about the condition of real equilibrium but only about the course of system development whose elements influence each other, and the character mode changes depending on a condition in a given moment" [9, p. 258].

6.

Discussion of the proposed model.

A fundamental fact in the considered model is that on the one hand the basis of the biological field is a fundamental physical field - torsion one - and on the other hand, the realization of this field in the animate world has specifically biological character, i.e. the biological field is defined by the torsion fields generated by the chromatin.

The important feature of the considered model is an integral idea about a cell. The cellular (torsion) field is in its essence an embodiment of a unique ordering principle (invariant) in the organization of a bioplast. Some aspects of the hypothesis and consequences.

The hypothesis substantiating the decisive role of torsion fields in the occurrence of a biological cell field presumes the presence of rotatory movement in the dynamics of the chromatin. Although this supposition requires to be experimentally proved, it looks quite possible. The supposition about the presence of periodical pulsation in an interphase nucleus raises more doubts. In this suppositions we took into account the known experimental results and in our reflections we based on the natural principles of vital processes organization:

a) the presence of obligatory structural-dynamical order - chromatin pulsation in the nucleus is supposed to occur between replication centers situated at the periphery and centromere segments concentrated in the center;

b) indispensable cyclicity of natural processes.

Author knows that the cell nucleus is considered to be tightly packed with chromatin threads, something like shown in Fig. 10. However, we do not consider it to be an obstacle for pulsation in the form of travelling superspiral waves, moreover, the precise order inside a native nucleus is unknown. The Fig. 6 A naturally should not be taken literally. It is meant that reciprocal arrangement of the centromere - replication centers - specifies the principle of intranuclear order. And numerous folds of chromosomes are oriented radially - between the center of the nucleus and its membrane. The ideas about the presence of ion channels in the nucleus membrane can as well seem to be not completely indisputable for today, but from our point of view, the presence of active transmembrane transportation of ions, first of all protons, through the nucleus membrane is clearly indicated by the difference between the pH of karyoplasm and cytoplasm of a cell.

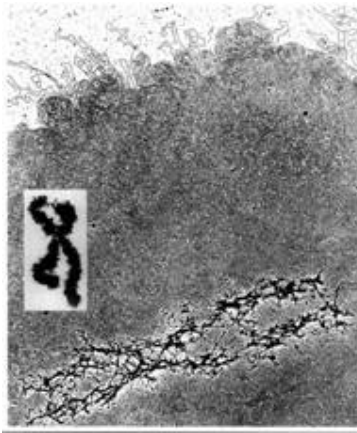


Fig. 10. A partially uncoiled chromosome (U.K. Laemmli).

Only histons were removed from the chromosome. Scaffolds are clearly seen among chromatin threads. An uncoiled chromosome is shown on the insertion. Scale (below) - 2 μ m.

The number of conclusions can be made from the proposed model of a biological cell:

- the cells which have similar in their structure individual external field can easily form a definite living organism tissue; the ones which possess different individual field during the contact with the former can form a border between different tissues (organs);
- the entire system of concentric fields of a cell can change its direction during the change of the pulsation character in the interphase nucleus and change of direction of superspirals' waves movement to the opposite ones, "left" ones - to the center of the cell, "right" ones - from the center (Fig. 6 A); an external cell field will become "left"; this will lead to the incompatibility of a reborn cell with neighbor cells (tissues); it is not excluded that similar processes occur during the carcinogenesis, and thus cancer cells have "left" orientation of their external torsion cell field;
- tissues of an adult organism, which completed its growth, possess as a rule a weaker biological field - cells of a specialized tissue either do not divide at all or the division occurs rarely; however, this field is more specialized - the specificity of its cells, tissues and correspondingly fields of various organs is conditioned by the fact that a definite set of genes is constantly activated in them, which influences the character of general dynamics of the chromatin.
- the mitogenetic radiation plays an important role in intercellular interactions and formation of a unified informational environment of the organism [3]; some ultraviolet quanta are enough for a cell to pass on to the division; apparently, the mitogenetic radiation, which possess a torsion component, specifically destabilizes the biological field of the cell putting it into such nonequilibrium condition that cell division is a natural result of this condition.

Comparison of the proposed model with the observed phenomena.

