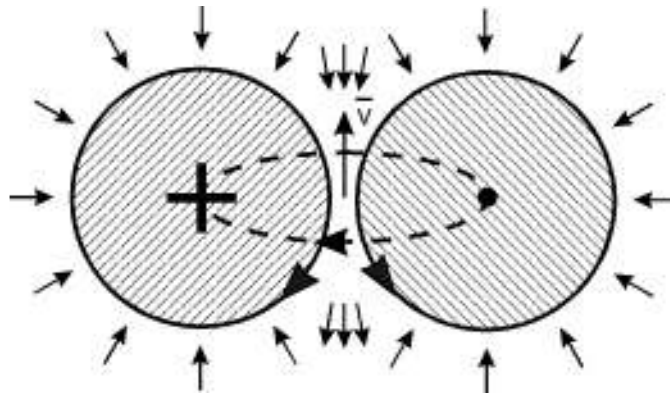


Fundamentals of United Physical Concepts in Popular Interpretation.

Part 1.

Physics as Seen by a Hydraulic Engineer.



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Hereby the author examined the fundamental problems and actual situation in the classic and modern theoretical physics. There has been considered the fluid-mechanical model of the substance dynamical sink structure, which can form a basis for the united universal mechanism of the substance shape-forming. Based on the proposed model, we have considered, in a popular interpretation, the nature of fundamental physical phenomena: forces, stuff structure, electromagnetism, substance relativistic manifestation, and so on.

The book is intended for a wide circle of readers: lecturers, researchers, students, schoolchildren, and all those, who are not indifferent to physics and the matters of natural science as a whole.

Manifesto of Free Physics

(for the foreword)

"There are four greatest obstacles to seeing the truth... They are, namely: the example of a weak and unworthy authority, the permanency of habits, the opinion of ignorant crowd and the disguise of own ignorance under ostentatious wisdom".

Roger Bacon

The history of the mankind development testifies that scientific knowledge at all times had strongly marked and differentiated character. There always existed the gap between information for those consecrated, the so-called esoteric knowledge, and the closed societies for consecrated, and so on, on the one hand, and the knowledge for the 'crowd', on the other hand. One among many evidences of this fact is the myth on Prometheus.

According to Aeschylus, people obtained all arts from Titan called Prometheus. Prometheus (his name means 'he who thinks beforehand, who foresees') *steals the wise knowledge from the gods* Hephaestus and Athena together with the fire, because without the fire nobody could possess or use this knowledge – so, in the form of the fire, Prometheus grants the technical progress to the mankind. Together with other Titans, Prometheus improved the people's life and shook their belief in the omnipotence of Olympic gods. In all centuries, the following words of Prometheus sounded as a call for freedom: "...I would not have changed my sorrows for the slavish service. It is better for me to be chained to a rock, than to believe Zeus's servants" (Aeschylus). The torments of Prometheus lasted for centuries, Prometheus being chained, according to Zeus wish, to one of the mountains in the Caucasus. His breast was broken by a spear, and a gigantic eagle flied every morning and pecked the Titan's liver, which then grew up again during the next night. This was the *gods' punishment of Prometheus for disclosure of the knowledge, belonging to gods* to people, and depriving the people from slavish fear of unknown natural forces, and making their labor easier, and giving them chance for the development of their creative thought, and developing their yearning for constant activities, and enabling them to forget their sorrows.

Our time does not make exclusion thereof. In addition to the above, it can be characterized alas by elaborated forms of misinformation and forced massive spreading of the ideology, scientific and technical policy and information profitable for oligarchy. The consequences of such activities look rather poor – the 'tame' science is in crisis, and in practice only those technologies are used, which are profitable for narrow circle of persons, making money on them, without consideration of global consequences. Such an approach led the ecological situation on the Earth to the critical point [1,2].

The way out of the current situation lies in free knowledge, public information, and independent science without dogmas.

It is preconditioned by several things.

My 'discernment' and understanding of the real situation in science and technologies were impetuous and shocking. They were preceded by the works of V.A.Atsukovsky [3, 4], A.V.Chernetsky, R.F. Avramenko [5], S.V.Avramenko [6], A.A. Melnichenko [7] et al. At the beginning, due to my own simplicity I was choked by the feeling of 'patriot's' offence that our scientists of genius were the first to discover unlimited sources of energy and create the 'perpetual motion machine', they elaborated fundamental knowledge and nobody not only in our country, but also abroad, does not 'blow the trumpet' celebrating their triumph.

Our existing at that time ideological atmosphere did not even give rise to appearance of grains of doubts with respect to the causes thereof. We believed that there could be only one cause 'the blindness of the bureaucrats from science', and there was belief in a 'kind lord'. In the course of time the 'kind lord' still did not appear; this was at least strange, especially as the 'perestroika' was in the height. Our shock drew back after we obtained access to the world-wide scientific and technical information via Internet.

One of the fundamental laws in the Universe is the law of free choice. All of us know its role and consequences in everyday life, but it is not smaller and maybe more important in the development of science, when in its starting point the science faces the choice between several ways of further development, for instance, – to recognize either Einstein's relativistic concept of empty space or the existence of subtle material medium – the ether. Modern dogmatic science believes the path it passes from the starting point to be the only true one. We read in the journal "Molodaia gvardia" (1995 ., # 8, page 70): "***In 1964, Presidium of the Academy of Sciences of the USSR issued a private resolution forbidding to all academic councils, scientific journals and scientific sub-faculties to take for consideration, to consider, to discuss and publish any works criticizing Einstein's theory***". The interdiction to publish articles on "perpetual motion machines" could already be made public; the majority of physical journals contain this interdiction in explicit form, because the solution of the French Academy of Sciences (1775) on interdiction to consider any type of models of the so-called "perpetual motion machine" till today is not cancelled.

Armed with the principle 'nothing can be believed in, but only what passed through one's consciences', we should return again to one of the starting points and analyze whether this is really true.

Free energy

It turned out that since the middle of XIX century, along with traditional technologies and devices there existed various operating and patented (from mechanical up to electric) the so-called self-maintained devices. *Self-maintained devices* are the devices, which after their putting into operation, produce energy sufficient for the technological process progress and for maintaining the device operation, i.e. they do not need the input of additional energy (fuel) from outside (Free Energy, Zero Point Energy, and so on.), so they are the devices with efficiency factor >1 (overunity). Besides, the power consumed for this device putting into operation could be several folds less, than the power produced at its operation [8, 9, 10]. This produced the evidence of the *exchange processes with subtle environment (ether, physical vacuum), medium, which always is a real participant of the process*, and not its passive spectator. And the inventions mentioned below were based exactly on these exchange processes; we mean John W.Keely's Sympathetic Vibration [11], and Nikola Tesla's [12], T.H.Moray's [13,14], Bruce DePalma's [15] Radiant Energy.

Thus it turned out that within a period exceeding hundred years the Mankind could not implement the technologies based on free energy, i.e. requiring no fuel production and transportation and using the environmental subtle substance energy – ether, physical vacuum. And all this takes place, because inventors, scientists and the science as a whole are the hostages of financial, political and social interests of the wealthy clan, and the hostages of money as a whole. N. Tesla makes a striking example thereof. At the end of XIX century this scientist of genius stood at the cradle of the electrification in the USA. N. Tesla's patents actually made the basis for practically all the implemented electro-technical devices, from twin lines transformer sub-stations and up to alternative current engines. After selling his patents for these inventions and even before the finishing of their implementation he has developed the fundamentals of energy supply on the principles, which did not stipulate the use of devices for electric energy transfer along conductors. He also developed several means and devices for obtaining electric energy in any point of the space by means of self-maintained devices [16], even a battery-driven vehicle. But, alas, the flywheel of tapping for money invested in the countries' electrification already began to rotate, and the taste of the power over peoples depending on energy carriers yielded its fruit. N. Tesla could not implement his devices. The possibility of free energy use did not suit the powers that be, and his talent was directed on secret military programs [17]. And there began total science cheating as well as its scrambling and misinformation. Those who disagreed to this were scared or physically destroyed. As a rule, these designs were transferred under the competence of military authorities, and the pretext of national security [18], and their civil use became impossible or had exceptionally military character.

All this hindered for almost a hundred years the process of implementation of ecologically pure technologies that require no fuel production and transportation; it also enabled to polarize the society by the poor and the rich, thus making social contradictions deeper and leading the Earth's ecology to the edge of the abyss.

This became possible only because of the science dependence on those possessing power. "He who pays the piper calls the tune" – alas, on a planetary scale this sorrowful truth can become deplorable.

And the science, as hundred years ago, still stands before the same road fork, as before, and has to begin from the very beginning, taught by galling experience. Prometheus's pupils! It is the high time to roll up your sleeves and repair an omission! New free physics is waiting for you!

Vladimir Berdinskikh

Introduction

"The quickest and the most reliable way to master any science is to pass himself all the path of its development"

Felix Klein

Appearance of qualitatively new problems related to ecology, energy, psychology, biology, and medicine, along with the necessity of comprehension of several new physical phenomena, such as UFO, bio-energy-informational exchange, the problems of parapsychology, poltergeist and so on, makes one to think over the problems in fundamental science and puts forward the matters on taking into consideration new, more and more smaller organized substance elements composing material formations already examined by physical science (V.A.Atukovsky, A.V.Chernetsky, R.F. Avramenko, A.Ye. Ackimov et al.), and on the necessity of development of the new physical concepts related to the structure and mechanism of the physical vacuum structures interaction.

The matter of the crisis in the fundamental physics is not a new one. During half a century several scientists (Dirac, Heisenberg, Landau, V.A.Atukovsky, G.V. Nickolaev, G.I.Shipov, D.Kh.Baziev et al.) made vain attempts to put forward this matter and go out of the crisis. But our cemented consciousness, which was operated over in due time, without doubts by the first class specialists of their business, was in peculiar scientific vacuum for very long time and needs urgent reanimation.

The way out of a deadlock situation in modern physics will become possible only after the disclosure of the causes, which generated this crisis, and after their quickest elimination; this needs rejection of several known scientific paradigms, as well as fundamental principles, postulates and even philosophic concepts, and the development of a fundamentally new physical theory in its essence. The yearning for 'correcting', 'repairing' or 'patching up' the existing theories (Einstein's theory of relativity) makes mess out of the actual situation in physics. Besides, it orients the scientists in wrong direction and releases the physicists from the problems of comprehensive development of the basis of really scientific and successive theory, based on the principles of dialectical development, this theory adequately conveying the essence of already known laws and opening the ways for the new 'laws' disclosure. Finally, it is high time to go away from the relativistic concepts of Einstein's empty space, from explicitly formal – mathematic al - methods in physics, used by official academic science, to totally recognize the *reality of existence of a very subtle material medium - the ether with real physical properties* and return to further development of really physical theory [1].

Human thought always tried to create a united, logically non-contradictive picture of the world, and the most fundamental aspect in this yearning was the disclosure of the cause-and-effect relations between the material formations participating in the phenomena. The causality fact recognition puts forward the matters of the nature of elementary interactions inside the phenomena. These interactions between the system elements can take place only via direct contact in the common point of the space, or via inter-medium particles (the ether, physical vacuum, and so on); besides, all physical laws are in principal identical on all the levels of substance organization and must be based on usual laws of the classic mechanics.

In different periods of the science history these matters were approached in various manners; for instance, Maxwell's electrodynamics has purely mechanical origin; all its provisions were strictly derived from the relations of the continuous mediums mechanics and the ether behavior concept, the ether being interpreted as the world medium filling up the world space, as the ideal liquid. This concept was based on the knowledge of the state and behavior of the ether elementary volumes as the ideal elements, i.e. non-viscous and incompressible liquid (the authors of later manuals prefer to omit the latter) [2]. Meantime, these principles can form a basis for the physical concepts upgrading.

Still the development of hydrodynamic models of physical phenomena faces severe difficulties, because these phenomena extremely vary in their forms, and the models themselves are based on the concepts of liquid whirl (Helmholtz, W.Thomson, Chellis, J.Thomson, Maxwell, N.P.Kasterin, V.F.Mitkevich, V.A.Atukovsky et al.) [3]; up to now they are far from being thoroughly examined and this does not allow regarding the theory development as totally completed, thus making again return to the development of hydrodynamic models of physical phenomena.

This work made an attempt, in popular interpretation, to track successively the unity of fundamental physical phenomena and develop the fundamentals of the united physical concepts, based on the examination of fundamental modern physical concepts and on the fluído-mechanical model of dynamical sink structures.

CHAPTER 1

FUNDAMENTAL PROBLEMS OF MODERN THEORETICAL PHYSICS

"Mathematicians prove theorems for their own pleasure, and for a physicist – theorist the most dangerous thing is to get overloaded with mathematical erudition".

L.Landau

1.1. Ways of theoretical physics development [2,4]

It is possible to upgrade physical concepts only after close examination of historical development of the modern theoretical physics.

Newton's *classic mechanics* forms the basis of modern theoretical physics. Newton has introduced in science the notion of material particles system state; due to this notion, the state of mechanical system is totally determined by coordinates and impulses of all the bodies composing this system. Coordinates and impulses are the fundamental values of the classical mechanics. Knowing them, one can calculate any other mechanical value, for instance, energy, angular momentum and so on. The system behavior is an assembly of simple components, and the material bodies system state can be described by the state of its parts.

Although Newton's mechanics was later recognized to have restricted application domain, it still remains the basis without which any subsequent formation of theoretical physics could be possible.

Based on the Newton's mechanics, the *continuous mediums mechanics* later appeared. In this mechanics, gases, liquids and solid bodies are considered to be continuous homogeneous physical mediums. Here, instead of coordinates and impulses of separate particles, other notions are used - density, pressure, mass transfer velocity and *external forces* applied to them; these notions unambiguously characterize the behavior of the mediums said. The density, pressure and hydrodynamical velocity themselves are the functions of coordinates and time. The notions of continuous mediums mechanics have totally used the notions of Newton's mechanics; still, the first ones are the adapted versions of the second ones; such adaptation allowed describing the continuous mediums motion. The equations of continuous mediums mechanics - Euler equations for ideal medium, and Navier-Stokes equations for viscous medium - enable us to find out the values of these functions in any next time moment, provided that boundary and initial conditions are known. However, all that concerns mainly liquid streamline motion.

Already by the end of the XVIII century, scientists paid attention to the fact, that the resistance to the bodies' motion in liquid can not be explained without the concept on vortices appearing around moving bodies. Works of Helmholtz and some other researchers were devoted to the liquid vortex motion; later, these works were actually developed only as the vortex statics, because the vortices formation and life cycle in liquid were not considered. To a large degree, the similar situation preserves up to this day. Even today continuous medium physics avoids considering problems related to non-stationary liquids and gases fluxions, and in cases when non-stationary character of respective problem can not be ignored, this problem is represented as a quasi-stationary one, i.e. the problem is specified as a stationary one, within admissible error range. However, today such approach seems to be more and more insufficient; as a result, the most important problems of the vortex motion still await their solution. For instance, actual state of problems related to vortices formation, life cycle and energy, remains extremely poor. Even the structure of these formations and medium motion in their neighborhood are actually non-described.

Thermodynamics -dynamical heat theory- on the first stage of its initiation dealt only with the heat equilibrium state and equilibrium processes (those proceeding infinitely slow). Its fundamental values, determining the system state (thermodynamical parameters), are pressure, volume, temperature and several coefficients, related to each other by the thermal equation of state.

Later on, beginning from the 30es of XX century, the thermodynamics of non-equilibrium processes was created; this thermodynamics determined the state via density, pressure, temperature, entropy and other local thermodynamical parameters, considered as functions of coordinates and time. For them, the equations for mass transfer, energy and impulse, describing the system state evolution in the course of time, have been written, as well as the equations for diffusion and heat conductivity and Navier-Stokes equations. Complication of problems caused the necessity to consider more aspects of each phenomenon, and this, in turn, entailed the use of larger number of parameters and equations.

The total content of thermodynamics is mainly the corollary of laws on energy conservation and entropy increase; another corollary of the latter is the macroscopic processes irreversibility. The last circumstance generated several doubts because the entropy increase law stipulates the inevitability of the so called heat death of the Universe, in which all processes will stop for the reason of general heat equilibrium.

Statistical physics or statistical mechanics is actually the further development of the continuous medium mechanics and thermodynamics. Statistical physics manipulates with statistical distribution functions of particles - gas molecules, with respect to coordinates and impulses. Here stochastic functions are introduced, in particular, probability density distribution, as well as distribution functions, satisfying Liouville's motion equation. Besides, the energy of the system particles interaction between each other should also be considered, i.e. a system is not only the sum of particles composing it, but more complicated formation, a complex, in which a new quality of composing bodies interaction appeared, this quality being not inherent to each body separately. In 1872 for the first time the

equation was obtained by Boltzmann, describing the distribution function evolution for gas; this was called the kinetic equation. In 1874-1878 Gibbs calculated distribution function, and this enabled finding all thermodynamical potentials of the particles system, what, in turn, gave origin to statistical thermodynamics.

Application of continuous medium mechanics theory to electromagnetism phenomena enabled Maxwell to create *electrodynamics*. Maxwell's works were preceded by Ampere's works, who created electrostatics as the theory on the currents static interaction in space. The very term 'electrodynamics' itself was introduced by Ampere in 1826. This term was intended to denote the theory of forces, acting on conductors with direct current, which are immobile in space. In his works Maxwell also considers forces, generated by electric and magnetic fields; in doing this, he considers electric intensity as a force acting on a single electric charge, and magnetic intensity - as a force, acting on a single magnetic mass. Maxwell's electromagnetism theory is a direct consequence of mechanics of incompressible and non-viscous liquid, which was developed based on Helmholtz's ideas on laws of vortex motion in the ideal liquid, which, according to Maxwell, is ether.

