Basic Physical Properties of the Physical Non-material World Objects

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Received: March 19, 2012 Accepted: April 4, 2012 Online Published: May 1, 2012

doi:10.5539/apr.v4n2p175 URL: http://dx.doi.org/10.5539/apr.v4n2p175

Abstract

Physical properties of non-material objects are investigated. Physical definition of the physical non-material W_{NMPh} world is given. By physical methods the following conclusions were obtained: the W_{NMPh} set is nonempty set; the W_{NMPh} world is cognizable; physical non-material O_{NMPh} objects of the W_{NMPh} world act on material O_{M} objects of the material W_{M} world and change a physical state of the material O_{M} objects; at least, some non-material O_{NMPh} objects (but, probably, all or nearly all O_{NMPh} objects) are capable to control interactions of material objects, energy balance of these interactions, energy pumping-over between material objects and transformation of energy from one its kind in another. Non-material O_{NMPh} objects act by unusual non-forcing, non-energy way. According to physical laws of the material W_{M} world, the long-range action fields (LRA-fields), really, cannot exist, more precisely, these fields cannot exist as material objects. However, according to experimental data, LRA-fields really exist. LRA-fields belong to the W_{NMPh} set and have the above properties of O_{NMPh} objects. There is the single material - non-material world. The W_{M} and W_{NMPh} components of this world physically interact with each other, that necessitates the adequate development of physics. (Processes of a high level complexity, for example spirit actions, exceed the limits of physics competence.) The above conclusions are valid under the following restrictions on the long-range interaction: the energy conservation law is not violated; the actions are transferred at a distance by physical fields; thesis "the planets (and all the more stars) cannot influence on the Earth by means of energy fields" is valid. If these restrictions are violated, other explanations of the LRA-fields existence are not excluded. Discussion on different directions of thoughts is useful.

Keywords: physical non-material world, properties, objects, planets, stars, control, long-range action fields, energy-free, interaction, the Earth, Kozyrev

1. Introduction - Problem on Cognoscibility of the Non-material World and Definition of the Physical Non-material World Inletting it in the Activity Field of Materialistic Natural Sciences

The hypothesis of the existence of the non-material W_{NM} world and its significant action on the material W_{M}world already exists through millennia in many philosophies, but it is not inscribed into the scheme of natural sciences. Moreover, natural sciences themselves, although they are materialistic sciences in essence, do not give a concrete physical differentiation of the notions of material and non-material worlds. For the whole foreseeable historical period we do not see the corresponding scientific thought development in academic physics, investigating a universe, with respect to cognition of the non-material world. Academic physics simply did not study non-material objects. It knows nothing about them. Academic physics did not respond to the question: whether or not there are at least some non-material bodies or fields from the point of natural sciences view? Why there is no answer to the given question? The matter is that in academic physics reigns the conviction: it is impossible to study the non-material world by the methods of materialistic, in essence, science - physics. This conviction is firmly rooted in physics, so to speak, by default. But this is an error. It does not correspond to philosophical sciences and is often concerned to the fact that we confuse non-material and incognizable (see Appendix 1). According to Monism (which is the leading philosophy school), the material - non-material W world is the uniform world, its components W_{M} and W_{NM} are interrelated. And where there is interaction between the parts, it is possible to cognize one part on the behaviour of other part.

In philosophical currents there is no uniform definition of material and non-material notions because of the complexity of the question. To include the ancient philosophical hypothesis in the field of natural sciences activity, it is necessary to define the notions of material and non-material more concretely, and then to attribute to non-material objects any physical characteristics or at least one physical characteristic, for the beginning. Only

then it is possible to deduce physical inferences from the hypothesis, and only so it is possible to open to natural sciences the long thorny way to study of the non-material world and thus to convert the ancient hypothesis *into the working hypothesis*. In line with this, we give simple physical definitions of material and non-material worlds, specially adapted for their inclusion in the activity field of natural sciences. Here it is necessary to show a correctness, that is to take into account that physics investigates the world from below, that is only at the level of enough elementary processes. Phenomena of a high level of complexity (such as spirit, mental phenomena, creativity, will, diseases of complex biological systems, etc.) exceed the limits of physics competence (see Appendix 1).