It is known that the most powerful morphogenetic field is generated around a developing embryo, actively growing tissues (for example, among plants - developing buds, the cone of the growth of rootlets, etc.) [1]. Indeed, cell divisions pass with high frequency in intensely growing tissues. Before the cell division in the S period of interphase the doubling of chromosomes occurs in the process of replication, and according to our model, the cell field intensity increases (See Chapter 4). It is known that "...spin polarization conditions are metastable" "...resulting in the occurrence of torsion phantoms" [4, p. 14-15]. It says that an intensifies biological field of an embryo, actively growing tissue creates in the ambient space a dynamic informational "scaffold" which determines its development. The biological field controls the morphogenesis in this way.

The biological field of an adult organism ensures its integrity, processes coordination, supports the regeneration of tissues and organs through information. This is due to the biological field how an organism "knows" which and how much a renovated tissue should be, which regenerated organ it should be.

The cell, which organizational foundation is a multi-layer system of concentric and self-coordinated torsion fields, must have considerable steadiness to various external field influences that can be observed in reality.

The presented simplest torsion model of a cell allows to explain the known negative influence of "left" torsion fields on living systems. In particular, the decrease in cell membranes penetrability [5, p. 56], decrease of oxygen consumption by isolated mitochondria, etc. under the influence of the "left" torsion fields of the environment. First of all, this can happen due to disorientating influence of external "left" torsion fields on "right" torsion fields of membrane ion channels. In the end this results in the violation of vital activity processes of a cell.

Bibliography:

1. Гурвич. А.Г. Теория биологического поля. - М.: Советская наука, 1944.
2. Гурвич А.Г. Принципы аналитической биологии и теории клеточных полей. - М.: Наука, 1991.
3. Гурвич А.Г., Гурвич Л.Д. Введение в учение о митогенезе.- М.: Изд. Акад. мед. наук СССР, 1948.
4. Шипов Г.И. Теория физического вакуума. - М.: НТ-центр, 1993.
5. Акимов А.Е., Финогеев В.П. Экспериментальные проявления торсионных полей и торсионные технологии. - М.: НТЦ "Информтехника", 1996.
6. Овчинников Ю.А. Биоорганическая химия. - М.: Просвещение, 1987.
7. Adachi Y, Laemmli U.K. Study of the cell cycle-dependent assembly of the DNA pre-replication centres in *Xenopus* egg extracts. *EMBO J.*, 1994 Sep. 1; 13 (17) : 4153-64 .
8. Saitoh Y, Laemmli U.K. Metaphase chromosome structure: bands arise from a differential folding path of the highly AT-rich scaf-fold. *Cell*, 1994 Feb 25; 76 (4) : 609-22.
9. Гурвич А.Г. Избранные труды (Теоретические и экспериментальные исследования). - М., "Медицина", 1977.
10. Пухальская Е.С. Морфологические изменения митотических фигур в результате их взаимодействия. - Сборник работ по митогенезу и теории биологического поля. - М., 1947, с. 162-173.
11. Гавриш О.Г. Физическая природа биологического поля. Торсионная модель клетки, - в кн.: Павленко А.Р. Защита населения от негативного воздействия геопатогенных зон, компьютеров, телевизоров.- Киев, "Наукова думка", 1997, с. 64-79.
12. Гавриш О.Г. Физическая природа биологического поля. Торсионная модель клетки. (Гипотеза), - в кн.: Павленко А.Р. Компьютер TV и здоровье. - Киев, "Основа", 1998, с. 139-144.
13. Гавриш О.Г. О физической природе биологического поля. Сознание и физическая реальность, 1999, т. 4, №2, с. 51-55.
14. Gavrish O.G. About physical nature of the biological field. Conference on physics of biological systems. Kyiv, 6-10 September, 1998. Book of abstracts, p. 113.

Gavrish Oleg Gennadievich,
candidate of biological science,
chief research officer of the Institute of Bioorganic Chemistry and Petrochemistry
of the National Academy of Sciences of Ukraine

("Physics of consciousness and life, cosmology and astrophysics"),

№1,2002, Kyiv publishes the article by Kaznacheev V.P. (International Scientific Research Institute of Cosmic Anthropoecology, 2, Academic. Timakov Str., Novosibirsk, Russia, 630117)