A. Einstein's theory of relativity that appeared in the beginning of XX century because of the impossibility to explain, in the framework of existing at that time concept of the ether, the results of Michelson – Morley's experiments on finding ether wind. This theory, and quantum mechanics later on, changed the principles the physics was based on, including the goals of physics and its methodology. Both special and general Einstein's theory of relativity are based on arbitrary and not very valid postulates; they do not validly use, as a general physical invariant, the category of four-dimensional interval, the component of which is partial property of a partial physical phenomena - velocity of light; their logic, according to V.A. Atskovsky, is closed on itself, where conclusions lead to initial prerequisites; they contradict with each other in a fundamental and essential matter - the matter of the ether existence. These theories are not successive with respect to the theories of classic physics; they reject model-based concepts and cause-and-effect relations, and consider the microcosm processes not as consequences of hidden forms of substance motion, but rather as some stochastic processes, having no physical causes. These theories assume the space non-Euclideanism and the time flow unsteady character; here the mathematics prevails over physics, and physics is subordinated to abstract mathematics, which does not represent the laws of real physical world.

Quantum mechanics is a theory, establishing the ways of description and the laws of motion for microparticles - elementary particles, atoms, molecules, atomic nucleuses et al. Modern quantum theory of stuff is another "riddle" of theoretical physics. Many of its provisions are still disputable, for instance, eroded cause-and-effect relations of phenomena, non-understanding of quantification causes, absence of descriptive physical interpretation of quantum numbers. All this not only complicates the understanding of the internal essence of quantum mechanics, but also prevents its development. After failed explanation of non-emitting of electromagnetic waves by electrons on their orbits, instead of the nucleus planetary model upgrading or rejection, Bohr began to introduce his postulates, thus forcing physics to the background and absolutely ignoring cause-based substantiation of his postulates. And if this had not taken place, and physicists – theorists had not considered such an approach admissible, they would have been compelled to think over a mechanism, providing stationary character of electron orbits, and this would have entailed the appearance of an atom model, drastically different from the planetary one.

The most exact characteristic of actual situation in quantum mechanics seems to be given by M.Gell-Man, the creator of quark model of the substance structure: "quantum mechanics, this discipline, full of riddles and paradoxes, which we **do not fully understand, but can apply**". These words characterize the deep crisis in the understanding of physical reality which exists already for more than a half of century.

The quantum theory development was based on the increasing number of experiments, confirming the correctness of its equations and calculation methods applied to the data observed. In doing this, increased the difficulties related to creation of descriptive physical images corresponding to these experiments. In this situation, stochastic interpretation was a convenient way to avoid said difficulties, rejecting the descriptive way of thinking and physical meaning in theoretical physics. Thus, rejection of determinism, characterized by P.Langevin as "intellectual debauchery", led modern physics to crisis in understanding of the physical reality. Unfortunately, this tendency spread among the better part of leading modern physicists. For instance, being asked, whether he understands the quantum theory, A.Migdal answered something like that: yes, I understand this theory, because I can solve its equations, compare the results of theoretical calculations with experiments and in several cases obtain reasonable coincidence between them. Thus, one can see the evident desire to keep away from everything that lies outside formal calculations.

"Existing quantum theory is good, until we do not try to apply it to the particles with high energy, as well as in the domain of small distances» (Dirak). In the quantum theory, charges and photons are considered as point particles; for this reason, the limits of coordinate (or impulse) integration in the integrals, corresponding to the electron and photon self-energies, are zero and infinity. As a result, corresponding integrals become infinite. Really titanic efforts were applied, including those of Paulie, Heisenberg, Oppenheimer, Feinman et al., to eliminate these infinities, but without any result. Dirak, the creator of quantum electrodynamics, wrote: "**Correct conclusion is that the fundamental equations are not correct.** They must be essentially modified, in order to avoid the **appearance of infinities** in theory at all, and enable equations to be solved exactly in compliance with normal rules, without difficulties. This provision needs some very serious changes: *small changes will give nothing*".

Attempts to move away from the stochastic interpretation of wave function stimulated the works of L. de Broglie, B.Madelung et al., devoted to principles of determinism and classic cause-base in quantum theory.

In Madelung's hydrodynamical model, Schroedinger's equation for a particle moving in the potential field, is equivalent to the equations of "vacuum hydrodynamics" - continuity equation and equations of quantum liquid motion (quantum analogue of Euler equations). Quantum liquid is considered to be the excited state of an elastic medium, called the physical vacuum in the quantum field theory.

Similar opinions shared Russian physicists Ya.Frenkel and D.Blokhintsev. According to D.Blokhintsev: "... particles are only the excitations of vacuum continuing to exist with absence of particles; therein fluctuate electromagnetic field and electric polarization. It is not the rest, but perpetual motion, similar to choppy sea... From this point of view it is also clear, that isolated particles, left to themselves ("free", as they say) do not exist. Even in case of substantial distance between the particles, they still continue to belong to the medium, which generated them and is in the state of continuous motion (moves in the uniform and straight- line way). It is possible, that this *connection between particles and medium* covers the nature of the *impossibility to isolate a particle*, which manifests in the quantum mechanics apparatus ". Such an approach makes to consider the nature of intra-atomic medium, its parameters, and structure, what inevitably leads to *necessity of total revision of the planetary atom model, which does not stipulate any medium inside an atom*.

The idea of Thomson W. (The Lord Kelvin), that: "Helmholtz's outstanding discovery of the law of vortex motion in the perfect liquid, i.e. the liquid, having zero viscosity (or zero liquid friction), inevitably leads to the thought, that Helmholtz rings are the only true atoms" becomes actual. V.A.Atukovsky developed a vortex-type model for atoms, based on hydromechanical laws [3]. All this shows that application of the classic physics methods to microcosm objects is not only correct, but seems expedient because they can do something the quantum mechanics methods can not do: enable us to understand the micro-particles structure, explain the essence of physical nature of corpuscular - wave dualism and some other things, and cast a new glance at relations of micro- and macrocosm and the nature organization as a whole.

Increasing importance of hydromechanical models and vortex-based concepts in modern physics stipulated the need of inertia fields and forces problems solving.

The problem of inertia fields and forces in theoretical physics, from the classic mechanics, where it was formulated by Newton, and up to the modern field theory, has always been and still remains the least elaborated part of physics.

Discussions on the inertia forces problem appear from time to time every 20-30 years, raising the same questions: whether inertia forces are real, what is their origin, are they external or internal forces with respect to an isolated mechanical system. The point is that inertia forces do not comply with the third Newton's law; for this reason, difficulties appear at their dividing to external and internal with respect to isolated system. Our knowledge on these forces almost has not changed since Newton times. According to A.Pice: "*the problem of inertia origin has been and remains the darkest aspect in the theory of particles and fields*".

Inertia forces manifest themselves in accelerated reference systems; for this reason, Newton, Euler, Makh, Einstein and several other researchers considered these forces as *real*. Matters, related to inertia forces and, moreover, inertia fields, are far beyond not only Newton's mechanics, but also the classic mechanics in general. For this reason, it seems expedient to raise an issue on the *research of physical properties of inertia field, generating inertia forces*.

The brief review of the physics development, given above, and statements of the physicists-theorists produced several evidences of necessity to eliminate certain existing contradictions, preventing further physics progress, by means of drastic changes in fundamental physical concepts.

Later on we shall review the most outstanding and specific physical theories, which authors offer their own ways of recovery, characterizing certain trends.

This does not mean that these works exhaust the number of theories and scientists dealing with the said matters. This book format and volume do not allow touching the works of all the authors, engaged in this field. For those interested in these matters I can only recommend some of them [6,7,8,9,10,11,12,13,14].

1.2. G. I. Shipov's general relativity and the theory of physical vacuum [4]

For the moment, G .I. Shipov's general relativity and theory of physical vacuum [4] may be recognized as the top achievements in mathematical upgrading of relativity theory and quantum mechanics.

G.I.Shipov set up: "... a principle of general relativity, stating the following: all physical fields are relative.

This means that general relativity equations shall be formulated in such a way, which enables the physical fields composing these equations to be *turned into zero* (may be locally) by means of certain transformations, reasonable from the physical point of view. The theory of physical vacuum was the result of the program's successive fulfillment". Such a technique enabled him "to overcome" the infinity, manifesting via relativistic multiplier.

General theory of relativity, special theory of relativity, and relativity of Galileo - Newton make a class of theories, based on translational relativity. Complete description of inertia forces needs the theory of relativity to be expanded through inclusion of rotative relativity theory. G.I. Shipov set up the principle of general relativity and the theory of physical vacuum, based on the geometry of absolute parallelism with spinor structure of inertia fields in inertial reference systems, generating the substance density. Fields, determined by the space torsion, are called torsion fields. An inertia field is a torsion field, generated by the torsion of absolute parallelism space. Replacing the

substance by the space torsion, G.I. Shipov passes on to purely geometric spatial description of substance fields and external fields under the slogan: nothing occurs in this world, but the curvature variations and the space torsion.

The general principle of relativity matches with the general principle of inertia, which has been developed in the theory of physical vacuum giving the following notions with respect to inertia forces:

- 1) they are generated by an inertia field, acting as the single field in the theory of physical vacuum;
- 2) inertia fields are determined by torsion, which characterizes the space elastic properties and has local nature;
- 3) inertia forces, due to their vacuum nature, can not be classified as internal or as external forces with respect to any "isolated" system.

There are no isolated systems, in their usual sense, in the theory of physical vacuum, because of all-pervading ability of physical vacuum, related to unusual nature of inertia fields and forces.

Equations of physical vacuum represent a system, generally consisting of 44 nonlinear first-order partial differential equations. In this system, unknown functions are: a) 6 components of nonholonomic tetrad; b) 24 components of Ricci rotation coefficients; c) 20 components of Riemann tensor.

Thus, in general there are 44 equations for 50 unknown functions. For this reason, according to G.I. Shipov, the search for specific solutions of equations system should be correctly called "the solutions construction". This construction shall be based on physical considerations, symmetry properties, conformity principle or other techniques, enabling physical interpretation of obtained specific solution.

The substance transition from virtual state into real state takes place after the constants or integrands in one or another specific solution (geometric image) acquire respective physical values. In this case, the exited vacuum formation – inertion - manifests itself as a real particle or a field. In other words, the real substance is born out of vacuum.

As a result of vacuum levels splitting into two systems, describing right and left world, the physical objects with positive and negative masses (positive and negative energy) appear.

Simultaneous birth of positive and negative masses enables us to build the model of the Universe with zero average mass before and after the stuff birth.

Positive masses mutually attract forming thus galaxies, seen in the Universe. Negative masses push away from each other, thus evenly distributing themselves in the Universe. The antiparticle with positive mass and charge (positron), corresponds to the particle with positive mass and negative charge (electron); particle with imaginary mass is called tachyon.

Geometry of absolute parallelism is the space of events for the theory of physical vacuum; herein the term "event" means an interaction of a whole and a part, forming a certain physical situation.

As a result of a torsion field birth, appear primary vortices - information carriers.

Above information on G. I. Shipov's theory is quite sufficient to get an idea of his approach to solution of modern theoretical physics problems and draw general conclusion about his theory. Namely, his theory is the mathematical construction of solutions, eliminating contradictions of theoretical physics up to the total correspondence of physical vacuum equations to all fundamental equations of modern physics, considering torsion fields. Thus, the mathematical approach and basic models of quantum mechanics processes have been preserved.

1.3. V.A. Atsukovsky's ether dynamics [3]

Complete rejection of relativity theory and return to positions of classical physics, based on hydromechanical and gas-dynamic concepts for solution of problems of modern theoretical physics is typical for the works of V.A. Atsukovsky [3], which has developed the fundamentals of ether dynamics.

Methodological fundamentals of ether dynamics are:

- the primary purpose of the science is to disclose the internal mechanism and cause-and-effect relations (determinism) of the phenomena;
 - the interactions between elements can take place only through their direct contact in the common point of space; thus, the principle of remote-range action is rejected;
 - the motion and its inherent components - substance, space and time - are general physical invariants which possess the following properties: presence in all structures and phenomena, primary character, preservation at any transformations, unlimited divisibility, additivity, linearity, and unboundedness. This means non-Euclideanism of real physical space, uniformity and unidirectionality of time, perpetuity and indestructibility of substance;
 - identical physical laws act at all levels of substance organization, both in macrocosm and microcosm;
 - the substance structural organization expands infinitely in depth and in height with respect to hierarchical levels.
- Basic provisions of ether dynamics are:
- The world space is filled with material medium, possessing the properties of a real gas – the ether.
 - Ether is the building material for all kinds of stuff formations, from elementary particles of stuff, to stars and galaxies. Physical fields represent various forms of ether motion.
 - The element of ether - amer - possesses the unique form of motion – the uniform translation in space.
 - The only kind of gas motion, providing the localization (collection and keeping in compact state) of high density gas in space, is the closed rotative motion.
 - Proton is the ether spiral toroidal vortex, neutron is also a vortex, but surrounded by an additional boundary layer, which reduces ring motion.

- Magnetic field is the ether toroidal flow, generated by a spiral toroidal vortex in the ether, surrounding this vortex. Electric field is the ether ring motion in the neighborhood of the same vortex. Polarity of electric field is the orientation of the ether ring motion with respect to toroidal motion. Magnetic moment of a toroidal vortex is determined as a product of the toroidal motion circulation by the toroidal motion angular velocity. Charge is determined as a product of the medium's ring motion circulation by the torus surface area.

- Strong nuclear interaction is the result of both the pressure reduction in the boundary layer between adjacent nucleons and nucleons pressing to each other under the ether pressure applied to the external sides of atomic nucleus.

- An atomic nucleus may be considered as an assembly, composed solely by nucleons - protons and neutrons, combining with each other via boundary layers.

- All quantum-and-mechanical effects and phenomena can be interpreted from the point of view of a real viscous coercible gas mechanics. Electron envelopes of atoms can be interpreted as attached ether vortices, where the spiral motion is directed oppositely to that created by protons in the near-nuclear space. The analogue of multilayer electron envelope is the Taylor multilayer vortex in gas mechanics. Wave function of Schroedinger equation can be interpreted as the ether mass density in attached vortices.

- All known electromagnetic phenomena can be interpreted from the point of view of the ether gas dynamics. Electric field is a set of open vortices of the ether, where the ether rotates around the vortex axis and performs translational movements along the vortex axis from the charge, and on the periphery - to the charge; electric penetrability of the vacuum is the ether density in the stuff-free space; magnetic field is a set of closed vortices of the ether, in which the basic motion is the ether rotation around the vortex axis; the stuff magnetic penetrability is the stuff ability to increase the ether density in tubes of magnetic field, penetrating this stuff. Ether dynamics predicted and experimentally confirmed the following aspects: existence of longitudinal electric field, in which the vector of electric intensity has the same direction as the vector of energy propagation; densification in the space of magnetic field; relations for mutual induction of circuits, substantially differing from those calculated on the basis of Maxwell equations. Models of electromagnetic phenomena along with the use of ether-based notions enabled us to get rid of paradoxes of electrodynamics naturally.

- All optic phenomena can also be interpreted from the point of view of ether dynamics. Photon structure can be represented as a two-row chain of linear spiral vortices, in which the vortices of one row rotate in one direction, and the vortices of another row rotate in the opposite direction. Each vortex is compressed in its central part. Such a structure naturally explains corpuscular - wave dualism.

- Gravitational interaction is the result of thermodiffusion process in the ether, basing on the heat exchange between the stuff mass and the ether, surrounding it; such heat exchange takes place on the ether energy level. Coriolis forces excite the vortex motion of an ether are the reason of occurrence at rotating celestial bodies of a magnetic field.

- A model of stationary dynamical Universe with stable ether circulation has been developed. The use of ether-dynamical concepts allows eliminating fundamental cosmogonic paradoxes.

Ether dynamics demonstrated the efficiency of dynamical approach in the study of natural phenomena, and gave start to dynamical theory of substance.

The basic notions of ether dynamics temporarily ignore several internal details of amer structure and internal forms of substance motion, belonging to deeper levels, than the ether. Amer, according to V.A. Atsukovsky, is a complicated formation, and study of the next levels of substance organization should be left to the future. For this reason, the motion nature of ether elementary particle – amer - remained undisclosed. This also affected the motion nature (dynamics) disclosure of higher levels structural formations of crude substance (protons, atoms, and etc.); their lack of translational motion, their static character also needs further investigation. All these aspects made impossible the drastic change of ideas, related to the atom planetary model with its orbital electrons. Solution of these problems requires further development of dynamical theory of the substance.

1.4. D.Kh. Baziev's fundamentals of united theory of physics [5]

D. Kh. Baziev's work "Fundamentals of united theory of physics" can serve as an example of another approach to problems solving of modern theoretical physics. The theoretical concept introduced by this work, according to its author, totally disagrees with existing theoretical physics, although it entirely bases on already collected experimental materials and observations.

Non-perfect character of gas thermodynamics induced development of the theory. In molecular physics, the notion "ideal gas" dominates, which implies no interaction between gas molecules. The world science has been studying gases since 1652, when R. Boyle discovered relation between gas pressure and volume. But to the present the nature of real gases remains undisclosed and there is no equation, describing true states of the gases. Since the middle of XIX century, statistics became the basic tool in gas thermodynamics. Such an approach substituted the consideration of physical essence of the real molecules interaction for a mathematical game, describing stochastic events. This course led the gases theory up a blind alley, where it remains today.

In compliance with existing concepts, gases have absolutely no structure, and the particles continuum is formed by molecules, arbitrary moving along all directions and chaotically pushing each other. This picture resembles the true interpretation of the gas pressure on the container wall; namely, this pressure value is explained to be based on

the number of molecules, pushing this wall. Still, the following aspect remains absolutely unclear: how one can explain the gas pressure inside the elementary volume for totally unstructured gas.

D.Kh. Baziev found the way out of this situation in the new shape of material formations structure.

The essence of his theory can be conveyed as follows.

Molecules and atoms are oscillators; more specifically, each of them is an assembly of particles, filling up the inner space of a spherical oscillator – a globule, the volume (diameter) of which periodically varies with a certain very high frequency. For this reason, the author called such a structure of substance a hyper-frequency oscillator. The most specific and common property of the structural elements of gases, liquids and solid bodies are their hyper-frequency oscillations. The term "oscillator" represents the common property of stuff particles, irrespective of the stuff aggregative state. Globule is an elementary unit of gas and liquid macro-volume, characterized by the unity of mass, energy and space, as well as electric charges. Gas is formed by the globules continuum and has globular structure with coordinate number $K=12$.