According to physical concepts, all material objects that are studied today's by natural sciences (technical objects, planets, stars, biological tissues and cells, electrical, magnetic, and nuclear fields, and so on) have an energy E. Therefore, from the physical point of view, the set of objects, having energy E, is the material W_{M}world. Then, by definition, the set of objects that exceeds the limits of the W_{M} world is the non-material W_{NM} world. Consequently, from the physical point of view, the non-material W_{NM} world is the world of energy-free objects. This is the definition of the non-material world by the method of exclusion. Whether can natural sciences cognize whole non-material W_{NM}world? There is no exact scientific answer to this question now. Most likely, no, cannot. In order to take into account the limitations of physics competence correctly, it is necessary to define *the physical* non-material world. Therefore we shall designate as the physical non-material W_{NMPh}world that part of W_{NM}world which is cognizable by physical methods.

Remark 1. By definition, to each physical non-material O_{NMPh} object of the physical non-material W_{NMPh} world is implicitly attributed the property to act at least on some physical material O_{M} objects of material W_{M}world and to change the physical state of these material objects as otherwise O_{NMPh} object would be incognizable by physical methods. Thus, to each O_{NMPh} object is attributed possession by some physical properties.

Remark 2. In spite of the absence of energy, physical O_{NMPh}objects of the physical non-material W_{NMPh} world automatically are not nothing as they have some properties and are capable to some interactions. Non-material fields are non-material objects by definition.

In this paper we investigate the basic physical properties of O_{NMPh} objects of the physical non-material W_{NMPh} world.

2. Physical Base Properties of O_{NMPh} Objects of the Physical Non-material W_{NMPh}World (Beginning)

According to the special relativity theory (SRT), if the energy E of an object is zero, its momentum $\boldsymbol{p}$ and its inertial mass m are equal to zero too. Here and everywhere the energy E is meant as a total energy including the energy, contained in the rest mass, and the mass m is meant as the relativistic mass (The relativistic mass exists, in spite of attempts to deny representations of the founders of the SRT on the relativistic mass. If we accept the special relativity, we must recognize the existence of the relativistic mass as a measure of inertia (Vasiliev, 2009d, 2012b). Hence, non-material O_{NMPh} objects are inertialess. They do not carry the momentum $\boldsymbol{p}$ and cannot act by force method. According to Remark 1, they act on material O_{M} objects. Consequently, they act on material O_{M} objects by some *energy-free and non-forced way*. Hence, instead of energy and strength the physical non-material O_{NMPh} objects have something the other that allow them to act that could be called as an *non-material action potential or shortly - as* NM-*potential*. The revelation of NM-potential would be a step ahead of the physics. SRT does not impose restrictions on the velocity of propagation or motion of energy-free O_{NMPh} objects. SRT does not forbid them to overcome interstellar distances almost instantaneously. At the equivalence of inertial and gravitational masses, O_{NMPh} objects are not affected by the gravitational field. Therefore, they can freely leave black holes and carry the information on their internal processes.

But all the above, mentioned on the properties of non-material O_{NMPh} objects, loses its meaning if the W_{NMPh} set is empty. Therefore there is now the key, as a matter of fact, the main problem: the W_{NMPh} set is empty or not empty? To answer this question, we investigate at first experimental data about the long-range action fields existence and then continue to study the basic properties of O_{NMPh} objects.