Consciousness and Physics presenting the analysis of the results of the advanced scientific investigations conducted under the direction of Kaznacheev V. P. during 40 years at the Institute of Clinic and Experimental Medicine of SB RAMS and the International Scientific Research Institute of Cosmic Anthropoecology and dedicated to the study of the influence of physical fields, including vacuum-torsion ones, on biological objects: cells, bacteria, etc. The author describes the experiments on the changing of human consciousness in the special devices, named Kozyrev mirrors, with the obtaining of the clairvoyance effects. The transfer of chemical and biological information from one biochemical or biological object to another by means of the spinor-torsion fields was found. The role of field holograms in live substance functioning and the origin of the homo sapiens species are discussed. The concepts "Kozyrev hologram" and "Kozyrev space", which allow to explain the observed effects, are considered. The author proposes the general conception of interaction between spinor-torsion fields and live substance, including the effects of chirality and heliocosmic imprinting.

Keywords: physics of consciousness, spinor field, torsion field, biology, cell, information transfer, Kozyrev hologram, Kozyrev space, human, ecology, field hologram, hormesis, chirality, health, live substance, biophysics, heliocosmic imprinting, Minkovskiy-Einstein space.

Below we present a brief version of the article.

Nowadays humanity as a specific live substance form possessing intelligence and mind experiences the acceleration in its evolution. In the beginning of new century we observe not only the intensification of the mechanisms and processes of co-evolution, technosphere and humanity, not only the growing crises: biosphere, ecological, climatic ones. One more process not sufficiently studied by the science should be emphasized in this overall picture. Mankind having thought and mind as a whole, possessing scientific thought as a planetarium phenomenon, as Vernadsky V.I. defined it, more and more feels its own co-evolution, as strange it may sound, in mutual adaptation of itself, its everyday side, physical notion, biosphere complex to its intelligence, its socially-generalized mind.

The intelligence uniting mankind, realizing in technical, astrophysical, geological and other cultural and spiritual aspects is moving somewhere. Where is the planet intelligence moving, where is its intellectual "generalized mind" moving, providing the conditions for its "humaneness", for own continuation in generations, for own seeming immortality, for own happiness and well-being?

If we apply to the present achievements in psychology, psycholinguistics, psychoanalysis, psychiatry, we could say that it is still about empiric accumulation of material. In essence, it is the widening of some behavioristic tendencies, when psychiatrists and psychologists regard human behavior together with his actions, anamnesis, recollections, past as the "subject-object" system. For a subject-researcher the observed people are the object. While for the people observed by the specialists these specialists are the object. Thus, today the "subject-object" problem puts questions for us. How much does the resolving ability, intellectual capability – all-penetrating ability of both intellectual and "acceptor sensor machine" of a researcher correspond to the scales and reserves of a researcher so that he or she could understand psychological, psychic, emotional processes on conscious and subconscious levels of the observed people? Today it must be declared that our scientific community did not create a basic principle for our intelligence, our consciousness, and everything comes to empiric generalizations that are posed as fundamental ones (frequently only with the aim to enhance the prestige) [Фромм Э., 1994].

In this work while examining the interactions between consciousness and physics we consider the physics to be the science that studies the world in its infinite manifold – from the microcosm to the universe rather than the code of canons. Vernadsky V.I. introduced the notion of "live substance" that obeys the above-mentioned laws. He clearly showed that the interaction between live substance as a natural phenomenon, including a human being and his activity, and inert substance is realized through the biogeochemical exchange stream realizing entropy and negentropy evolutionary mechanisms. Owing to the latter, there is always live substance constantly being in the state of stable imbalance, permanent phase change of the second type.

Thus, the examined problem of the XXI century comes to an answer on the question: "Where are the basic mechanisms of our essence, our consciousness?". Thus, it was reflected in the title of the present work. Examining the evolution, one can notice that there is some discrepancy in the notion of health that was defined in the works of the World Public Health Organization and now accepted as the standard of psychic, social and economic well-being. In the mentioned definition there is a positive side, however, it does not reflect the laws of evolution of well-being itself, the laws of evolution of health.