Classic molecular physics bases on the fact, that one can describe the kinetic energy of gas molecules in two ways: mechanical $E=mv^2/2$ and thermo-dynamical $E=3/2kT$. According to the author, the new results have been obtained, giving several evidences of the fact, that kinetic energy of the molecules can be determined via thermo-dynamical way, as $E=kT$, and that $E \neq mv^2/2$.

The oscillator energy can be calculated based on the system of three equations:

$$E_o = PV_{go}$$

$$E_o = kT_o$$

$$E_o = hf_o$$

where h - Planck constant, and f_o – frequency of the oscillator oscillations inside the globule volume V_{go} at temperature T_o .

In globule volume, the oscillator reciprocates with very large linear velocity v_o ; simultaneously, this globule wanders through the volume, occupied by the gas, with the velocity u_o . This was reflected in the oscillator mechanical equation $E_o = mv_o u_o a$, where a - the globule sphericity coefficient.

Considering all above, the oscillator energy equation - the fundamental equation of hyper-frequency mechanics - can be written as follows:

$$E_o = PV_{go} = kT_o = hf_o = mv_o u_o a$$

It results from this equation, that the measure unit of Planck constant is that of the angular momentum. At the same time, the angular momentum is an inherent property of the body motion along a quadric curve, i.e. orbital motion, but orbital motion is absolutely not intrinsic to oscillators under consideration. The author sees the way out in the assumption, that in the interaction between two oscillators, an unknown particle participates, which must be emanated and self-absorbed by the oscillator! It must have a very small mass, electric charge and orbital motion in the field of oscillator body, larger than it. In the process, the Planck constant is the angular momentum of this particle.

Which are the real prerequisites for possible mechanism of interaction between the oscillator pairs? Firstly, why should the said particle be self-absorbed by the oscillator? Because it seems to be a structural part of the oscillator, and the number of such particles in an oscillator is finite. And in case of their irrevocable emanations, at $f=10^{12}$ Hz, already long ago there would not have remained any gases on the Earth. Secondly, what sign is this particle likely to possess? It can be only positive! Because the elementary particle with negative sign - electron - is already known since 1897. An atom can not contain the second negative particle! And thirdly, how many particles can take part in a single act of interaction between the components of each oscillator pair? There should certainly be two of them - one for each oscillator. The frequency-domain interaction between the components of each oscillator pair is based on the fact of their mutual approach up to a certain critical distance; after this distance is attained, these components stop, with complete stagnation of their colliding impulses. Suppression of colliding impulses takes place at the expense of the impulse at the first X-particle emanation. Then, after a moment, the second X-particle is emanated and self-absorbed; its impulse is transferred to both oscillators and they fly away from each other with nominal velocity and impulse.

In order to stop mutually approaching oscillators in the points of their critical approach, the first X-particle must generate an impulse, equal to the amount of the approaching impulses, but having the opposite direction to the vector of both oscillators. The second X-particle, which is emanated in the moment when the oscillators stop, returns to them their previous impulse value together with rotation of their motion vectors. Only this mechanism makes possible continuous, hyper-frequency, alternate/reciprocal motion of an oscillator. Thus, the qualitative side of Planck constant becomes clear - it is the half of the angular momentum of an X-particle, which is a component of an atom. Photons possess constant real velocity, constant angular momentum and two velocity components - orbital and stepping. Besides, a photon possesses constant final mass and constant positive charge; and, finally, one and the same truly elementary particle, called by the author "electrino", acts as a photon in all kinds of emanations and as X-particle in the interaction between oscillators.

Electrino and electron are really elementary particles, which are indivisible, incompressible and ideally spherical. Electrino is a photon, a neutrino, an electric current carrier, and a magnetic field carrier.

Really existing hyper-frequency oscillations of gas molecules and the electro-dynamical model of atom (with its orbital electrons) are incompatible. High compactness of oscillators along with their general electrical neutrality, as well as zero distance between atoms in molecules, corresponds to the frequency-domain motion of gas molecules. All confirms the idea, that both separate nucleon and any atom is an electrostatic system, formed by negative electrons and positive electrinos.

Any atom consists only of neutrons, which are the elementary atoms.

Neutron is formed by negative electrons and positive electrinos and is an electrostatic system.

The share of electrinos, as a neutron component, is 99,83% by mass and 50% by charge.

Proton is not an autonomous particle, but only a positively ionized neutron.

Hyper-frequency mechanics, which replaced outdated quantum mechanics, bases on the oscillators electro-dynamical interaction, because each of them possesses at the same time both positive background field, and local negative fields.

Electric current is the ordered vortex motion of electrinos around a conductor, where the trajectory of each electrino is represented by a spiral line, entering the conductor body or not entering it (in case of superconductivity). The vortex motion of electrinos assembly creates positive field around the conductor; that field is usually called circular magnetic field of a conductor. And stepping movement of this positive field along the conductor is its electric current. One and the same particle - electrino - acts as the elementary material carrier both of magnetic field and electric current; since that moment, according to D.Kh. Baziev, electrodynamics turns right side up, as well as all other branches of classic physics. There are no interactions in the nature, but electrostatic and electro-dynamical ones, because the substance of the Universe consists only of electrons and electrinos. Gravitational interaction can be totally reduced to the electrostatic interaction of non-compensated charges.

The positive field of oscillator propagates into space in a spherical symmetric way and can not be concentrated in one point. This is the oscillator background field, because the oscillator negative field bears discrete and beam-like character and is several times more concentrated, than the positive field, exactly by $k=q\lambda/\vartheta=1,977913*10^6$ folds.

A gas or liquid molecule is not only a hyper-frequency oscillator, but also a hyper-gyroscope. Against the background of surface-isotropic positive field, its negative field continuously rotates, changing the rotation direction at each interaction, and provides high speed of the whole electro-dynamical cycle. Positive background field of oscillators causes their constant pushing away from each other, but the interaction of polar fields develops the force of mutual gravitation. As a whole, the hyper-frequency reversion of sign of interacting fields creates the electrically neutral medium of continuum on the distance, which exceeds the critical one. According to D.Kh. Baziev, the neutron determination as electrically neutral particle, and non-discovery through experiments of electric field of gases molecules of one or another sign, made up to now, has been caused only by the fact, that these bodies are hyper-gyroscopes with the frequency of the field sign reversion, directed in the given point, equal to the circular frequency of rotation. Considering the fact that through any fixed in the space point, flicker electric fields not of one oscillator, but of their continuum, the reason for seemed electrically neutral nature of continuous mediums oscillators becomes clear.

The energy accumulation and production by a local system is proportional to its mass, and the energy exchange volume with the background system is proportional to the local system surface.

Thermo-dynamical system of any real gas is a function of only two variables – the space and the energy, the globule volume and the oscillator frequency. Pressure, being the energy voluminal concentration, is nothing but the energy-to-space relation, i.e. pressure is not an autonomous parameter of thermo-dynamical system and it should be excluded out of the system state arguments. In the matters of thermo-dynamics, we should reject all conditional and vague parameters, inherited from the initial development stage of this branch of science, such as heat, heat transfer, entropy, etc.

D.Kh. Baziev's full mechanics consists of the contact interaction mechanics and the orbital motion mechanics. Contact and remote interactions have several essential differences; for this reason, the motions, caused by them, must be considered separately. The most essential difference lies in the fact, that a contact interaction of a pair of macroscopic bodies always takes place with the obligatory participation of the third body, creating the background gravitational field.

Kinetic energy is the electro-dynamical interaction of two truly elementary particles, electron and electrino, and potential energy is the energy of their electric rest. There is no initial source of kinetic energy in the nature, but the neutron electrostatic energy, and D.Kh. Baziev proposes to call the process, resulting in such energy release, as the phase transition of the highest kind (PTHK).

Under the united theory, there is no chemical element, including rare gases, incapable of phase transition of the highest kind, and the connection energy is the electrostatic energy of electrinos and electrons, composing an atom. Nucleons, forming an atom, are connected with each other by a contact way, i.e. they are all pressed to each other, forming a berry-like structure, and are absolutely immobile with respect to each other. The sole force, keeping them together - is the electrostatic force between the nucleons' polar fields. Any other forces, so called nuclear forces, do not exist and can not exist.

Chemical elements are not the product of the elementary atom condensation; they are part of the final product of the Earth neutron nucleus splitting on the star stage of the Earth evolution. In other words, atoms are micro-pieces of the primary neutron stuff, residuals of the phase transition of the highest kind.

D.Kh. Baziev's concepts, considered above, provide a demonstrative example of necessity for nonordinary thinking at solving any problems, especially those of theoretical physics, on its way out of crisis caused by its long-term motion along "well-trodden track".

Based particularly on mechanical concepts and on the electrostatic nature of connections in the substance, D.Kh. Baziev further developed several concepts of modern theoretical physics.

Still remained undisclosed the nature of translational and rotative (hyper-gyroscope) motions, and the structure of elementary formations of the substance (electron and electrino).

1.5. Conclusions

The study of the theories above shows, that there are two directions in the physics, respectively suggesting two ways for physics upgrading:

- the direction, based on upgrading relativity theory and quantum mechanics through further mathematization of theoretical physics, for instance, G.I. Shipov's general relativity and the theory of physical vacuum [4];
- the direction, based on the return to the principles of classic mechanics, for instance, V.I. Atsukovsky's ether dynamics [3], D.Kh. Baziev's fundamentals of united theory of physics [5].

Both ways need further development of the concepts of inertia fields and forces in real mediums, disclosing the nature of substance formation.

In spite of their polar approaches, those directions base on identical experimental materials, verified several times, and the only difference between them lies in the fact, that some models are recognized by the traditional science, and others are not, so they may basically contain some reasonable ideas - the "grains" of the truth. The task is to skillfully separate these "grains" from "weed" and alien hull, without going into critics, which leads us away from the solution of main problems. In my opinion, the principal points in this process are:

- complying with cause-and-effect relations;
- the important role of the vortex structure in physical processes;
- the necessity of new approach to the substance formation mechanism.

Besides, it is necessary to settle contradictive matters or unsolved problems when approaching to the creation of united physical concepts, namely:

- decide the issue of substance motion nature;
- the structure of substance elementary formations.

CHAPTER 2 MECHANISM OF THE SUBSTANCE SHAPE-FORMING

"The experience shows, that new discoveries are made almost exceptionally via specific mechanical concepts"

L.Boltzmann

2.1. Back to close-range action

In 1687 there was published I. Newton's work "The Principia: Mathematical Principles of Natural Philosophy", where Newton formulated, in terms of mathematics, three laws of mechanics and the law of gravity, which made the basis for the classic mechanics. Newton's mechanics finished rather long and complicated period of philosophic and physical thought development that began in ancient times.

Classic mechanics formed the basis for development of the whole future science, and its conveyance method by means of mathematics turned out to be so much productive, so that further tremendous upgrowth of the natural science can be fairly regarded as the merit of "The Principia ...".

Newton's discovery of the law of gravity *left unsold the central part of the problem: the formula does not reflect the gravity nature and its mechanism*. Although the gravity with its obvious remote-range action *remained a riddle*, the its denied explanation is considered to be the most revolutionary aspect of "The Principia ...".

Still, several naturalists, adhering to the opinion of Greek natural philosophers and mathematicians, and considering that scientific theories should be a direct consequence of clear and obvious principles, make attempts to disclose the gravity mechanism already within 300 years since publication of the "The Principia ...". Newton justly claimed: "The assumption, that a body can affect another body on any distance in the empty space, by means of nothing, thus transferring action and force, is, in my opinion, such a nonsense, inadequate for anybody, capable of sufficient understanding of philosophic matters". In searching ways for the problem solution, Newton assumed the presence of a special medium – the ether, through which the gravity action propagates.

Many scientists tried to find out the causes of gravity over the centuries after Newton. In 1748, M.V.Lomonosov put forward a real hypothesis on the bodies' interaction. According to Lomonosov, the entire Universe is filled with a certain "gravitation-causing substance". It also constantly moves, and the interaction of its particles with the bodies results in effect of the bodies' gravity to each other. In 1782, J.Lesage developed in details the theory of the gravity mechanism, similar to that put forward by Lomonosov. He assumed that the entire Universe is filled with infinite number of very small "world" particles. They move chaotically in all directions with very large velocities and at collisions with bodies convey their impulses to these bodies. The bodies make a *shield* for each other against these particles, and the difference of the impulses conveyed creates the force of these bodies gravity.

Since 1856, there began to appear pulsation-based theories of gravity in Europe. Later on, these theories composed the *pulsation-based "school" of gravity* (Guyau, Bjerknes, Guthrie, Challis, and Barton), which explained gravitation through the pulsations of bodies, placed in incompressible liquid. Ju.N.Ivanov, D.Kh.Baziev and B.V.Gladkov can be regarded as modern representatives of the pulsation-based "school".

In 1853, B.Riemann put forward the third theory of interaction – the *theory of the ether sinks origin*, where it was shown, that the ether flow into large Universe via each particle can produce the gravity effect. This idea obtained K.Pirson's theoretical grounding in 1891.

The "ether sinks" theory found reflection in some modern hypotheses, namely, in the assumption, that elementary particles are certain half-stable vortices, emanating the particles flow in the world space (K.P.Stanyukovich, V.I.Atukovsky, Steven Rado et al.).

In the special and general theory of relativity, mechanical concepts have been absolutely forgotten: it was assumed there that the nature of gravity is conveyed by the idea: *the gravity is identical to the curvature space – time*, and there is nothing to rack one's brains over! McVitty quipped about this situation that here a mystery is explained by a riddle! Appearance of these theories caused the clash of opinions on the space, time, mass, common sense, and several other contradictions, which do not disappear in the course of time. Return to mechanical concepts will enable physics to recover common sense.

Mechanical program of physics development stipulates the causality of any natural phenomenon, caused by the impulses (energy) transfer from point to point by means of collisions of the medium moving particles, irrespective of whether researchers are able or not to have any information on physical properties of this medium in the given time.

The remote action transfer via material medium from point to point with final velocity is called *close-range action*. The notion of the close-range action serves as the origin for the notions of interaction time, interaction velocity and the interaction forces being the function of the interacting bodies' relative velocity [15].

Interaction time is a time interval, required for the total change of potential in the point, connected with the sample body, from the moment the sample body motion began.

Interaction velocity is associated with the characteristics of the medium, transferring the interaction, and depends on the processes, taking place during the interaction (dynamics of the interaction).

An interaction results not simply from the fact that a body emanates waves or particles, or is a shield, but it is due to this fact these properties react with each other in the space between the bodies under consideration, and

afterwards result of this reaction affects the bodies' behavior. Precisely this chain of events determines the properties of the close-range action.

The theory of the close-range action obtained its most comprehensive development in I.Ya.Milovich's work "Theory of dynamic interaction between bodies and fluid" [16], eliminating existing contradictions and disclosing the universal nature of force.

Let us try to paint an integral united picture of the natural phenomena world, based on the mechanical program, founded by Newton, and on the principles of close-range action, developed by I.Ya.Milovich.

2.2. Basic notions and definitions

Basic presuppositions for the proposed physical model of substance existence are, namely:

- presence of cause-and-effect relations between physical bodies and phenomena.
- each structural unit of the substance, being the basis for more crude substance, consists of small particles, which are the structural units of more subtle substance.

Universe is a boundary-free space, filled up with the continuous motion substance. The term 'substance' means a multi-component continuous medium, constantly, i.e. in continuous way, filling up the space, representing an assembly of a large number of various dynamical structures of the stuff with different coagulation degrees, generated as a result of interaction with each other, possessing various physical properties and reflecting the multitude of physical laws and phenomena proceeding in the Universe.

Depending on the correlation between the sizes of the stuff coagulums, filling up the given space domain, and their interaction with each other, one can speak on mediums with various properties. We can distinguish some properties of such mediums, common all physical phenomena.

Under *fluid* we shall understand a continuous medium, consisting of the infinite number of uniformly small particles of final size, each of them having such a small volume, that it can be ignored comparing to all the fluid volume, still sufficiently large to be regarded as homogeneous by structure. Each particle at any moment moves in the space in the uniform and translational way with the velocity, identical in value and vector with that of any other particle; particles move without interaction with each other, i.e. a *fluid* is a homogeneous flow of inert particles.

Particle or *ether* ("always running" - Aristotle) is an elementary structural unit, the assembly of which forms a fluid.

Nucleus or *body* is an assembly of particles, interacting with each other and composing in the space a dynamical structural element – a particle (the ether) of the following higher hierarchical level of the substance.

Obstacle is a medium component (a particle, a body), which characteristics differ from those of the fluid.

Protoparticle or *protoether* is an elementary particle, which multitude forms the fluid particles (the ether). Continuous medium, consisting of the infinite number of protoparticles (protoether) is called *protofluid*.

At obstacle appearing in the fluid as a result of the fluid particles interaction, the fluid particles inertness distortion takes place and the change in the velocity field, and in the field of the fluid particles distribution in the space, i.e. in the field of the elements concentration (in the medium density); that results in the appearance of the *interaction forces fields*.

The appearance of the interaction fields can result in the formation of the substance dynamical structures in the interaction space; these structures comply with the laws of fluid mechanics and can be described using the theory of the bodies and liquids dynamical interaction.

2.3. Scheme of the substance shape-forming mechanism

The general scheme of the processes model taking place during the substance shape-forming is described below.