3. Definition and Paradox of the Long-range Action Fields

Since the physical nature of the long-range action fields (LRA-fields) is not yet ascertained, we cannot give them full physical definition now. Therefore, we will give a phenomenological definition according to the facts of experimental LRA-fields observations. Planets and stars are sources of various physical fields. By the term ”the long-range action fields” of planets and stars, we call such fields F of planets and stars, whose actions are noticeable at least on the interplanetary and interstellar distances, respectively. This does not mean, of course,

that other physical bodies, besides planets and stars, cannot possess such LRA-fields. Like any physical field, LRA-field is a field-intermediary in some action transfer at a distance. We must not confuse LRA-field with "the long range action", which refers to the physics of action transfer at a distance *without intermediaries*.

According to astrophysics, LRA-fields cannot exist. Astrophysics firmly states one's position: *planets are unable to impact the Earth*. This position has the following substantiation.

Substantiation. Actually, the total energy flow of a field (known or still unknown to us) through its frontal area must be constant and must be spread throughout the frontal area. The frontal area increases with respect to r^2 (in case of its spherical shape, where r - the distance from the point-source of the field). Finally, the energy flow density of the field together with the field intensity should decrease with respect to $1/r^2$ or faster. The corresponding numerical estimates lead astrophysics to the present position.

Thus, the energy conservation law forbids the existence LRA-fields; more precisely, it would seems, that forbids, because, according to experimental data, LRA-fields exist in reality. The review of the experimental data on actions of planets and even stars is supplemented constantly. As supplement, the review is represented in papers (Vasiliev, 2008a, 2009a, 2009b, 2012a) and in Section 4 of this paper.

According to the experiments, actions of LRA-fields on terrestrial processes have the following characteristic energetic peculiarity. *The supposed negligible actions energy of LRA-fields cannot explain the observed effects. There is no dependence of the actions results upon the ratio of the supposed actions energy and the energy of processes on which the action is carried out. The supposed energy negligible actions of LRA-fields stand out sharply against the background of millions or billions of times more powerful actions of other fields. Here we observe the absence of any accordance between the supposed negligible actions energy of LRA-fields and the results of the actions, as if the quantity of the supposed negligible actions energy of LRA-fields plays no role* (see Section 4).

LRA-fields of the planets, Sun, Moon, Earth are poorly investigated. There are a few experiments conducted to study their dynamics. Therefore, their physical nature is not determined. But we were able to "have pull" the structure, some specific properties and origination conditions of LRA-fields from available data (Vasiliev, 2004, 2008a, 2008b, 2009a, 2009b, 2010). The physical model of LRA-fields has been developed in the result, as the logic consequence of experimental and observational data (Vasiliev, 2004, 2008a, 2008b, 2009a, 2009b, 2010). The physical model discloses existence of three various kinds of LRA-fields. According to the physical model, LRA-fields have the second characteristic peculiarity: *under certain conditions*, *LRA-fields interact nonlinearly and create brief abrupt flashes of their actions*. The physical model allows to compute cycles and moments of the brief abrupt flashes of LRA-fields actions (Vasiliev, 2008a, 2008b, 2009a, 2009b, 2010). According to the developed physical model, LRA-fields depend on external and internal movements of their sources, on the sources structure and processes occurring in them. Therefore it is possible to hope, that the use of LRA-fields will open new opportunities in research of internal processes of celestial bodies and the Earth, forecasting of earthquakes and solar flashes (Vasiliev, 2009a, 2012a). According to the physical model, all physical bodies possess LRA-fields.