The article describes the research work aimed at the creation of new technologies based on the Kozyrev's ideas and realized at the International Scientific Research Institute of Cosmic Anthropology [Kaznacheev V.P., 1999]. The part of the preliminary work had been done at the Medical Institute of Novosibirsk, at the Institute of Clinic and Experimental Medicine of SB RAMS during 40 years. The scientists constructed a generator irradiating ether-dynamic stream of ether (vacuum) heterogeneity described in the works by D'atlov V.L. [1988], Akimov A.E., Shipov G.I. [1996], Dmitriev A.N. [1997], etc. If such generator "twists" ether (vacuum) stream to the left (anticlockwise) (left torsion fields), then tissue cultures (human cells), [Kaznacheev V.P., 1999], begin actively reproduce,

while the synthesis of albumen and polysaccharides goes in its ordinary way. During the alteration of the ether (vacuum) stream rotation direction to the right (right torsion fields) the following effect is initiated: there are no mitoses, however, albumen synthesis in cells, the activity of their genomes are incredibly high in all cases. During the experiments we altered "Kozyrev hologram" – a "hologram" records the past, present and future – resulting in the change of a gene and cell genome function. It appears to be that with the help of up-to-date technologies one can modulate a "Kozyrev hologram" as well as one can try to investigate this phenomenon on live and inert substance.

Then, an interesting effect is described: a test-tube with insulin is placed into a Kozyrev generator (a kind of torsion generator), vacuum-torsion space "reads" information from insulin molecules, then the obtained information penetrates a human organism through skin causing change in glucose concentration in blood of an examinee as during direct influence of insulin. Thus, with the help of "Kozyrev hologram" information can be transferred into a genome, and it can change fermentative-genetic processes in live substance. Here we come across with unknown organism barrier mechanisms resisting the intrusion of new information by vacuum-torsion fields. The matter concerns "vacuum-torsion immunity". It seems that one should seek many secrets and chemical factors effects in this phenomenon. What is the part of such "immunity" in the mechanisms of our consciousness?

The author demonstrates as well the effect of spinor-torsion irradiation influence on various substances. Now it is not worth mentioning a big number of contradictions existing in the modern interpretations of chemists and whose scientists who explain cells genome activity as a function of energoinformational field processes. For us it is undoubtedly that a genome is a carrier of "Kozyrev hologram" during constant interaction with the environment – it is a complex information-field process.

The following experiment is described: a ferment that decomposes starch is placed into a torsion irradiator. If such spinor-torsion streams irradiated by a generator are directed on starch solution, then the influence of these streams causes the starch to be decomposed in the way it occurs with amylase. The matter concerns the fact that amylase memory as topographic reflection in Kozyrev space can be transferred into starch. In the check experiment it does not happen. This example illustrates how one can use the property of "Kozyrev hologram" in up-to-date technologies.

Let consider one more experiment, not less amazing one.

An inductor of genes expression is placed into a torsion field. The genes themselves - the germ cultures *Bactcoli* - are outside the generator at a distance of one meter. If a factor of gene expression is introduced into the generator, vacuum-torsion stream getting into a culture of germ community begins to stimulate the production of angiogenine. Here we see an illustration of memory transfer, in essence, an illustration of consciousness transfer when an inductor with its proper memory in vacuum-torsion streams transfers information into a cell culture.

If an examined object (a human being) is placed in right-handed or left-handed vacuum-torsion stream (the stream having high informational density – in contrast to energy value that is low because the torsion generator is powered by a weak battery), then one can notice the typical alteration of encephalogram only during single process. Such procedures with the change in blood flow of cerebrum were repeatedly revealed.

At the International Scientific Research Institute of Cosmic Anthropology (ISRICA, Novosibirsk) many international programs were elaborated, for example, "Helios", where we can reproduce the entire dynamics of heliocosmic activity for the last 100 years and connect it with a specific man, ovule fertilization stage he originated from. At the Scientific Center of Clinic and Experimental Medicine of SB RAMS the phenomenon of imprinting, the memorization of heliocosmic space state were discovered; now we are searching for means to operate this space. Some astonishing properties of "Kozyrev mirrors" were discovered during the experiments. Using these properties we can concentrate "energy-time" around our investigator or patient. The original generators of various combinations of vacuum-torsion streams were approved.

The combination of "Kozyrev mirrors" with laser therapy was examined, including the search on the Earth surface for positive spinor-torsion areas, utilization of trans-personal connections leading to new technologies of telecommunications (independent communications) [Kaznacheev V.P., 1999]. This is the new "vacuum (ether) pharmacology" and eventually new principles of planetary intelligence formation that can constitute future foundation for international program of co-evolution and human survival, his health.