Appearance of an obstacle in the fluid flow originates the particles SINK field. In proximity to the sink center, on the sink particles interaction with each other, the translational motion of these particles is replaced by their rotational, vortex motion. That is equivalent to the longitudinal motion stop and results in the particles concentration increase in the sink space, accompanied by the formation of dense VORTEX - the dynamical NUCLEUS, formed of coaxial closed vortex flows of fluid particles. The NUCLEUS, consisting of the closed vortex flows of the particles, rotating around their common axis, is the DIPOLE. The interaction of the dipole particles and of external fluid causes the nucleus motion along the dipole axis. The NUCLEUS MOVES in the space in the direction, perpendicular to the mother fluid flow. The interaction of the moving sink particles with the nucleus causes the appearance of the flow consisting of reflected from the nucleus particles, composing the SOURCE, i.e. the particles flow from the nucleus. The interaction of the flows of the sink and source particles with each other results in the formation of the stationary longitudinal WAVES, in which space the fixed position of fluid particles is maintained. These particles move around their average equilibrium positions, which serve as a field "shield", or a shell, preserving the space around the nucleus from its structure distortion. In other words, such a wave prevents the vortex from "straightening up"; sort of "preserves" the vortex in the space, thus maintaining the particles increased concentration (density) in the point of the space.

The totality of all these phenomena determines the conditions for the appearance and existence, as well as the properties of the substance dynamical sink structures.

Thus, the dynamical sink structures enable to implement the united mechanism of the particles coagulation for any level of the substance organization and explain the diversity of their properties.

The characteristic feature of the proposed processes scheme is that these processes are considered from mechanical points of view, for which the compliance with the SUBSTANCE CONSERVATION LAW is typical.

2.4. Fluid-and-mechanical model of the dynamical sink structure

Now let us consider in more detail the formation and functioning principles of the sink structures by the example of the dynamical spherical sink structure.

A sink is the dynamical structure of the substance, absolutely symmetric with respect to a space point - the sink center - and formed by the flow of particles, directed to this point.

Let us assume that before the sink formation there exists a fluid – a homogeneous flow of particles with the radius r_0 , moving with the velocity V_0 ; and the distance between adjacent particles in the flow along all directions equals to L ; consequently, the number of particles, moving via the unit section, perpendicular to the flow, equals to:

$$n_s = 1/L^2 \quad (2.1)$$

Along with the sink formation, the fluid flow structure changes, and absolutely symmetric particles flow appears, directed to the sink center. In this process, the distance between the particles, moving to the sink center along one and the same radial beam remains as it was in the fluid, and equals to L , and the distance between the particles in adjacent beams (L_R) becomes less near the center. At moving nearer to the sink center (Fig.1), beginning from the distance R_0 , the contact between the particles takes place at $L_0 = 2r_0$ and, because of the sink symmetry, as a result of interaction of the particles in the spherical section with the radius R_0 , the formation of densely packed spherical nucleus takes place, the latter consisting of the concentric circulations of fluid particles around the dipole axis. Let us call the distance R_0 the nucleus radius.

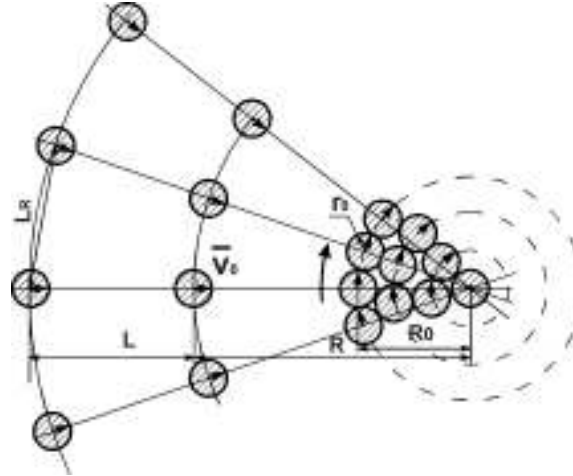


Fig.1. The scheme of the sink structure nucleus formation.

The fluid particles circulation around the axis of the rotating nucleus is caused by the collision of these particles with the sink flow particles moving in radial directions, i.e. the CENTRIPETAL FORCE is nothing else but the DRAG of the sink particles flow. The matter is that due to the sink properties, this force is identical by value at equal distances from the sink center and is always directed to the sink center, and, as it is known from the elementary physics, such conditions cause the particles uniform motion along circumference, i.e. the particles circulation.

The circulation particles flow is perpendicular to the sink particles flow; for this reason, the circulation particles flow drag is the force, perpendicular to the sink flow, and, by the physical sense, the force perpendicular to the sink flow, is nothing else, but the drag with the circulation generated by it. This is the manifestation of the united nature of the forces, perpendicular to a flow - the bearing capacity, the Coriolis force, the Lorentz force, and etc.

As a consequence of the substance conservation law, the number of flowing particles in any spherical section (S) of the sink on the distance R from the sink center is, at any moment, a constant value:

$$n_s S = const \quad (2.2)$$

Thus, the distance between the particles in adjacent beams L_R on the distance R from the sink center equals to:

$$L_R = 2r_0 R / R_0 \quad (2.3)$$

The number of particles in the unit section on the distance R from the sink center equals to:

$$n_s = R_0^2 / ((2r_0)^2 R^2) \quad (2.4)$$

At moving away from the sink center, on a certain distance from it, the distances between adjacent particles in a beam and between the beams become identical and equal to the distance between the particles in the fluid prior to the sink structure formation ($L_R = L$); let us call this distance the *sink influence radius* - R_{inf} :

$$R_{inf} = L R_0 / 2r_0 \quad (2.5)$$

With the formation of the dynamical sink structure nucleus, we come to the process of the fluid moving around the nucleus. Such movement, stipulated by the non-penetrability of the space occupied by the nucleus, causes change of particles motion, composing the fluid counter-flow. The body surface, perpendicular to the counter-flow (frontal), tends to *throw back* the fluid particles, belonging to the counter-flow. The other part of the body surface (back), on the contrary, *attracts* these particles [16]. I.e., from the nucleus frontal side there is the fluid particles flow directed to the nucleus and reflected from it, and from the back side – the fluid flow, attracted by the nucleus and moving away after the collision, however, consideration of the whole process of the flow moving around the nucleus, shows that it can be treated as a spherical sink of the fluid particles towards the nucleus and a spherical source - the flow of the fluid particles reflected from the nucleus.

After the collision with the nucleus, a sink particle is reflected and it moves towards the sink particle following it; after the collision with each other, these particles fly away from each other, changing the velocity vector on the opposite one. Now the second particle, reflected from the first one, after the collision with the particle, following it in the sink, is reflected by it, moving towards nucleus, and so on. The process repeats. As a result, a medium disturbance appears in the fluid space around the dynamical sink structure nucleus. In this disturbance, the fluid particles move around their middle equilibrium states, i.e. their *wave* motion takes place. That means that the longitudinal *stationary spherical wave* appears.

Thus, the presence of the longitudinal stationary spherical wave, resulting from radial flow interaction of approaching and reflected sink particles with each other, is an integral part of the substance dynamical sink structure.

The wave propagation velocity for the dynamical sink structure *equals to the motion velocity of the fluid particles*, composing this wave, and the *wave length* equals to the half of the distance between adjacent particles in the fluid flow:

$$\lambda = L/2 \quad (2.6)$$

We have considered the matter of the waves' formation at the interaction of the sink field with the source field, i.e. at the interaction of the approaching and reflected flows. Waves can also appear at the interaction of the sink field with the vortex field, and of the circulation flows around nucleus between each other; in this case, longitudinal waves appear, with their superposition on each other and on the other fields and so on. For this reason, various types of waves exist around the nucleus.

As we know from mechanics, the value of velocity for two identical moving particles after their interaction (collision) does not change, i.e. the particles energy after their interaction remains unchanged; the situation complies with the law of the linear momentum conservation. On the other hand, only fluid particles, i.e. identical particles, take part in the sink formation. For this reason, the feature of the dynamical sink structures under consideration lies in the compliance not only with the *substance conservation law*, but also with the energy conservation law.

2.5. Nucleus composition of the spherical dynamical sink structure

Considering the provisions above, how does the nucleus composition of the spherical dynamical sink structure look like?

Laws of mechanics and simple geometrical considerations will help us to build a nucleus model and make clear its structure.

The sink center is occupied by a single fluid particle – a sphere. Six densely packed particles (spheres) are placed around it in the equatorial plane; these particles move around the central axial particle, thus forming a closed ring – *circulation stream*. From above and below of the central axial particle, over its poles, symmetrically with respect to the equatorial plane, in the concaves between the spheres of the equatorial *plane layer*, three particles are placed. These particles move around the axis transversely to the equatorial plane, which contains the central axial particle, also forming closed rings – circulation streams (Fig.2a). Thus, the central axial particle is surrounded from all sides by the fluid particles. The velocity vector of the central particle is directed transversely to the equatorial plane along the nucleus axis. So, the first ($n=1$) *spherical layer* is formed around the central particle; the particles of this *layer* are placed in the three *plane layers* – in the equatorial one and the two symmetrical to it, placed above and below the equatorial layer and containing, respectively, 3, 6, and 3 particles, top-down, each of which generates one ($n=1$) circulation stream in each plane layer. The total number of particles in nucleus $N_{nucl}=13$.

The second spherical layer ($n=2$) around the central particle, and every following spherical layer are formed by the addition of a new circulation stream, coaxial to the existing ones, accompanied by the formation of a new plane layer out of alternate thrice-repeated (3^x) or six-times-repeated (6^x) circulation streams of the symmetrical equatorial plane (Fig.2b). With the appearance of each new six-times-repeated layer on the nucleus axis, the velocity vector of the new axial particle is added, which, as for the central particle, is directed along the nucleus axis.

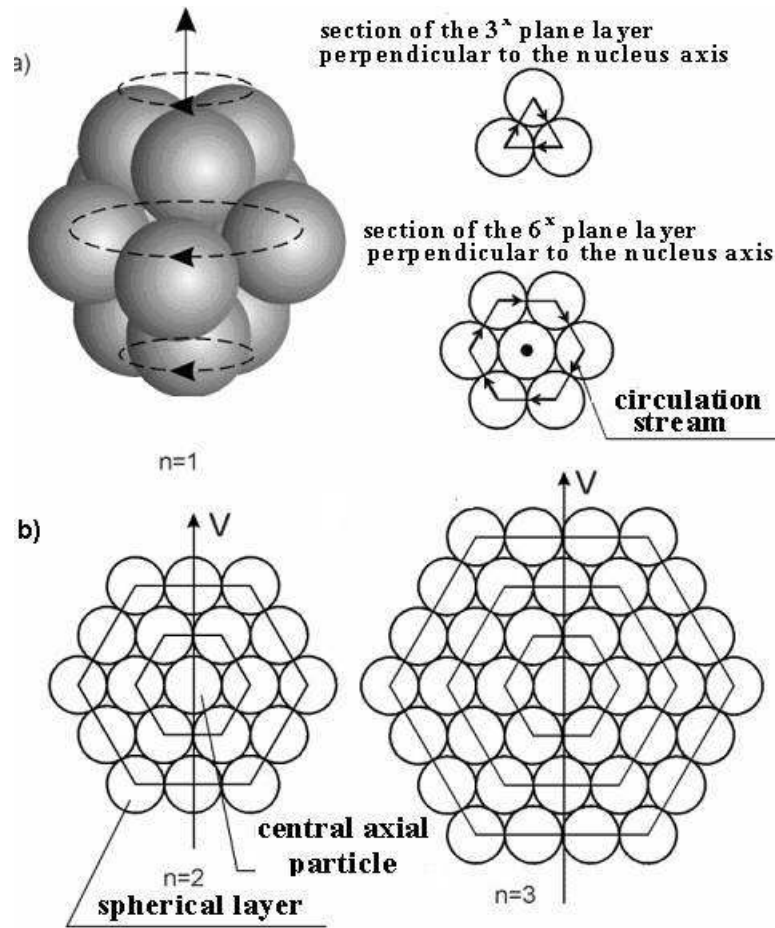


Fig.2. Scheme of the nucleus composition of the spherical dynamical sink structure

In the nucleus at $R_0 \gg r_0$, the number of spherical layers n around the central particle approximately equals to:

$$n \approx R_0/2r_0 \quad (2.7)$$

And the number of particles, placed on the nucleus axis N_0 , approximately equals to:

$$N_0 \approx n \quad (2.8)$$

Thus, a nucleus consists of densely packed spheres - the fluid particles, which generate symmetric (with respect to the equatorial layer) alternate plane layers of the particles of the six-times-repeated and thrice-repeated circulation streams, moving around the nucleus axis with the velocity, equal to the velocity of the fluid particles motion, and the axial particles with vector velocity directed along the nucleus axis. As is known, the linear momentum, considered as a vector, is conserved at any interaction in any closed system, unaffected by outer resulting force. This rule, formulated by Newton, is true for any interactions, including gravitational, electromagnetic, nuclear, and weak. For this reason, the nucleus linear momentum equals to the amount of the linear momentums of fluid particles composing the nucleus:

$$\sum_{n=1}^{n=N_{nucl}} (m_0 \cdot \vec{V}_0) = M_{nucl} \cdot \vec{V}_{nucl} \quad (2.9)$$

where m_0 is the fluid particle mass;

$$M_{nucl} \text{ is the nucleus mass, } M_{nucl} = m_0 N_{nucl} \quad (2.10)$$

\vec{V}_0 is the velocity vector for the fluid particles, composing nucleus;

\vec{V}_{nucl} is the nucleus velocity vector.

Since the velocity vectors of particles, composing the nucleus circulation streams, form *closed* broken vector lines, their vector sum equals to zero. *Only the particles, placed on the nucleus rotation axis (N_0 -particles)* determine the *nucleus motion velocity*, because they have identical velocity vectors, directed along the nucleus rotation axis, and their vector sum equals to $N_0 \vec{V}_0$. For this reason, the equation (2.9) after transformations looks as follows:

$$m_0 \cdot N_0 \cdot \vec{V}_0 = m_0 \cdot N_{nucl} \cdot \vec{V}_{nucl} \quad (2.11)$$

And the relation of the nucleus motion velocity to the velocity of the fluid particles, composing it, equals to:

$$\vec{V}_{nucl} / \vec{V}_0 = N_0 / N_{nucl} \quad (2.12)$$

As a consequence, the nucleus of the dynamical sink structure, formed out of the fluid particles circulating around the nucleus axis, moves in the translational way along such axis with the velocity, proportional to the number of the fluid particles, placed on the nucleus axis, and inversely proportional to the total amount of the particles, composing the nucleus (2.12). It means, that the *sink structure nucleus velocity can not be more, than the velocity of the particles, composing it* ($V_{nucl} < V_0$).

All the nucleus particles, except those placed on its axis, rotate around it, i.e. form circulation streams; thus, we can assume that a *nucleus rotates - it has spin*.

Purely mechanical model of the nucleus composition of the dynamical sink structure considered above enables us to visualize the nature of nucleus and the physical sense of the substance motion, as well as the principal *connection of the motion velocity value with the substance shape-forming structure, i.e. with the form*, thus slightly disclosing the nature of inertia forces and the substance perpetual motion.

2.6. Conclusions

1. The properties of the spherical dynamical sink structure nucleus model considered above correspond to the general knowledge on the substance properties.
2. The analyzed model reflects the universal principles of the material structures formation, along with their field and force manifestations in terms of mechanical concepts.
3. The physical sense of the motion, as the principal property of the substance form, obtained its visual interpretation. The velocity of a substance structural unit can not be higher than that of the subtle substance particles, composing it.

STUFF STRUCTURE IN TERMS OF SUBSTANCE FORMATION UNIFIED MECHANISM

"To research means to see what is seen by everybody, and to think in a way as nobody has thought"

A. Szent-Gyorgyi

3.1. Interaction forces nature of substance structural formations

Following the construction of the purely mechanical model of nucleus structure, let us consider its properties in dynamics, in order to understand the physics of similar dynamical structures behavior in the space and their interaction with other structures.

According to I.Ya.Milovich, the nature of forces for hydro-dynamical models is as follows:

A certain force and a linear momentum can be produced only by a system of two sources, or two vortices with opposite signs or opposite rotation directions, the so called force pairs, force tubes, or closed vortices.

Dipole, or a force tube of infinitely small length, is a force, able to interact with liquid surrounding it, or, being free, it *must move* in a liquid medium along the dipole axis.

It becomes clear now, why it is not possible to consider the substance separately from a MEDIUM, which generated it (surrounds it); they really compose the ORGANIC WHOLE, proven by the perpetual motion of the substance.

The dipole flow pressure force equals to the product of the liquid density by the flow cross-sectional area and by the square of flow velocity, or the liquid mass per second by its velocity, i.e. by the linear momentum of the flowing liquid mass.

A nucleus, as we have already found out, consists of closed vortices (the particles circulation rings) and is a dipole. This means, that the theory of dynamical interaction of bodies and liquid can be used to describe the interactions of the substance dynamical structural formations.

Let us specify now the motion direction, i.e. the dynamical sink structure orientation with respect to the external flow. At a vortex formation, its rotation axis is perpendicular to the liquid flow; that means that the sink structures in the external flow will orient their rotation axes (dipoles) transversely to the external flow.

This property is interesting from the philosophic point of view – a particle (a nucleus), being generated by a common flow, starts its motion not in the common direction, but transversely to it, i.e. the expansion of the space, occupied by a flow, the Universe exploration, has been designed by the nature. If we consider the generated nucleus as the basis for new hierarchical level of the substance (the cruder one), we can assume that *various hierarchical levels of the substance are mutually perpendicular to each other*.

According to I.Ya.Milovich [16]: “The theory of a dipole as the energy center, acting with a certain force on the boundary-free liquid mass, surrounding it, turned out to be so complicated for comprehension that even persons rather competent in hydrodynamics, manifested great lack of confidence towards it”.

However, the validity of these concepts can be proven by liquid mechanics [17]: “Existence of two or more adjacent vortex streams will cause relative motion of each vortex stream in relation with the velocity fields of other streams”.