The stated minimal information on the physical model is necessary to understand better the experimental material of Section 4. We will not delve into the details of the physical model. I want to focus here on the contradiction, paradox: on the one hand, according to the substantiation, LRA-fields cannot exist, on the other hand LRA-fields exist in reality. It is useful to note that the appearance of contradiction is not something new to science. It is useful to pay attention to the consequences of the elimination of contradictions in science. Similar paradoxes occurred many times in the history of science. Each time, the contradictions between facts and predominant science ideas indicated some applicability scopes of the existing science representations. Each time, these contradictions led to yet another, new understanding of the applicability scopes. As a result, a new model of the world around us was created. The new physical model was coordinated with the new facts. The new model came out over the applicability scopes of the old model. But the new model included the old model. The old model remains valid in the old applicability scopes. It happened when a non-planar nature of the sea surface was revealed that led to the development of the spherical Earth model in times of ancient Greeks, who could well calculate the Earth radius. The same happened with the discovery of the light velocity constancy (emergence of the relativity theory), discovery of quantum phenomena (quantum models emergence), and so on. Consequently, these contradictions are productive. They contain the potential of science development. Hence, such paradoxes must not be ignored. On the contrary, similar paradoxes should be used to expand scientific knowledge. In this paper, the paradox is resolved without violating the known laws of classical (in the sense, not quantum) physics

(Section 5). As a result, we obtain some new knowledge about interactions of the material and non-material physical objects. All reasonings are carried out below from the positions of classical physics.

4. Experimental Data on the LRA-fields Existence

At rises and settings, at culminations of solar system planets, Smirnov's detector (specific gyroscope on magnetic suspension) changes its average angular spin rate on 0.7-1.5% for a short time period, generally for 1.5-3 minutes (Bogdanovich et al., 2003, 2005, 2006a, 2006b; Smirnov, 2006, Smirnov et al., 2008) (Note 1). The same is observed at the passage of the planets, nearby stars (e.g. Sirius) and the distant galaxy (Andromeda) through the azimuth of the detector setting (Bogdanovich et al., 2003, 2005, 2006a, 2006b; Smirnov, 2006; Smirnov et al., 2008, 2009) (Note 2). For instance, the gravitational action on the detector at Jupiter rises is one and half billion times weaker than that of an observer moving around the detector. However, the device responded to the planet but not to the observer (in order to calculate the planets gravitational actions on the Earth correctly, it is necessary to take into account the free fall of the Earth in the external gravitational field; see Appendix 2). Here we observe an action of the planets to the motions in the Earth's region with a lack of the effective energy for such event, and against all else, much more powerful effects. Obviously, the energy of the actions of Sirius and the galaxy, all the more, cannot explain the observed effects. Using the physical model of LRA-fields, the author had calculated the time window in which brief abrupt flashes of actions of the Sun, Moon and planets LRA-fields must occur almost simultaneously (Vasiliev, 2008b). The author asked V. N. Smirnov to realize the special experiment in the derived time window. In figures from (Vasiliev, 2008b) one can clearly see that the influences of the sun, moon and planets are comparable to each other in the moments of these flashes. (Normalizations of the celestial bodies signals were not used.) Here we see again the disparity between the real results and the appreciable differences of the sun, moon and planets actions energies.

Smirnov's and Shnoll's detectors respond to the same astronomical phenomena. But Shnoll's one shows variations not in angular velocity but in the G histogram shapes representing macroscopic fluctuations of the physical processes rates (Note 3). S. E. Shnoll et al. (Shnoll et al., 2011) firmly discovered recently the influences of the planets (Mercury, Venus, Mars) on the G histogram shapes in time moments when the planets pass through the celestial equator i.e. when the ray from the planet is perpendicular to the Earth rotation axis. In their experiments, Shnoll's group (Shnoll, 2001, 2006, 2009; Shnoll et al., 1998, 2005; Panchelyuga et al., 2007a, 2007b) studied the G histograms for processes of different physical nature and different energy saturation, from radioactive decays and chemical reactions to noises in gravitational antennas. The following is important. Despite appreciable differences in energy saturation of the above processes (forty orders of magnitude) their G histograms changed synchronously and in the similar way. As well as in Refs. (Bogdanovich et al., 2003, 2005, 2006a, 2006b; Smirnov, 2006; Smirnov et al., 2008, 2009), we again observe here the absence of any accordance between the action energies of the celestial bodies and processes energies. (The mistrust to S. E. Shnoll's results occurred sometimes among specialists; this happened due to differences of the expert and automatic (by computer) estimations of histograms; see Appendix 3.)