We are taking the liberty to forecast that in the nearest years of the XXI century special laboratories, special institutes orientated towards the research on "vacuum (ether) pharmacology" will be opened. New and already known compounds of the natural environment will be tested there. It is especially concerns the compounds used in homeopathy, hormesis, and new bioinformational technologies. These are the new perspectives that allow to get free from "pharmacological money shell". It is already evident that wider and wider field of general pathology is opening – phenomenon of vital insufficiency: vital sufficiency – realization of biosocial program of an individual, his optimal vital cycle. Well-known nosologies are merely syndromes of this phenomenon.

To sum it up, we should return to the fundamental problems of the nature of live substance existing on our planet. A number of assumptions were put forward above. Their essence is that any organic, cell structures (probably, it concerns as well intercellular structures), i.e. all that is called live substance in protein-nuclein and field variants should be considered in two ways. From the position of heterotrophic thermodynamics the oxidation process is autotrophic thermodynamics of plants owing to sun and space irradiation assimilation (these processes are well examined). However, all processes of autotrophy in plants and heterotrophy in heterotrophic forms apparently go with the autotrophy of second type, obligatory assimilation and absorption of cosmic streams called "Kozyrev holograms" being referred to this type. Informational-energetic streams thus constitute the deepest fundamental property of live substance on the Earth.

Among the works already quoted by the author of this article (D'atlov V.L. [1988], Akimov A.E., Shipov G.I. [1996], Dmitriev A.N. [1997]) we would like to point to the work by D'atlov V.L. [1988]. In our opinion, it possesses potential extension in the noted process study: if with the help of heterogeneous physical vacuum theory a number of known phenomena, planetary-cosmic effects in inert substance can be explained, then there is a hope to obtain an explanation to the phenomena connected with live substance.

Let's return to the work by Vernadsky V.I. [1980, p.286]: "It is possible that our planet does not have dissymmetric phenomena (except life) in the biosphere, but passing through the space regions possessing these phenomena, it can enter region of right dissymmetry of this type, i.e. it can stand in the conditions of the field of right dissymmetry where life can be conceived. Surely, the existence of this field does not cause at all the appearance of life, but its absence excludes this process".

How should we consider chirality in respect to vacuum heterogeneous biothermodynamics? We can assume that chirality – molecules in stereo-spatial state – is conditioned not only by chemical and biochemical properties, it is as well the expression of heterogeneous vacuum streams in their chirality; we wrote about this in the work [Kaznacheev V.P., 1999]. When we create spinor-torsion streams in our technologies, then, apparently, deep fundamental influence spreads over spatial-vacuum-heterogeneous structures. This causes their secondary (chemical, biophysical and organic) changes. Probably, on this level there is the absorption of the above-mentioned streams that change (perhaps owing to transmutation of heavy isotopes of atoms into light ones, etc.) vacuum-thermodynamic, energy mechanism laid into the basis of initial fundamental autotrophy of life substance in its field expression. On the basis of this physical field (in the Kozyrev "energy-time" space) all the others are formed.

It can be supposed that the transfer from bacteria to bisexual form of reproduction (when male and female species appear or when some bacterial structures "impregnate" others) is connected with the fact that single chirality (aminoacid, polysaccharide and more complex forms – it is connected with nuclein structure of genome) is not sufficient. When insufficiency occurs in thermodynamic vacuum-ether field, there is a necessity in combination of two species for chirality to occur. Chirality determines autotrophy, initial-fundamental autotrophy, characterizes fundamental nature of any cell.

In the "Kozyrev mirrors", in our spinor-torsion processes our organisms, locating on the planet surface in some heterogeneous conditions of vacuum, constantly function in stably thermodynamic nonequilibrium. Hence their further (secondary) consensescence occurs because autotrophy fades away. Probably, it can be prolonged thanks to our new technologies or liquid-

crystal structure of water, its memory, food additions, torsion processes that can be upgraded and directed not only towards brain and body but as well towards cambial structures.

The change of heliocosmic cyclic recurrence is apparently the basis of what we call heliocosmic imprinting – ovum fertilization by a spermatozoon is connected with the addition of X, Y-chromosomes to chirality. It is possible that XY or XX numbers of chromosomes that differ in their genetic characteristics (they exchange their places in female organisms) bear in them definite technological processes. It is possible that on this level there is the beginning of transmutation mechanisms, processes lately determining dynamics of any our cell and intercellular interactions. If this deep imprinting environment changes, then the notion of imprinting should be understood as a process – the process of chirality which is on the level of fertilization.