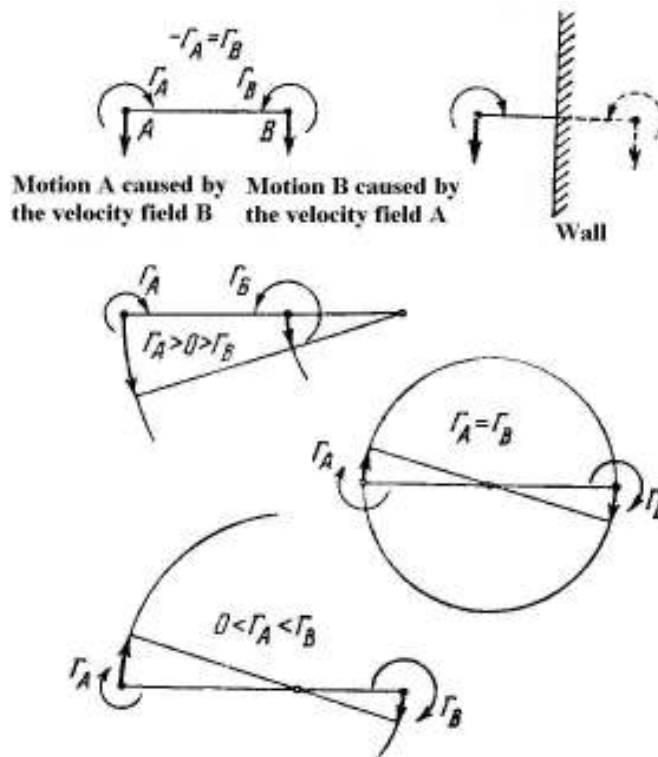


Fig.3. Adjacent vortices interaction [17].

Two vortices, equal in tension and having opposite rotation directions, will shift each other in the direction, normal to their axis plane, as shown in the Fig.3. The motion velocity depends on the tension and the space, occupied by the streams. On the other hand, if vortices are not identical in tension, they will move with various velocities along concentric circumferences with various radiuses. If two streams are equal in length and have identical rotation directions, then they will both move along one and the same circumference; if they are unequal in tension, they will move along concentric circumferences with various radiuses on opposite sides of their common center. If a sole stream exists in proximity to the plane boundary, parallel to the stream axis, it will move parallel to the boundary, as it were involved by an imaginary vortex (its “mirror reflection” on the other side of the wall). A vortex ring (similar to already known smoke ring) moves via the space influenced by its own velocity field, and the motion direction is normal to the rings plane. It is clear that the presence of several vortices with various tensions in a moving liquid will generate a rather complicated velocity field in the liquid mass”.

Now only one aspect remains not understood, in particular, why the particles gravitate to each other, forming ring vortices?

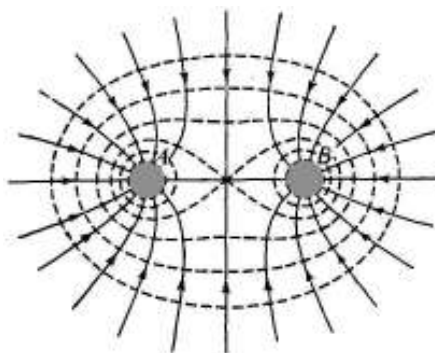


Fig.4. Two sinks interaction scheme.

Let us consider two sink structures (Fig.4.), located on some distance from each other. *Their particles begin to gravitate to each other due to the spherical symmetry distortion of the sink flow, directed to the structures nucleuses, this distortion being caused by surfaces, adjacent to each other* (internal) – here the sink flow is smaller, than on the external sides. These excessive impulses of the sink particles striking the nucleuses cause mutual approach of the nucleuses. Let us call this kind of the *dynamical structures gravitation* and the forces, appearing in this process, the *sink* ones. Two particles approaching each other make an obstacle to external flow of the fluid; that means, that a vortex source appears, and the pair starts to rotate, forming a vortex ring – dipole, maintaining autonomous motion of new structure.

If it is remembered that all the bodies of micro- and macro- world, from elementary particles up to stars, are basically sink structures, the *gravitation sink forces* make the universal mechanism of the gravitation between them. Paradoxically as it is, the mechanism of *gravitation forces*, *molecular forces*, and *the quantum interaction forces* is identical! And one sentence was sufficient to describe it!

All these features arise our admiration with respect to the dynamical vortex sink structures due to their perfect harmonic self-organization in a medium. In addition to self-creation of their shape, they move it and combine with other shapes!

3.2. Charges nature of the substance structures

The cornerstone of generally accepted atom model is the mechanism of the nucleus components forces interaction, its cohesion forces. In particular, the nucleus charge-based nature has been involved for their description by analogy with electric charges force interactions. On this basis, the nucleus-composing charged particles – electron and proton - and later, neutron, were introduced into practice. However, as is obvious, the nucleus model for the dynamical sink structure enables to solve these and several other problems without involving charge-based concepts.

Let us try now to find common principles for describing the whole variety of known substance forms – atoms of chemical elements, molecules, planets and so on, using the characteristic features of the dynamical sink structures.

If we consider the nucleus model of dynamical sink structure as the basic element of substance formation, then an *atom can be treated as being formed from the particles of one and the same kind* – the particles of surrounding fluid, from which a nucleus is formed and such process has the stage nature.

In the early stage the process of “mother” sink structure nucleus formation takes place, which results in the substance coagulation, contraction, sink, or its suction into one point of space. This stage finishes when the nucleus size and the number of particles composing it attain the values, determined by the fluid characteristics, already discussed in (2.3.).

Then, the second stage – restructuring of the nucleus - begins; let us call this process ‘crystallization’. As a result of crystallization, the substance, accumulated through the sink, gradually starts to separate (of one global ‘mother’ form – a sink structure) into smaller forms with new structural formations conserving the sink structure nature, maintained only by local field of the nucleus fluid particles. This disintegration process continues until the particles, composing the initial ‘mother’ fluid, appear; for the Earth it is proton (hydrogen). Chemical elements are sink structures, consisting of elementary nuclei of sink structures and fluid particles, differing from each other only by their genesis. Such structure’s sink is formed from the sum of sinks of the particles composing it, and the mother fluid particles, maintaining their local fields.

Based on the properties and principles of the sink structure formation, one can easily imagine the structure of all basic chemical elements, in coordination with their physical and chemical properties.

In order to simplify and visualize the derivation rules of chemical elements formation, let us start their consideration from the beginning of the periodical table, and not from its end, according to the order in which they are formed at the mother nucleus disintegration.

The first element, forming the Earth mother nucleus and the last one at its total disintegration is a fluid particle – proton (hydrogen). We shall preserve this name, *depriving it of the charge nuance*, when it is a fluid particle, i.e. when it *moves in the common flow, in one and the same direction with other particles*. Nevertheless, this fact enables us to demonstrate visually the nature of the *charge*, making this aspect absolutely clear; the matter is, that in real life we are so much used to charges!

The difficulty in the understanding of the notion ‘charge’ is caused by the fact, that the *nature of charge has never been considered*. There has been taken as the charge criteria ‘sympathy’ – ‘antipathy’, gravitation – repulsion of two objects (bodies, particles, atoms and etc.), that is to say that there have been established the comparison relations between the objects.

Can exist there any differences between sink structures, if they are all similar?

Yes! Of course! It is the velocity vector, i.e. the sink structure axis orientation – the orientation of dipole (its circulation (vortex rings), the dipole being the dynamical sink structure nucleus, its axial polar flow of subtle substance – proto-ether, on one pole of which this flow enters – the sink (suction) into the dipole, and on another pole the flow goes out – the source (ejection). Namely, the sink structure is a pump for the subtle substance (proto-ether), pumping it via the poles (Fig.5). Any pump can act either as an engine, for instance, a jet one, or as a pump providing the pressure difference in the flow, depending on the conditions of interaction with the environment. Thus, providing there are no obstacles to the pumped fluid flow, it acts as an engine and maintains its own motion, being a sink structure. When an obstacle to the flow appears, or the dipole itself (pump) stops in the space, its flow transforms into a force field, interacting either with the obstacle, or with the environment. Depending on the dipole poles orientation, such a fixed dynamical structure will either gravitate (absorb) the particles of the external fluid or of the other sink structures flow, or repulse them.

Accordingly, what is known in physics as electric interaction forces, is nothing else, but the interaction of the sink-source flows of fluid particles (proto-fluid), or the dipole polar flows, which direction is determined by the charge type (decreased hydro-dynamical pressure (vacuum) – suction, or increased - pouring out), and the electric charge value represents these flows consumption value.

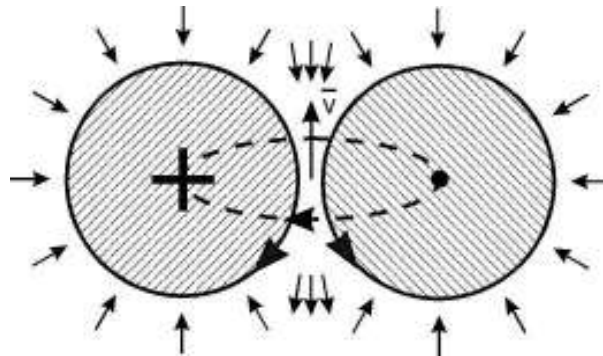


Fig.5. Scheme of the circulation ring (dipole).

The substance sink structure, with the nucleus as its mechanical manifestation, brings out clearly, that a nucleus can not be considered only as a particle of dense substance. Existence of a sink structure, as the substance shape-forming *unit*, is connected with manifestation, in a structural material formation - nucleus (body), of the so called field forms of this structure, of at least two levels - *radial flows (ether sink) of the particles of cruder substance*, forming the sink structure nucleus itself, and *proto-ether flows*, surrounding the said flows. These *proto-ether* flows are spherical *radial (sink) flows* and *axial polar (beam-like) flow* (generated by the particles, located on the sink structure nucleus axis); these flows are formed from smaller *particles* of subtle substance, of which the particles (ether) - nucleus components - are formed (Fig.6). As to the planetary macro-level: the Earth is a nucleus; the next level is made of gravitational (protons sink (ether)) and electromagnetic (heat) fields – electrons (proto-ether). For the next, lower substance level (microcosm), these are, respectively, electromagnetic (heat) and proto-electronic fields, consisting, respectively, of the particles of protons and electrons, and electrons – proto-electrons (let us call them in this way, assuming, that they are the particles composing electron) - they are the manifestations of ‘bio-fields’, ‘torsion fields’, and etc.

This unity may conceal the esoteric sense of triunity – the Trinity (Quarterner) – the *Father* (fluid (ether)), the *Son* (nucleus) and the *Holy Spirit* (proto-fluid (proto-ether)).

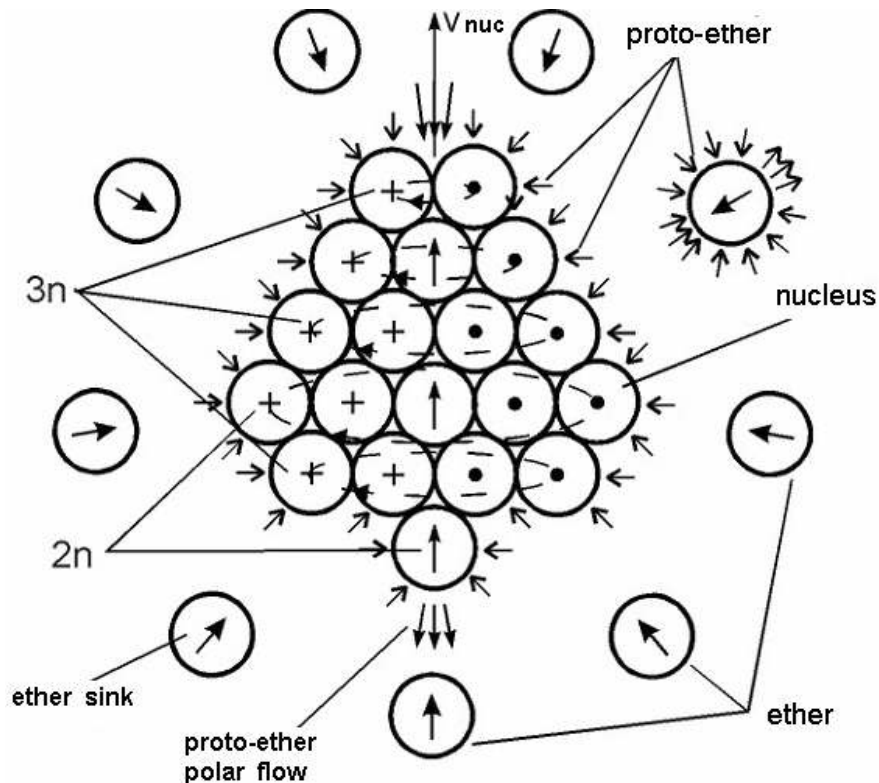


Fig.6. Scheme of the nucleus field structure.

The delusions related to this triunity of the substance, as well as the attempt to consider the substance separately, in isolation from its subtle shape-forming manifestations, led modern physics to the situation, when, first, the material nature of heat has been rejected, then electromagnetism has been separated rejecting the ether, and all this has been fixed by the Second Law of Thermodynamics, which forbids to think on the nature of things.

3.3. The structure of the stuff chemical elements

Let us now return to the models construction of the chemical elements.

Using Fig.3, one can easily imagine what will happen with two sink structures, which are both identical elementary vortex streams – they will form a closed vortex, and move along one and the same circumference on opposite sides from the common center, i.e. these two structures, subject to *sink forces*, will be localized in the space by way of a new *dynamical ring vortex structure*, moving in the normal to the ring plane direction.

If a proton is an elementary structure participating in this process, then the atom of hydrogen, 2 particles, will be the ring vortex structure, formed from such a pair (Fig.7).

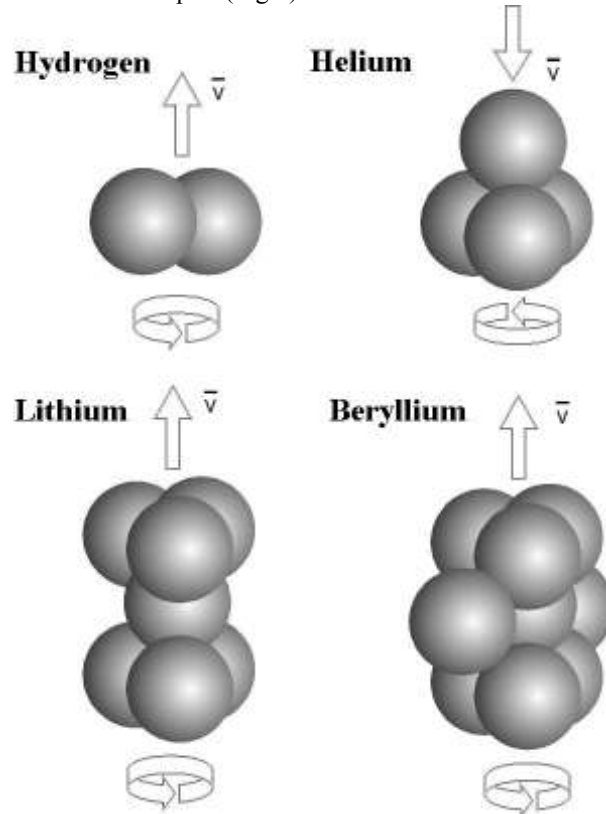


Fig.7. Scheme of the structure of chemical elements hydrogen, helium, lithium, and beryllium.

As we can see, together with spherical sink structures, there appears a new class of shape-forming structures – the *ring vortex structures*. Their stable existence is conditioned by the equilibrium of orbital structures composing them, i.e. only $2n$ or $3n$ structures (particles) ($n=1,2,3\dots$ whole number) may exist near a stable ring vortex structure (with the empty center). It means that the next ring vortex structure may consist of 3 particles. However such structure already possesses more distinct dipole properties, i.e. intense axial flows ('pump' consumption), to the suction pole of which (normally to the ring surface) another proton can be easily attracted (sucked), with the axis perpendicular to the ring surface, thus increasing the axial flow consumption and, consequently, the velocity of the formed dynamical structure and the cohesion force with the value and nature, different from the cohesion force of ring vortex structures. The force of such connection is determined by the force of the dipole appeared, because a single sink structure and a ring vortex structure are combined via their opposite polar poles – the source with the sink, thus forming a new dipole. Let us call this type of connection the *polar* one. The dipoles flow dissipation, participating in this combination, is minimal; for this reason, such *polar connection is the strongest* one. The particles moving in the atom vortex rings are connected with each other via polar connections.

The dynamical structure, formed by the polar connection of one proton to the vortex ring structure of three particles, is the atom of helium, consisting of 4 particles.

The addition of another three particles ring on the opposite side of the helium atom axial particle symmetrically to the first ring of three particles will generate the structure of lithium atom, consisting of 7 particles.

Later on, a new vortex ring with maximal number of particles equal to six may form around the axial particle. (It should be mentioned, that the cohesion force of the particles in ring vortex structures becomes less as the ring diameter increases). As we have already mentioned above, these can be two particles located opposite to each other - the atom of beryllium (9 particles). Then another two particles - the atom of boron (11 particles). There are missing two particles for the complete packing of the first six-times-repeated ring.

The atom of carbon (12 particles) differs from that of boron by the presence of a single axial particle, located in the concave of one of thrice-repeated rings, similar to that of the atom of helium, which forms a basis for the next six-times-repeated ring. The structure of one carbon isotope consists of 13 particles – the single axial particle is absent, but the first six-times-repeated ring is totally filled up – the highest dense packing, similar to that of the diamond structure.

The atom of nitrogen (14 particles) has the carbon atom structure, but only two earlier unfilled places in the first six-times-repeated ring are filled up with particles.

Then atoms formation takes place through external (the second thrice-repeated) ring, coaxial to the ring of three particles on the basis of carbon isotope of 13 particles, by means of 3 particles addition; thus we obtain the atom of oxygen (16); and adding 3 particles more, we obtain the atom of fluorine (19). The period is completed by addition to the fluorine structure of a single axial particle, similar to that of helium and nitrogen; thus, the atom of neon is obtained (20 particles). The period beginning repeats by adding to this single structure three particles ring, similar to that of lithium atom, and the atom of sodium is formed (23 particles) and so on – metals are formed by the addition of two particles to six-times-repeated rings, and non-metals – by the addition of three particles to thrice-repeated rings (triad).

Let us stop further dwelling upon the matter and considering the whole table of elements, this task is for the other researches. We would rather try to generalize and formulate general principles determined.