The chirality exists in the heliocosmic space of environment and mother organism during uterine development. After the birth all of us are submerged into the mentioned heliocosmic plasma – vacuum-thermodynamic space saturated with electromagnetic and other fields that are apparently only companions contributing to the realization of chirality. Thus, our entire life passes in the above-mentioned conditions.

Today, the discovery of imprinting should be considered as the discovery of a process unknown to us, or a vital cycle of an individual, or a cycle of generations, i.e. that that Berg L.S. put into the sense of the “monogenesis” notion and that Vernadsky V.I. described while introducing into his tables (the differences between inert and live substance are outlined in these tables). Chizhevskiy A.L. went into this problem during the study of z-radiation [1970]. Bauer E.S. [1935] and Gurvich A.G. came close to it, Umov N.I. wrote about this notion [1916]. Today the works by Popp F.A., 1989 on biophotons, the works of scientists from Leningrad elaborating this “layer” of science, - all this closely approaches the considered fundamental problem. Tsiolkovsky K.E. told about this in general outline in his works on science of science.

In our research on telecommunication, imprinting, spinor-torsion regulation of cellular structures, information transfer, liquid-crystal structure of water, diagnosis, clinic, light-reflection of skin we provide only some fragments, important components put into the basis of spinor-torsion heterogeneities of chiral streams of vacuum (ether). One should understand geometrical and physical space basing on these viewpoints. If we imagine a cell as a ball, this means that we set a geometric representation. If area of ball surface is proportionate to its linear dimension squared, then volume is proportionate to this value cubed. As Arshavskiy I.A. underlined, this is a critical feature widely described by cytologists.

There is the limit for the assimilation of the components of spinor-torsion streams, many described autotrophic processes probably being based on this. In the case when chirality is disrupted (for example, the effect of 74th parallel discovered by Kozyrev N.A.), in a cell there can be a change of attitude towards virogenia, towards a virus; the informational programs connected with the activation of some genome clusters can be altered; the phase of apoptosis, dystrophic processes occurs, a cell falls into an original pause of activity. Many infectious, dystrophic, viral, deficient processes as well as viscosity of grey-plasmic processes of liquid blood, intercellular liquid – all this is joined into initial physical space, whose basis is a highly complicated vacuum-torsion fractal.

On the whole, speaking about the work of the International Scientific Research Institute of Cosmic Anthropology (ISRICA), other native and foreign scientific organizations and subdivisions, one can claim that the considered problem can be generalized into the problem of live heliocosmic substance as the problem of chirality, specific negentropic orientation in the organization of physical space of biologically active structures. We work not only with the nature of consciousness and human intelligence, but we as well touch upon the basis of every cell, intercellular relations, basic foundations of homeostatic processes: barrier, immune, xenobiotic, hormonal, releasing ones, symmetry of cerebral hemispheres.

It is evidently that “diseases” or insufficiency of both cellular and intercellular processes as well as of metabolic processes are caused by the initial disruption in vacuum-dynamic basis of chirality. An interaction in planetary-cosmic scale, processes in liquid-crystal structures of water, chemical compounds change significantly their sense and must be considered as the secondary ones. The modern medicine is immersed into the secondary processes. Trying to correct a live structure, substitute some of its components (chemical, genetic), one goes towards molecular, chemical, biological technologies disregarding the basis connected with dynamics. Understanding this problem, developing new technologies, we can increase the effectiveness of treatment, prophylaxis, search for new forms of informational relations, screens protecting from cosmic danger, and finally vital cycle streams management, life prolongation and increase of capabilities and talents of future generations.

At the end we wish you – to listen to the fundamental thoughts of our native scientists. To listen to the works conducted by the collective at the ISRICA, because they present a wide spectrum of ideas continuing the ideas of Russian cosmism. We should be proud that we can continue the ideas of native natural science, and we hope that physiologists, psychologists, psychiatrists, biologists, ecologists, and evolutionists will accept them in the XXI century.

. Bibliography:

1. Акимов А. Е., Шипов Г. И. Сознание, физика торсионных полей и торсионные технологии. //Сознание и физическая реальность. — 1996. — Т. 1. — № 1-2. — С. 66-72.
2. Аршавский И. А. Физиологические механизмы и закономерности индивидуального развития: Основы неэнтропийной теории онтогенеза. — М.: Наука, 1982.
3. Бауэр Э. С. Теоретическая биология. — М.: ВИЭМ, 1935.
4. Берг Л. С. Труды по теории эволюции. 1922-1930. — Л.: Наука, 1977.
5. Вернадский В. И. Изучение явлений жизни и новая физика. //Труды биогеохимической лаборатории. — М.:Наука, 1980 а. —Вып. XVI. — С. 256-264.
6. Вернадский В. И. Несколько слов о ноосфере. // Проблемы биогеохимии. Труды биогеохимической лаборатории. — М.: Наука. 1980 б. — Вып. XVI. — С. 228-245.
7. Вернадский В. И. О коренном материально-энергетическом отличии живого и косного естественных тел биосферы. //Проблемы биогеохимии. Труды биогеохимической лаборатории. — М.; Наука, 1980 в. — Вып. XIV. — С. 55-73.
8. Вернадский В. И. Об условиях появления жизни на Земле. //Проблемы биогеохимии. Труды биогеохимической лаборатории. — М.; Наука. 1980 г. — Вып. XVI. — С. 278-296.
9. Гребенников В. С. О физико-биологических свойствах гнездовой пчел-опылителей. //Сибирский вестник сельскохозяйственной жизни. — 1984. № 1/урвичА. Г. Теория биологического поля. —М.: Госиздат. 1944.
11. Дедов В. П., Рыжкин Ю. Ф., Филимонов В. П. Возможная роль Земли в гравитационных опытах. //Проблемы гравитации и теории относительности. — М.: Изд-во ун-та др. нар., 1986. — С. 20—29.
12. Дмитриев А. Н. Планетофизическое состояние Земли и жизнь. //Вестник МНИИКА. — 1997. — Вып. 4. — С.45-54.
13. Дятлов В. Л. Поляризациянная модель неоднородного физического вакуума. — Н.: Наука, 1988.
14. Казначеев В. П. Научная картина мира и живое вещество (5 лет работы МНИИКА. Краткие итоги) //Вестник МНИИКА. — 1999. — № 6. — С. 9-20.
15. Казначеев В. П. Общая патология: Сознание и физика. — Препринт. — Новосибирск: НИИ общей патологии и экологии человека НЦКЭМ СО РАМН, 2000. — 47 с.
16. Казначеев В. П., Трофимов А. В. Интеллект планеты как космический феномен. — Препринт. — Новосибирск: МНИИКА., 1997.
17. Козырев Н. А. Время как физическое явление. //Моделирование и прогнозирование в биоэкологии. — Рига: Изд-во Рижского ун-та, 1982. — С. 59-72.
18. Кузин А. М. Вторичные биоенные излучения — лучи жизни. — Пущине: РАН ИБК, 1997.
19. Моңро Р. А. Путешествия вне тела. — Новосибирск: Наука, 1993. Ю.МочановЮ. А. Древнейший палеолит Дириниа и проблема внетропической природы человечества. — Новосибирск: Наука, 1992.

21. Налимов В. В. *Спонтанность сознания: Вероятностная теория смыслов и смысловая архитектура личности.* — М.: Прометей, 1989.
22. Умов Н. И. *Собрание сочинений.* — М., 1916. — Т. 3. — С. 105-214.
23. Фромм Э. *Психоанализ и дзен-буддизм. //Что такое дзен?* — Львов: Инициатива. — К.: Airland, 1994. — С. 11-77.
24. Чернощеков К. А., Лелехин А. В. *Материализация идей Чижевского в эпидемиологии и микробиологии.* — Томск, 1993.
25. Чижевский А. Л. *Физические факторы исторического процесса.* — Калуга: Ун-т, 1970.
26. Юнг К. Г. *Об архетипах коллективного бессознательного. //Вопросы философии.* — 1988. — № 1. — С. 133-150.
27. Popp F. A. *Coherent photon storage of biological system. //Electromagnetic Bio-Information / Eds. Popp F.A, et al. Munchen: Urbum und Schwarzenoera, 1989.-P.144-168.*
28. PuthoffY., Targ R. A. *A perceptual channel for information transfer over kilometer distances. Historical perspective and recent research. //Proceedings of the IEEE.* — 1976. — Vol. 64. — № 3. — P. 329-354.