1. The atoms of chemical elements are the products of the mother nucleus disintegration, the nucleus debris and crystals. This explains, putting it mildly, not very strict appearance of the periodic system of elements as to the high serial numbers. We have considered the structures of atoms of chemical elements from the beginning of the periodic table only for better understanding and visualization.

The atom of hydrogen (proton) is the first and unique element of our planet, the Earth; all the others are nothing but the derivatives of its structure, the disintegration products, and the products of mother nucleus restructuring.

2. The vortex nature of the sink structures nucleuses causes their hydro-dynamical cohesion and makes the basis both the centripetal gravitation field of the particles composing stable ring vortex structures – sink forces, and the axial gravitation of dynamical structures – polar forces.

3. *Sink and polar forces* form the basis for various types of connections between the substance dynamical structures.

4. The dipole nature of dynamical vortex structures of all kinds causes their motion.

5. The principles considered in terms of chemical elements formation, can be applied to the substance structural levels, both to the lower ones – specifying the sink structure nucleus construction, and the higher ones – molecules, macro-formations, planets and so on, because they are also based on the substance dynamical structural formations.

3.4. Evolution of the sink structure nucleus by the example of the Earth

Now, when there are disclosed the basic formation principles for the dynamical structure of the substance, its chemical elements, its molecules and so on, we can return to the structure of our planet, the Earth, that has not been considered by us earlier due to methodological aspects.

And how does its evolution proceed - the structuring, division of the whole nucleus?

When examining the environment, we immediately notice that the division process is a constant process in the living nature. Fertilized ovule is subject to several division processes, rapidly changing each other; this is called cell-division. The ovule begins its division in longitudinal direction; in the end of the process it is divided into two cells of identical size, the so called blastomeres. Then each of the blastomeres divides also in longitudinal direction forming 4 cells. The next, the third division takes place in transversal direction, and, as a result, 8 identical cells are formed. Further, more longitudinal and transversal divisions follow each other; resulting in the formation of 16, 32, 64, 128 and more cells. These divisions follow each other quickly and blastomeres do not grow, *their size becomes less as the number of cells increases*.

This division process may be also about the same demonstrative for the sink structure nucleus of the Earth; the principal specific feature of the sink structures, immediately coming to mind, is the rotation of appearing 'blastomeres'. After the first division, a ring vortex pair appears around the nucleus axis (as with hydrogen); after their division, four 'blastomeres' are formed - a stable vortex structure in which they combine – a ring vortex structure of three particles and one particle on the axis (as with the atom of helium); at that the axis orientation of the newly formed nucleus, as well as its axial and tangential velocities, undergo changes due to the 'blastomeres' size decrease. As a result of the next division a structure of eight particles is formed, similar to that of lithium isotope. A new structure formation also takes place at each division, accompanied by *changes of the nucleus axis orientation and of the nucleus axial and tangential velocities*, similar to the formation of atoms of chemical elements. In the course of division one of the 'blastomeres' may be torn off the whole structure forming a satellite (for instance, the Moon).

During the nucleus division, its active surface growth occurs - the total surface area of appearing particles increases, as compared to the initial nucleus surface. On these surfaces, the processes of division and crystallization on micro-level take place, resulting in the crust layer formation, differing from the 'blastomeres' by its structure and properties. Thus, the traditional concepts on the Earth structure as the melted nucleus, the mantle layer, and the crust, can be improved by means of detailed elaboration of the nucleus structure, and disclosure of its dynamics. If

our suggestion on the Earth nucleus structure is true, then on what division stage it is and how this assumption can be confirmed?

We can find the relevant answers in the studies of the energy-force framework of the Earth [18], with its global and smaller energy grids. The researchers, developing this peculiar direction in geomorphology, believe, that the Earth is a specific crystalline formation, having facets, and nodes and connecting them geo-energetic lines; in other words, this formation has energetic-and-field nature, represented by the lines of force, planes and energetic nodes with polarized emanations.

The Earth crystalline structure is known for a long time; as indicated by ancient sources and archeological digs. There have been found some articles, representing the structural-crystalline model of the Earth in the form of icosahedron - dodecahedron, i.e. a body, consisting of 12 regular pentagons and 20 triangles (Fig.8). Investigations showed that the centers of world religions and cultures, the places with unique fauna and flora, and the largest deposits of mineral products are located in the nodes of this gigantic framework. The points where the basic figures of the framework intersect coincide with ocean mountain ridges, planetary fractures, and zones of active upraise and foundering of the Earth's crust. The centers of all world geomagnetic anomalies, minimal and maximal atmosphere pressure, are located in the vertices of the polyhedrons.

Judging from the researches of the global grid, disclosing the largest structures of the Earth framework, the nucleus has already divided into more than 60 global forms.

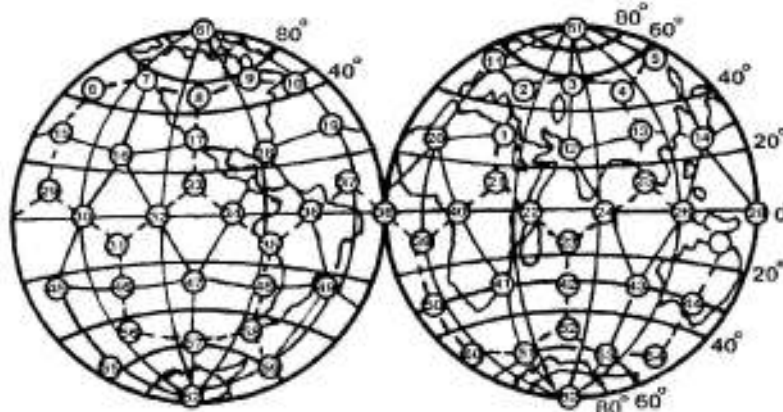


Fig.8. Icosahedron-dodecahedron force framework of the Earth [18].

These forms, in their turn, may divide forming smaller structures, which energy-force manifestation is reflected in the form of the grids of Hartmann, Curry, Wittmann and others.

More sorrowful for the mankind events serve as the evidences of our planet's internal structure and evolution. They are, namely: the shift of Earth's poles, which, as we know, is accompanied by each new stage of any material form structuring, including the Earth; its structure division, accompanied by global changes on Earth's surface, and the cataclysms, caused by the said above.

Another confirmation thereof is the discovery made by I.V.Kolesnikov's (ZhRFO, 1993, #1-6), which is indicative of the falsity of existing world academic science concepts on the stable character of nutational oscillations of Earth's rotation axis. He has proved that these nutational oscillations are not of constant value, as the world science considers them until then, but they develop according to divergent oscillation process. Kolesnikov's discovery of the nutation angle quantification makes the hypothesis on the Earth's poles turning an objective law, promising disastrous effects for all the living substance on the Earth's surface. According to the data of super-deep drilling of Greenland ice sheet, the geochemical analysis of marine sediments, the motion dynamics of glaciers (Lenton and Brocker), Kolesnikov has made the decisive conclusion that every 12 thousand years the Earth varies the nutation angle stepwise, within the range from 21,5 up to 24,5 degrees. For the last time the existing nutation angle (23,5 degrees) was fixed 12 thousand years ago. Now it must, as calculated, vary by one or even two degrees stepwise, thus making 22,5 or 21,5 degrees.

Thus, at present, according to I.V. Kolesnikov, the Earth is in the pre-overflow state: it is ready, at any moment, to release itself from redundant energy, violating the stability of its motion around the Sun. This step will manifest itself in the form of a global earthquake, with the force of about 10 scores, by Richter scale (for middle latitudes), with the global appearance of ocean tsunami waves several hundred meters high, as well as others, nothing less disastrous, phenomena. Practically all the planet population, except for some regions, faces imminent annihilation. These things are verities.

The Earth is a complicated dynamical structure with the properties which we only begin to perceive.

3.5. Long live the VORTICES! (For the conclusion)

It is customary for us to criticize for the crisis in the fundamental physics mainly the relativistic theory, the quantum mechanics and so on, thus forgetting the mechanics – the liquid (fluid) mechanics.

Alas! The roots of the crisis can also be found there! It was the mechanics that first gained no understanding of interaction forces nature and since the middle of XIX century took a great interest in pure mathematics to the prejudice of physic phenomena.

I. Ya. Milovich wrote [16]:

“Up to now, the real nature of the force, which we manipulate, has not been studied by our science in full; for this reason, we still can neither completely find out the connection between it and other natural forces, known to us, nor predict its effect under the conditions we have not examined.

In order to clarify the matters on the nature of the liquid medium resistance force with respect to the solid bodies' motion in it, it is necessary to know the physical basis of this phenomenon. Such a purely physical basis was put forward for the first time by Newton in 1686; he assumed, that the liquid medium resistance force is the result of the liquid particles inertia, the liquid moving towards the body, streamlined by it; as a consequence, this force value must be measured by the linear momentum of the mass of liquid, moving towards the body.

Newton went further and assumed the liquid medium material particles, moving towards the streamlined body, to be similar to the inelastic impacts of these particles against the said body. Based on this, he has developed the ‘impact theory’ of the resistance force. But his attempt to find the value of such force had failed, because his resistance force turned out to be half as much as the actual force, determined nowadays purely experimentally. Since then, during the period of substantiation and development of the hydrodynamics, all the attempts of several first-class mathematicians and hydro-mechanic engineers to find the interaction force between the body and the liquid, moving towards it, produced no positive result.

Failure of the ‘impact theory’ of the bodies resistance and further development of experimental researches arose the critics of some Newton's ideas and their replacement by the opinions, under with which the liquid medium resistance is stipulated by the body surface friction against the liquid, moving towards it.

So gradually the ‘friction theory’ of the liquid medium resistance developed. Its representatives tried to determine the motion-in-liquid resistance force for the plane surfaces and express it as purely experimental formulae.

Introducing the notion of ‘friction forces’, nobody has given clear definition of its nature and mechanical sense. Meanwhile, it has already been known, that this force fundamentally differs from the solid bodies friction force, because it turned out to be independent of pressure.

Viscosity of liquid increases the resistance force, but does not cause it”.

Already in 1930, I.Ya.Milovich in his theory succeeded in eliminating contradictions of the experimental results of the ‘impact theory’. His works enabled us to find out the physical essence of interaction forces of the body with the liquid, moving towards it, and develop the theory of such interaction: “a vortex ring with its atmosphere moves in a continuous liquid medium as an autonomous liquid body, and bears in itself the whole force of the impulse, generating it. It is the only natural mechanism, through which a continuous liquid medium perceives and transfers inside itself the impulses of external forces”. But the ‘friction theory’ already took roots in the heads of hydro-mechanical engineers, and made no concessions in its positions. This was another example of the triumph of mathematics adepts over physics.

If the ideas about the vortex nature of resistance forces had prevailed in the proper time, instead of the ideas based on friction and viscosity, we would have paid great attention and respect to VORTICES, we would have rewarded them, because a VORTEX is a FORM CREATOR, a VORTEX is a MOTION, a VORTEX is a FORCE, a VORTEX is the MOTION ENERGY CONSERVATION, what we made sure of, considering the substance structure. We would not have treated them as vortices - the source of turbulence, disorder, harmful LOSSES, and items to fight with.

Most likely, we would have profitably used the vortex-based technologies already long time ago, if there would not have existed clannish dogmatism in the science. The matter is, that the aspects of the Theory of dynamical interaction of bodies and liquid was developed by I.Ya.Milovich in the 30-es of XX century, and his books were published in the 50-es, i.e. they were available to scientists for researches.

I.Ya.Milovich has not been alone in his love to vortices. Since the 30-es of XX century, V.Schauberger during his whole life unsuccessfully proposed to use vortices in practice, starting from the hydro-energy with the efficiency factor of hydroelectric stations much more than one, and up to flying plates.

Only in recent years, the vortex-based technologies boom began, but much time has been lost!

CHAPTER 4.

FUNDAMENTALS OF ELECTRICITY FROM THE POINT OF VIEW OF HYDROMECHANICAL ENGINEER

"... There are three ways leading to knowledge:
- the way of *reflection* – this way is the most noble,
- the way of *imitation* – this way is the easiest,
- the way of *experience* – this way is the most bitter one"

Confucius

4.1. On some physical delusions In terms of thermodynamics

Phenomenological approach plays an important role in acquiring and development of physical knowledge. The point of phenomenological approach is that a researcher is not interested in 'the nature of things', his purpose is not to 'explain', but only to describe a phenomenon; almost all introduced terms are introduced only for the description of one or another phenomenon or its quantitative estimation.

That is dangerous, because with the development of the theory, it is possible, when describing one or another phenomenon, to *omit, leave undeclared* certain phenomena, which are 'modest', not known for the moment, and their absence in this theory in future can play a fatal role in the development of science and technique.

Let us illustrate this in terms of development of thermodynamics and electricity.

For a long time, all the information possessed by the physicists in the sphere of the heat- and electricity-related phenomena, was reduced to the firm belief that both, the heat and the electricity, are *very similar* to the *liquid*.

Joule's law on the heat and the work equivalence, substituting at the end of I century the notion of the *heat* as a subtle substance motion form (the concepts by R.Descartes, F.Bacon, M.V.Lomonosov et al.), gave a start to the delusions, which later on took root in physics, in spite of the fact, that one notion did not hinder another, because they were complementary. The first one establishes the quantitative correspondence, which can be measured, and relates to the *consequence*. The second one establishes the heat material basis and its nature, thus being related to the *cause*. Simply, the work is the energy consumed, and the *energy is the substance*, but, alas, as things looked rather bad with materialism in our science development at the end of I century; just this circumstance led us to the today's crisis.

It turned out easier to throw away the cause, leaving only the consequence (the law on the heat and the work equivalence), than to cast a deeper glance at the nature of the heat, and to understand that with mechanical processing, i.e. friction, the boundary layer of the substance structure changes; as a result there increases the dissipation of particles constituting this layer, determining its heat. And this is completely consistent with the nature of the heat.

Let us remember that Rumford's experiments on the turning of gun barrel served as a pretext for rejection of the material nature of the heat, and consequently – of the energy, which manifestation it is. As a result of friction, the temperature in the processing zone increased. Davis's experiments also contributed to the conclusion above showing that two pieces of ice or wax can be melted by their simple friction with each other, without contact with any other warmer body [19]. These examples, as well as the story of unreasonably rejected 'ether', demonstrate how easily the science, basically phenomenological, can be misguided and led up a blind alley if one forgets the causes and rests only on consequences, or blindly takes on trust alien ideas without due consideration of own accumulated experience and without constant updating of outdated notions and opinions. Authorities and dogmatism are not admissible in the science, and deviation from this central methodological principle results in failures.

Let us together continue the search for such ideas being outdated and imposed by the authorities, in terms of thermodynamics.

The first law of thermodynamics - the law of the energy conservation and transformation – sounds as follows: *the energy does not disappear and does not appear again, it only transforms out from one kind into another in various physical and chemical processes* [19]. These principles were taken as a basis at derivation of all mentioned above models. It means that there are no contradictions at this stage. And it also means that the following *statement is true: the perpetual motion machine of the first kind is impossible, because it implies the work, which is contrary to the energy conservation law.*

The second law of thermodynamics embarrasses from the very beginning by its uncertainty and large quantity of formulations [19]. Then it is emphasized, explaining in some degree the first observation, that, namely: the second law of thermodynamics is developed on the basis of experience, and in general form it sounds as follows: *any real spontaneous process is irreversible*. Just here, our experience begins to suggest, that there is something wrong. And what about water circulation in the nature? And what about certain cyclic natural processes: from the Earth's revolutions around the Sun to any lifecycle – the stuff - nutrition- growth- death- disintegration – the stuff? And, finally, the substance sink structure, formed of the subtle substance particles, and disintegrating back into them? Our experience, on the contrary, shows that any real spontaneous process is reversible; this also appears from the First law of thermodynamics – nothing appears from nothing, and nothing disappears anywhere. And, finally, the

statement on the impossibility to build the perpetual motion machine of the second kind. Under this statement, one can not build a motion machine, which simply takes the heat (the substance) from a certain source and continuously (in a cyclic way) transforms it into work (the motion). However this possibility is realized by the sink structure - it provides the subtle substance (the heat) sink for its nucleus formation, which possesses velocity - moves, i.e. does work transferring the mass. What causes the delusion of scientists accepting the second law of thermodynamics? It is the fact, that during the derivation and arguing of this law, only *one-level substance* have been considered, *without regard to connection with its subtle structure*, and the tri-unity nucleus nature has been forgotten. And here appears the 'cause', which was rejected earlier - the material nature of the heat (the energy), leading to artificial narrowing of the framework of the material formations participating in the process.

Thus, the Second Law of Thermodynamics in its generally accepted form does not correspond to our modern concepts and is not true, as well as the statement on the impossibility of existence of the second kind perpetual motion machine.

Do you like examining delusions of the physicists? If so, be sure there will be lots of them in this book. You can also read about them in the work of V.I. Atsukovsky [2], or try to find them personally; for instance, the Carnot's theorem is proven *ex adverso* and invalidating the Second Law of Thermodynamics, and the conclusion is made thereof, that the initial assumption is not true. Almost all delusions are introduced in the science under suchlike proving schema - at first a wrong postulate or definition is introduced, and then it serves as validation criterion for the further logical constructions and data. Let the physicists not to take offence, because they are not alone in that. For the first time I faced such an approach in hydro-geology - if the unloading curve of a well contradicts to Darsey equation - that means, that the pumping-out is 'faulty' and should be ignored, independently on the causes thereof. Alas! I don't even speak about the 'perpetual motion machines', rejected because of their non-compliance with the Second Law of Thermodynamics, but here the question is more complicated, and apart from delusions, it bears today a political and financial character rather than that of thoughtlessness, but this is not a physical matter.

Another widespread way to mislead is to mix up the cause with the consequence. For instance, why is it colder on poles and becomes warmer as we move to the equator? If we calculate the solar radiation, then it can be seen that its quantity in proximity to the poles is not less, than in other places. Simply here another delusion takes place. After unreasonable rejection of the heat concept as the form of subtle substance particles motion, the cause started to be mixed up with the consequence in the physical theories. The matter is, that the atmosphere, accumulating the heat, has the minimal thickness on the poles, this being the reason of decreased temperature, contrary to equatorial zone, where the atmosphere thickness is maximal, and temperature is higher. For establishment of the reasons thereof, let us consider the Earth model as a sink structure. As we already know, the substance spherical sink is directed to the center of the Earth; the particles radial flows of this sink after collisions with the atmosphere dense layers, transform into vortex (circulation) flows, perpendicular to radial. The properties of such flows depend only on the *height of their location* over the Earth surface (the rotation radius) - one dimension, and obtained the name of *potential energy*, identical for the total respective plane. The subtle substance axial radial flow, perpendicular to them, for instance on the poles, is local and depends on its *location* on the *plane*; such flows obtained the name of kinetic energy, characterizing the energy in a point on the *plane* - *two dimensions*. The Earth heat field is an assembly of the particles flows in its layers and it is characterized by its total energy (total head (pressure)), consisting of its potential and kinetic energies (piezometric and velocity head (pressures)). Whereas the circulation flows around the Earth characterize its potential energy (piezometric potential) and promote the energy (the heat) accumulation (conservation), the radial flows on the poles characterize the pressure velocity, or kinetic energy, and promote the heat (the energy) exportation, thus resulting in the reduction of the medium density (piezometric head (pressure)), i.e. of the temperature. So the cause of the temperature on the poles lies not in the non-regular character of the radiant heat exchange energy, generated by solar beams and accumulating in the atmosphere, but rather in the convective heat exchange of the heat flows - solar particles, participating in the formation of our Planet. In addition to this conclusion we unexpectedly took initial steps in the understanding of physical sense and differences between kinetic and potential energies, and outlined the ways of drawing possible useful hydraulic analogies for the space (the fields), surrounding sink structures for the subsequent phenomenological models.

From the point of view of the concepts regarding the Earth heat field, considered above, there arise some unexpected and interesting conclusions on the electric phenomena nature.

Around the Earth surface, there exists electric field; that means that between various points of our atmosphere, located on different heights, potential difference exists; in proximity to the Earth's surface the average value of the potential change by height makes around 1.3 V/sm. As the height above the Earth increases, this field quickly becomes weaker, and already on the height of 1 km its intensity equals to 0.4V/sm only.

The existence of temperature and electric stratification in the Earth's atmosphere and the thermoelectromotive force - T.I. Zeebeck's effect, allows drawing analogy with the nature of the Earth electric field and thermoelectromotive force; this is very close to drawing analogy between the heat and the electricity.

Let us try to find confirmation of the equal nature of connections: the heat - the electricity, the flow heat - the electric current, the temperature difference - the potential difference. This can be easily obtained from Joule - Lentz's law, being a direct confirmation of these connections, because the electric current advancing via a conductor is accompanied by the heat release. Without dwelling upon the quantitative side of the law, let us examine whether it includes another mistake.

For this, let us return to the origin of electric models creation in the phenomenological concepts of its founders - Coulomb, Volt, Ohm, Ampere and others, as A.I.Kitaigorodsky [20] made, and examine them.

This will seem a bit silly and/or trivially, but let us be patient and avoid hasty conclusions.

In their phenomenological models, their reasoning was something like that: when I connect the poles of the accumulator with a conductor, something like a liquid will flow inside the conductor; this 'something' is the electricity; let us call it electric current. And where does this 'something like a liquid' come from? Certainly, from the accumulator – the source – a sort of a reservoir with this liquid. And the heat released is the result of the electric current energy release – this liquid energy in the form of the heat from inside the conductor outside in the atmosphere. It all looks quite reasonable, and as no another explanation can be found. But if to make an attempt?! The matter is that something like a liquid - the heat - can enter the conductor from outside (as a liquid enters a well cavity through lateral filtering surfaces, out of the stratum surrounding it - out of its atmosphere) and under certain conditions, feed the flow inside the conductor, generated by the pressure difference through the levels jump – potential jump, and this is already the electric current.

Isn't it a sudden turn? Even the ardent adepts of the traditional physical concepts will agree that it seems reasonable to verify this model. We acknowledge that the energy, advancing via the conductor, dissipates through its lateral surface in the form of the heat. Why a similar process can not proceed with the opposite sign in the opposite direction, when the energy is absorbed inside the conductor out of the space with the accumulator replenishment with the electricity – the reservoir filling up with something like a liquid, and this makes the thermoelectromotive force?

The same charge-based concepts on the nature of electricity, its carriers and the non-material nature of the heat make an obstacle to the understanding of the fact, that the heat and the electricity have one and the same nature. For this reason, we can not attain the clarity in physics until the fundamental physical concepts are drastically changed.

4.2. Electricity in the notions of dynamical sink structures

As it can be seen from the previous examination, due to 'non-material nature' of the heat, the matter on the electric fluid propagation through a lateral surface still remains unclear. Let us try to eliminate this gap through the consideration of the electricity phenomenological model on the basis of the sink structures. For this, let us continue the derivation of the basic notions of electricity in terms of the founders' concepts.

Let us begin with the accumulator, which has two 'poles'. After touching them with the hands, one can feel a certain effect as if something runs via the body. Let us call this 'something' electricity. Connecting both poles with the articles consisting of various materials we can see that some articles heat up more than the other ones; and another articles do not heat up absolutely. These results are described by the researcher like follows: when the poles are connected with a wire, the electricity - something like a liquid - flows through it. Let us call this phenomenon electric current. Those articles, which heat up well, and seem to 'conduct' the electricity well, are called conductors. Lots of bodies heat up badly; they seem to 'conduct' the electricity badly, or create large resistance to the flowing current (liquid). Those, which absolutely do not heat up, are called insulators or dielectrics. Using a liquid instead of a conductor (the copper sulfate solution), the researcher finds out, that every second a fixed mass of copper deposits on the cathode, thus confirming that its appearance is connected with the fluxion of a certain fluid, which carries the atoms of copper. The researcher introduces two new terms. First, he assumes, that the mass of copper M is proportional to the quantity q of electricity advanced via the circuit, i.e. the definition $q = kM$ (4.1) is introduced, where k is the constant of proportionality. And, secondly, he proposes to call the electrical mass advanced via the circuit per a unit of time as the current strength:

$$I = q/t \quad (4.2)$$

Now the current can be characterized by two measurable values: the quantity of heat (Q_{heat}), releasing on a certain part of circuit per a unit of time, and the current strength (I); this means, that appears a possibility to compare the currents, generated by different sources, by measuring a separate current strength I and Q_{heat} released in the form of the heat for one and the same part of the conductor. Repeating experiments with various conductors, one can find out that the relation of the heat quantity Q_{heat} to the electrical mass q , flowing via various conductors, differs for various current sources. Such relation Q_{heat}/q is called by the researcher 'voltage' or 'the potential difference' - U ,

$$U = Q_{heat}/q \quad (4.3)$$

Please pay attention to the fact that the researcher 'called' and have not 'find out' that Q_{heat}/q equals to voltage.

And finally, the **law** (Ohm law) is derived by the researcher on the basis of carried out experiments and definitions: for the overwhelming majority of conductors, the voltage and current strength are proportional:

$$U = IR \quad (4.4)$$

The constant of proportionality value, R , obtains the name of resistance.

Let us examine, which parameters appear in the Ohm law:

I is a value, experimentally measured basing on indirect characteristics (4.2),

R is a specific material article, which characteristic is obtained by means of it comparison with the standard participating in the measurement of I .

U is a formula parameter, which depends on the source properties and the resistance, i.e. on the process as a whole. It is introduced with the goal to forget about physics later on and impose all the problems on mathematics. This is the purpose of any phenomenological model – to develop a physical model one time, settle inter-connections, introduce parameters, describe the process mathematically, and not refer to physics any more, calling the results of the operations above a ‘Law’. Without understanding the physical sense of voltage from its initial definition (4.3), or forgetting it later, the voltage definition starts to be derived from Ohm law (4.4), what is wrong, generally speaking. Let us return and examine the physical sense of voltage on the basis of its initial definition (4.3).

Total electrical mass q at its advancing via conductor can be divided into a part, which dissipates through the lateral surface of the conductor as the current advances in the form of the heat Q_{heat} , and into a part, which enters directly the final point along the conductor length, q_i . This can be written as follows:

$$q = Q_{heat} + q_i \quad (4.5)$$

In other words, at connection of the conductor (closing of the poles), the initial electrical mass per second q (flow rate), coming out from the initial point (a pole), includes not only the electrical mass, which dissipated in the form of the heat Q_{heat} , but also the electrical flow rate, which reaches the final point q_i , as a consequence of the energy (substance) conservation law. This is remembered to a certain degree when the notion of E.M.F. of the circuit closed part is introduced. It would be more correct to write the voltage definition in (4.3) as:

$$q = q_{\perp} + q_i \quad (4.6)$$

where q is the flow rate of electric fluid in the circuit,

q_{\perp} is the flow rate of electric fluid through the conductor’s lateral surface

$$Q_{heat} = q_{\perp} \quad (4.7),$$

q_i is the flow rate of electric fluid which reached the destination point via the conductor section.

Then (4.3) will look like: $U = q_{\perp} / (q_{\perp} + q_i)$ (4.8)

Since various materials pass electricity via themselves in different ways, as it has already been mentioned, then:

- if $q_{\perp} \ll q_i$, then $U \rightarrow 0$, $U_1 \approx U_2$ i.e. all electrical mass remains in the conductor, having moved from one its point to another, remaining not consumed;

- if $q_{\perp} \gg q_i$, then $U = const$, i.e. all electrical mass was consumed for dissipation through the lateral surface of the conductor or on the load, and their carrying capacity is unlimited (grounding mode).

Now the statement, that if a conductor ‘heats nicely’ it conducts electric fluid also well, already does not sound as unambiguously, as earlier - it turned out that it dissipates rather than conducts the electric fluid, i.e. lets it pass inside itself on necessary distance. And it means that the item understood by us as electric current more likely was not the flow velocity, but filtration flow rate of fluid via the conductor wall.

Now we can see that a hydraulic analogy of the voltage with the liquid levels difference (Fig.9) was only a particular case ($q_{\perp} \ll q_i$). And its real model is the well cavity filter in a water-bearing stratum (Fig.9b, 9c), and the electric voltage analogue is represented by the head (pressure) losses (levels (head) difference), determining the flow velocity (flow rate) during filtration through the filtering surface outside (Fig.9b) or inside (Fig.9c) the well cavity – under the action of ΔH_1 , and flow rate of fluid in the internal cavity of the well – under the action of ΔH_2 , i.e. there are also two acting components, both in flow rate (current), and in the head (pressure) losses.

And how does all this comply with our concepts? Let us continue further construction of electricity phenomenological model based on sink structures.

Fluid surrounds everything around us. A part of this fluid is used for the formation of the substance elementary structures by means of the sink structures formation.

Sink structures, due to construction, apart from their velocity vector along its axis, and the symmetric sink field, as a dipole, have a sort of pump, pumping the external fluid particles along its axis, and thus forming a linear flow. The flow enters on one pole forming the sink, and on another pole it goes out, thus forming the source; this means that its properties depend on the dipole axis orientation with respect to the fluid external flows; here the so called charge properties are meant.

Without any external action the stuff sink structures are grouped in such a way that they form closed circulations of their axial flows (vortex rings), remaining in equilibrium (neutral), or rather transforming into new structure with much weaker dipole properties (charge).

If all the sink structures (stuff atoms) – dipoles, placed on a closed surface, for instance on a sphere, are oriented in such a way that their axes are perpendicular to the surface and their like poles are directed in one side, let us call such a surface a charged surface.

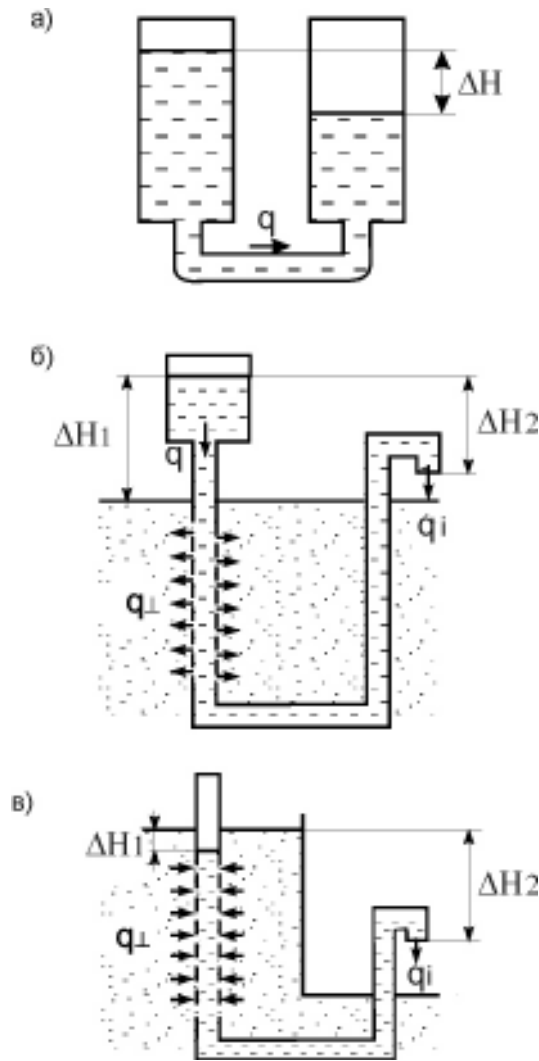


Fig.9. Hydraulic analogue of electric current.

If dipoles are directed with their sinks outside, let us call such a surface negatively charged; in this case, comparing with external side, excessive fluid particles appear inside the sphere, i.e. higher concentration or higher pressure; let us call it *negative potential*. The sphere internal cavity forms something like a reservoir for excessive fluid particles (Fig.9b).

If dipoles are oriented with their sources outside, let us call such a surface positively charged; in this case, comparing with external side, the lack of fluid particles appears inside the sphere, i.e. lower concentration, depression, or decreased pressure takes place inside; let us call it *positive potential*. The sphere internal cavity forms in this process something like a reservoir for discharged space. For such concepts the hydraulic analogue with the borehole cavity in the water-carrying stratum (Fig.9c), turns into almost *real calculation model*, following respective upgrading of terminology.

If one connects a tube (conductor) to such a charged body, then, because of the pressure difference *inside* it, a fluid particles *flow* appears in the direction, determined by the potential sign; this flow will take place, until the pressure values on the tube ends become equal.

External flows of subtle substance (protoether) from charged surfaces (oriented dipoles) are *electric and, electromagnetic fields*; they depend on the forms and location of these surfaces, determining one or another kind of their interaction, specific for various kinds of electric devices.

The work of specific electric devices will be considered in details in the second part of this book. Let us only emphasize here the principal points. – Electric current is characterized not so much by the *direction of its motion* along the conductor, as rather by the presence, along with ‘*pressure*’ current (the current, caused by the voltage (pressure) excess inside the system, providing the energy in the form of heat release (dissipation) through the conductor lateral surface, the *suction* mode of current), – of the current at the expense of the energy inflow inside the system. (These aspects, because of wrong concepts, remained a mystery or misunderstood). This is the absorption of the energy, the so called *free energy*, from outside. Currents differ!

The sink structures, beside to polar (axial) flows, which are usually neutralized in material formations through their combination into ring structures, have not only axial flows of the subtle substance (Fig.6), but also radial (sink) flows of the same particles, characterized by flow rate of the sink. They are integral parts of the substance – energy

of any particle. For this reason, the change in the particles (structures) concentration in medium results in the change of this subtle-field component of the substance – the energy, and its total rate of flow. Such characteristic of the substance is called by the traditional science as the *temperature*, although for all these fields – *temperature*, *electromagnetic*, *electric* the *material carrier* is represented by *the same particles of protoether* – electrons.

**PROBLEMS OF MODERN PHYSICS
IN A NEW PERSPECTIVE**

“Nature and nature’s laws lay hid in night
God said: Let Newton be, and all was light.
But not for long. The devil howling “Ho!
Let Enstein be!” restored the status quo.

I.Pope, A. Eddington

5.1. Relativistic mechanics – it is very simple!

Even during the period of official prohibition to criticize Einstein’s relativity theory, such critics was widespread [1, 2, 4, 5]. We will not dwell upon it, and rather emphasize the principal weakness of this theory - the departure from the physical sense of phenomena to the thicket of mathematical tightrope walking. For this reason, let us try to disclose the physical sense of fundamental relativistic notions, based on the concepts already considered.

Let us begin with relativistic mass. One should remember that *relativistic mass* m of a body increases as its velocity increases, in compliance with the law:

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}} \quad (5.1)$$

where m_0 is the body mass in rest, v is the velocity of its motion.

The body mass increase at its velocity increase results in the impossibility for any body with non-zero mass in rest to attain the velocity equal to the light velocity in vacuum, or to exceed this velocity. This statement makes a striking example of what one can come to in his reasoning, if one becomes blindly enthusiastic about mathematics. This is just the case when, according to Feinmann, "it is necessary to forget about common sense" in order to believe in this. Indeed, such a conclusion from the formula (5.1) could be made by a mathematician uninterested in the physical sense. But, alas, it was physicists-mechanic engineers who inspired him! And let us not lay the blame on somebody else! A simple clarification of the notion ‘mass’ have to be done. Without understanding the subtle field internal nature of the inertia forces, this nature being the cause of bodies’ motion, they started to link it to mass, thus identifying the mass with the inertia force (measure). And, as already determined, the motion is caused not simply by the substance quantity, but rather by its form. This delusion manifested itself with respect to relativistic objects in senseless interpretation of the formulas like (5.1). Please open any manual of physics and read the definition of mass. A good manual, after the definition – the measure *of the body inertness is called its mass*, - will gingerly remind, that the notion of the body mass has several senses: mass is the measure of inertness, and the measure of gravity, and the measure of the stuff quantity. Let us examine, what caused such an approach and where this approach led to.

Before formulating his fundamental laws, Newton gave the following definitions [21]:

The quantity of substance (mass) is the measure thereof, established proportional to its density and volume.

The linear momentum is the measure thereof, established proportional to the velocity and mass.

The congenital force of the substance is the resistance capacity inherent to it, in compliance with which any separate body left to it maintains its state of rest or uniform straight line motion.

An applied force is an action effected over a body, in order to change its state of rest or uniform straight line motion.

So there are two kinds of forces – *congenital force of the substance*, an internal force providing its uniform straight line motion (inertia) or maintaining it in rest, and *applied force*, an external force changing its state of inertia.

Newton formulated his first law as follows:

Any body continues to maintain its state of rest or uniform and straight line motion, till and as long as it is forced by applied forces to change this state. I.e. this law concerns the influence of one external forces against congenital (internal) force of the substance (the cause of the substance motion) - inertia. In the course of further physics development Newton’s concepts were distorted, and two various forces were replaced by one, which, later on, they had to make ‘dual’:

“Aristotle and Aristotelians considered a force as the motion cause. They believed that as the action of a force ceases, the body motion ceases as well. So a force is required to maintain a motion. The formulation of the Newton’s first law means that such a force-related concept is incorrect, because *for maintaining (uniform) motion, no ‘forces’ are needed.* A force began to be considered as the *cause of the body linear momentum change.* And since this change is caused by other bodies, the following force definition can be given. *Force is the measure of the bodies interaction intensity manifesting itself in the change of their linear momentums*” [21] (italics by the author).

As always, this resulted in the cause and the consequence mixing up, and the Newton’s first law became the law of free motion (inertia), but not the law of free motion (inertia) *under the action of only internal (congenital) forces of the substance.* Simply, at that time they could not understand the nature of these forces (see chapter 3.5), there

had to be chosen purely phenomenological. Respectively, the *mass transformed from the stuff quantity into the body inertia measure*, and as for a body still moving with constant velocity, they began to apply inertial reference system in order to get rid of the explanation of this inertial motion nature. The effect of this delusion was not that acute on the objects of classic mechanics, and if it was, then the physicists changed to totally empirical approach, inventing numerous coefficients, amendments, and etc (hydrodynamic whirl makes a striking example thereof). Such an approach was nothing else but the continued ‘hanging about’ and it only intensified the crisis, generating new domains of physics operating with ‘new’ forces – gravitational, electromagnetic, nuclear, weak interactions, torsion, and bio-field, and so on. All those remembering about the presence of *internal forces (the substance congenital forces)* – the adepts of alchemy, esotery, ‘perpetual motion’, - have been defamed in every way, persecuted and scoffed, and they still are scoffed at.

The concepts on dynamical sink structures appearing in the process of the substance formation returned the science back to the Newton's positions and stopped the ‘hanging about’, which lasted for several years.

Based on the concepts of the nucleus sink structure, which forms the basis of all structures – any body consists of the particles, concentrated in the space in a certain form. The number of particles it consists of ($N_{nucl.}$) - can be regarded as the body material quantitative characteristic; let us call it the ‘*body mass*’. As we already know from (2.12), the velocity characterizes form with certain relation ($N_{nucl.}/N_0 > 1$). Minimal body mass corresponds to minimal number of particles it consists of, and is proportional to one, i.e. one particle it consists of; this means that *at the body mass decrease, its structural form disintegrates up to the fluid particle size - up to one particle, and not up to zero*. And the velocity of the structural form, disintegrating in such a way up to one particle, increases in this process and acquires its maximal value equal to this particle velocity. *Maximal velocity value is attained when the closed circulation (vortex) particles motion in the structural form opens* and becomes linear, and some of the particles, participating in this motion, can continue their motion in the *train-like manner* – one after another ($N_{nuc.}/N_0 = 1$) with their velocity - the velocity of the fluid, which particles they have been earlier, before form development, thus forming a *wave train*. Since the process of velocity increase - of the form disintegration – is a gradual one, the *shape* of the wave train in the space is not strictly linear, but rather expanding *spiral*. Such shape of the substance is usually called light or emanation and, as we can see, it is material; the photon mass equals to zero only as per formula (5.1), in reality it equals to the mass of one particle or $N_0 = N_{nucl.}$ particles. There is *neither zero, nor infinity in the material world, rather the return to its elementary substance level only* - fluid exists, the structural form appearing (being born) from the fluid; so we come to the idea on the ‘*Soul*’ (subtle substance) *immortality*. I.e. photons move in the medium of the particles similar to themselves, being the components of the fluid force field. Such structure energy equals to the total kinetic energy of the particles in the train, and Einstein’s formula: $E_0 = m_0 c^2$ (5.2), is nothing else but the conveyance of the *energy conservation law* for dynamical sink structures - although the velocity of a structural form at its vortex coagulation becomes less, but the total energy of the particles composing it is conserved. I.e. when this form ‘straightens up’ in the form of a beam, or a wave of particles train all the particles, composing this train, possess exactly this energy: $E_0 = N_{nucl.} c^2$. And *Lorentz’s length decrease* should be considered (also as in the case of relativistic mass), exactly conversely - when a form ‘straightens up’ its length becomes maximal and equal to the particles train length: $N_0 d_0 = N_{nucl.} d_0$, but other dimensions (perpendicular to the velocity vector) really decrease because of the shape disintegration.

With such fluid-mechanical approach the question of ‘*dualism*’ does not appear at all, one should only remember about the material nature of medium, in which the waves propagate, be aware of the fundamentals of acoustics and mechanics of continuous mediums, and not forget about the physical sense.

Also the nature of *quantification*, or discontinuity of the basic quantum-mechanical processes, becomes clear and understandable. Let us refer again to the formula (2.12); the form velocity, as well as its energy, depends on the number of particles composing it, and the change of such particles number can take place under the same rules, which we have already considered at chemical elements formation:

- the nucleus (as the wave train) consists of the whole number of particles and can disintegrate (or combine) by separation (or addition) of the whole number of particles, i.e. the discontinuity of the mass- energy change takes place;
- the discontinuity can be divisible by 1 at separation (or addition) of axial particles and divisible by 2 and 3 - for the circulation ring structures.

In the processes of the substance structures formation considered above, the velocity of the particles composing the substance was neutralized through the circulation motion organization. The particles velocity vector lies in the plane of the vortex structure ring, forming a dipole (Fig.5), i.e. the velocity of such structures, their draft force, *manifests itself mainly through the flows of the dipole subtle substance* (protoether), and the basic (“draft”) particles velocity vector ‘is frozen’ in circulation (except N_0 particles).

Those quantum mechanics objects, which structural formations velocities are close to the maximal velocity for single particles, give us the contrary picture - the *particles* motion in the structure *coincides with the velocity vector of the particles themselves*. And their interaction with each other (gravitation or repulsion) takes place through the subtle field flows (protoether) of these particles. To disclose specific interaction forms, one can use Fig.3 again, and here again may be obtained various kinds of ring motion. The general form of such structures motion is a distinct *spiral motion* along divergent or convergent spiral trajectories (Fig.10). The velocity of the particles themselves is a

constant value, because it is determined by the shape; for an electron it is the velocity of light, and when their motion is considered in connection with the space, with regard to their spiral motion, the particles translational velocity will be less than the velocity of the particles themselves.

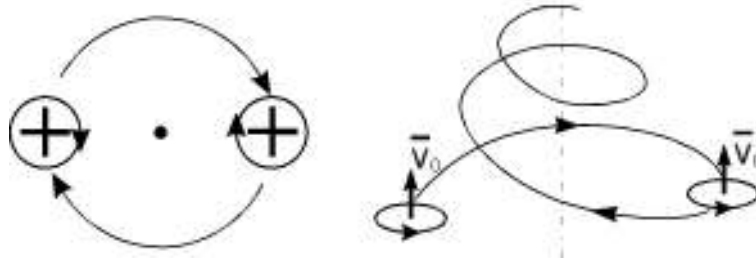


Fig.10. Scheme of the relativistic particles motion.

When continuing our examination of the physics development let us think over why we pay so much attention to the velocity of light? The matter is that the velocity of light is nothing else but the velocity of the particles of one of the shape-forming hierarchical levels – electrons! Why the velocities of particles of the other shape-forming hierarchical levels remain a mystery, for instance, the velocities of protons, atoms of chemical elements, molecules and so on? The particles possessing the velocity of light were united in a special domain of physics – relativistic mechanics. The motion of protons, atoms, molecules and etc – were called random or chaotic motion, and described by the mathematical functions of statistical physics and statistical thermodynamics. If we refer to *cumulative effects*, characterized by the flows of *directed* medium particles unlike the chaotic state of medium particles, this will help us to eliminate these problems.

Chaotic motion is such a motion, at which the particles average travel in a certain volume of medium equals to zero, i.e. the substance remains on one and the same place. Circulation, or vortex motion of the medium particles, which, as we know, is far from being random, can be regarded as manifestation of chaotic motion. And *cumulative* flows are the directed particles flows composing the train of moving particles transferring the substance in the space. It is the generalized type of the substance motion, which simple form is the motion of relativistic particles, only the velocities of cumulative flows for the particles of various levels differ from each other and are determined by the medium particles velocity; in traditional physics, it is called the *sound velocity* in a medium, without much thinking on this notion nature.

When physicists speak about cumulation, they usually have in mind short-lived processes (alike relativistic phenomena), for instance explosions, and under cumulation they mean the increase in action of these processes in a certain place or along a certain direction. As a result, a step-wise change of the medium state takes place, thus forming the impact wave. In the points of the medium reached by the impact wave the energy density increases also step-wise. Now, if this energy is re-distributed by any way in the space, so that the medium kinetic energy density becomes essentially larger in a certain direction, than in other ones, a stream in the medium appears, i.e. the short-lived orientation of the velocity vectors of the particles composing it in one direction. The effect of energy concentration in a certain direction or a certain place represents cumulation, and the stream appearing at this process, is a cumulative stream. We face cumulative streams at every step – from flows of relativistic particles up to the streams caused by drops falling in a liquid, or hydraulic impacts in a pipeline. [22]. In all cases of sudden collision of a stream with an obstacle, the latter suffers the so-called hydro-dynamical impact. This scientific term means a simple physical phenomenon: at the moment of the collision of the stream having the density ρ and moving with the velocity \mathbf{v} with an obstacle, the deceleration wave begins to propagate in the stream in the direction, opposite to that of the stream motion with the sound velocity c ; the pressure on the front of this wave equals to:

$$P = \rho v c \quad (5.3)$$

Formula (5.3) is nothing else but the generalized form of the Einstein's formula (5.2), which does not include the mass as the inertia measure, and it means that there disappeared the necessity of the relativistic multiplier $\sqrt{1 - \frac{v^2}{c^2}}$

which caused several problems.

Cumulative streams make another confirmation of the important role of the substance organization, or its form.

As a conclusion, one should give his due to the hydrodynamics, which although considering the mass to be the inertia measure, but operating with real material mediums and bodies, did not lose the common sense and unlike the relativistic mechanics with its relativistic mass (5.1), found more adequate way for the explanation of the body motion problems in a medium; namely, it introduced the notion of *connected mass* – the artificial mass, which being added to the body mass, *substitutes the inertial action* of all the liquid. Its value depends not only on the body geometry, but on its motion direction as well [23].

Now we can see that it is quite sufficient to use the means of classic mechanics for describing all modern physical concepts if one understands the nature of the substance congenital force – inertia.

5.2. Let us philosophize a little

The matter of the TIME is very complicated because of its universal and really generally philosophic sense, and it can be a little disclosed only in the context of the cause-and-effect relations chain in the NATURE. As you could already notice, the principal ring of this chain is the substance shape-forming process.

This connection can be tracked again by turning to the relationship velocity – the shape (2.12).

Velocity ($V_{nucl.}$) as we know is the value equal to the path (S), divided by the time (t), during which this path was traversed:

$$V_{nucl.} = S/t \quad (5.4)$$

After inserting (5.4) in (2.12), we obtain, that the time equals to:

$$t = \frac{N_{nucl.} \cdot S}{N_0 \cdot V_0} \quad (5.5)$$

This means that the processes progress and the realization of the cause-and-effect relations the basis of which is the time are the functions of the ‘mass’ ($N_{nucl.}$) and its form ($N_{nucl.}/N_0$). For the dense bodies (large forms) the time flows slowly and for relativistic bodies (single particles) the time flows more quickly. The identical connection: FORM – MASS – VELOCITY – TIME is obvious. That means that the less is the form mass, the quicker it can move both in the time, and in the space of the shape-forming and space cause-and-effect relations. At such an approach, the travel in the time on subtle planes (substance levels), i.e. the substance motion separately from its crude form, becomes natural and does not arise now any special questions as to its transfer both in the past and in the future.

The matters of motion in time in a solid body (with respect to physical structures) after their preliminary disintegration (disintegrated form) with the subsequent form ‘assembling’ is less prepared for understanding, as well as the matters of immortality, reincarnation, life on other planes of the substance and so on, although they do not contradict to united physical concepts. The crisis in the science forced us to address again to the principles basing on cause-and-effect relations. On the example of a dynamical sink structure, they made us to *understand the unity of the subtle and crude substances and the existence of the internal congenital substance forces*, and enabled us to outline the fundamental laws of their existence and become more ‘materialists’ rather than before when the subtle substance role in our world was rejected. All this counts in favor of the fact, that our *scientific ideology* finally became closer to esoteric knowledge.

Esotery (from the Greek Esoterikos – internal, hidden, and mysterious) implies the *knowledge of Nature’s subtle forces*, search for hidden causes, which put into action human hearts, worlds and things. These causes inside the causes are their moving force due to which the Great Wheel of Existence and Non- existence perpetually rotates [24].

The principal specific feature which still being the reason for excluding esotery from the list of sciences and not recognizing it, is not merely the fact that it discloses the subtle, hidden internal world of phenomena, but also that it has mysterious nature, designed only for the devoted ones. This makes also the reason for the symbolic character of its fundamental concepts exposition, differing from traditional scientific terminology. At the same time such an approach is possible only under the conditions of deep understanding of the unity of all fundamental phenomena and processes of the nature. Everything was considered by the esotery based on united physical positions, which we only begin to approach now, delving deeply into the substance internal structure. Incomprehension of esoteric language is not an evidence of the fact, that esoteric knowledge is not true. Let us illustrate this by the example.

In compliance with esoteric concepts, there exists only one material element (substance form), and this element always manifests its quaternary nature in its forms. The symbol of quadruple – ‘the cross of the substance’ – is the symbol of the spirit, involved in the time and the space. The end parts of the cross make the embodiments of four elements: the Fire, the Air, the Water and the Earth [25]. The phenomena of terrestrial world are the results of interaction of four cosmic or spiritual forces identified as these four elements with a certain fifth element – *Distillation*, keeping all four elements conjoint or united. What exact and beautiful terminology was chosen by those Consecrated in the ancient times, and how grievously clumsy looks my terminology for description of the one and the same process of the substance formation! Let us return to the united dynamical model of the substance nucleus structure, Fig.6:

- the *nucleus* is the ‘Earth’,
- the *fluid* (ether) is the ‘Water’,
- the *protofluid* (protoether) is the ‘Air’,
- the *polar protoether flow* (concentrated linear flow of protofluid (protoether)) is the ‘Fire’,
- the *cause*, which served as the beginning of everything is the ‘*Distillation*’ – the ‘Thought’, the ‘Word’, the ‘*obstacle*’ (according to I.Ya.Milovich), which generated all this unity. If using such a ‘translation we examine the Biblical stories related to the Earth’s origin, we shall obtain then a model very much similar to the one considered in this book. Please try it! It turned out, that ancient Consecrated were telling not simply fairy tales! Some technical

secrets concealed behind the ancient esoteric symbols, confirming that those were not simply fairy tales, we shall consider in the second part of this book.

It is high time to eliminate the consequences of the crisis, to review our scientific approaches in the natural science, to remove the label of ‘non-scientific approach’ from the ‘perpetual motion’ and esoteric concepts, and to move forward!

Instead of the afterword

"Do split in the eyes of the one, who tells you that it is possible to envelop the immense".

Kozhma Prutkov

Heisenberg, Planck, Schrödinger, Einstein, Dirak, Feinman and several other prominent physicists were strongly embarrassed and disturbed because of certain contradictive incompleteness of modern theoretical physics.

As A. Einstein told: "Who could think, that we shall know so much and understand so little ..."

Being aware of all this, the author sincerely wished his work to make easier the state of souls of estimated scientists, the founders of modern physics, who up to the end of their lives could not reconcile themselves to have deprived physics of its causality and tried to return to physics the common sense.

Being aware of the fact, that the fundamental concepts replacement is a very difficult process, without saying of the counter-action of official academic science, screened off itself by the fence of interdictions and not wishing, 'to undermine the basis it is based on', and knowing, that such a replacement needs the pupil's capability and readiness to perceive these concepts by the modified form of his consciousness, the author expressed his view on the new fundamental ideas in a popular interpretation. And the author made Felix Klein's words the epigraph in the Introduction because they demonstrate, in the best way possible, how one can achieve such a perception. For this reason, the author, in his exposition, tried only to disclose the basic theoretical aspects, making the reader to try at further thinking '*to pass himself the whole path of its development*' as the author did. Thus, the natural selection takes place, dedication (in esotery), and the birth of real scientists – researchers; and this book is addressed just to them.

The author faced serious problems with terminology, with the names of the notions, essentially common but various in traditional terminologies, and so on. These matters need wide discussion and systematization.

The matters of the problems in modern physics influence the development of technique and technologies and the ways out of actual crisis based on the united physical concepts at the development of practical technical devices and technologies, harmonically using free energy – the energy of external environment, will be considered in the second part of the book 'Technique and technologies in the new light', which is in the process of issue.

The author shares the opinion of the Nobel Prize laureate A.Szent-Gyogyi, that 'there exists only one true way to avoid mistakes: to do nothing, or, at least, try to do nothing new. This, still, is a largest mistake by itself. Those selected capable of opening new ways in science without mistakes are very rare ones, and the author, without doubt, does not belong to them. In the domain of unknown, the fulcrums are unreliable, and he who enters herein, can not hope on something more, than on his possible mistakes being honorable ones'.

If after reading this book a reader will feel the need in deeper understanding of the problems of modern natural science, as well as any other problems, I shall consider my task as fulfilled.

The author.

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