Recently, using special spectroscopy, V. A. Zubow and his colleagues discovered the changes of per molecular structures of many terrestrial objects under the influences of the Sun, Moon and planets (Zubov, 2008a; Zubov et al., 2010, 2012; Vasiliev, 2010) (Note 4). These objects are: living and nonliving objects, liquid and solid media, in particular, solutions and water. For instance, during the Jupiter upper culmination the variations were observed in the mean molecular weight of clusters in the potato bio matrix, in the number of the various clusters and in their irradiation energy (Zubov, 2008a; Zubov et al., 2010, 2012), so (Zubov, 2008): "*During the Jupiter upper culmination the reliable picture of its action on the potato bio matrix is disclosed. … the Jupiter effect is unexpectedly strong during its culmination … the commensurability of the planet and the Moon effects follows from the experimental data* ". This is despite of the insignificance of the Jupiter action energy compared to the Moon action energy.

Researchers of the Siberian Branch of Russian Academy of Sciences found (Eganova, 2005) that the far from us collision of the Jupiter with the comet SL-9 generated, however, on the Earth the contrasting changes of the behaviour of mechanical and physical-chemical systems, over which the long-term calendar scientific observations were carried out. The researchers found the following (Eganova, 2005): "*The rotational displacement of the asymmetric torsion balance, which occurred over the entire period of the catastrophic event on Jupiter in July 1994, lasted until 21 October, after which the torsion balance back to its normal state with daily torsional vibrations, and, the return act had occurred without any further relaxational vibrations Particular interest is the reaction of an old English device – of stormglass: the large ampoule contains the specially prepared the complex mixture, which combines great number of substances: water, camphor, ammonia, nitrate, and alcohol. Mariners had used this device as a predictor of the weather. After those events*

on Jupiter, a great layer of crystals had arisen in the stormglass and that layer was not eventually dissolved (as it usually happens), it is compacted and stored until now, that is, more than 10 years .... Moreover, in one stormglass which was put in the thermostat (35.1° C), this layer had disappeared (note that a stormglass operates in a thermostat, in principle, as usually), but when after few years the stormglass was removed out from the thermostat, the same layer was recovered (!) with time." - the end of citation.

Recently, I. Charvatova disclosed influences of the planets Mercury, Venus, Earth, Mars on solar activity and solar-terrestrial phenomena (Charvátová, 2007; Dmitriev et al., 2009). And, I. Charvatova revealed a role of planets oppositions in the phenomena. According to the physical model of LRA-fields, just at the moments of planets oppositions relative to the Sun (and in special other instants) the abrupt flashes of the LRA-fields actions of the planets to the Sun occur with a possible long-living aftereffect. The academic science starts to recognize influences of planets on the Sun interior processes. For example, as it is marked in the handbook (Dmitriev et al., 2009): «*Physical origins of solar cycles are not known. They can be the internal property of the Sun as a star and its dynamo action as mostly believed now. Otherwise, planetary influences and interstellar causes could be involved. For example, it is believed sometimes that orbital rotation of giant planets (Jupiter, Saturn, Uranus and Neptune) is a natural source of the solar activity north-south asymmetries, and decadal and secular variations in the range of periods from ~11 years to ~165 years* " - the end of the citation.

Nearly forty years ago, Meidav and Sadeh (Sadeh et al., 1972) discovered the action of pulsar CP1133 on seismicity. According to Weber, the energy of the pulsar gravitational waves is on many orders of magnitude lower than that required for the detected pulsar action on seismicity (Sadeh et al., 1972). A.Ya. Lezdinsh forecasts simultaneously the epicenter, time (usually within a few days) and magnitude of strong earthquakes at Kamchatka Peninsula with using the correlation between earthquakes and planets' positions relative to the Earth and local horizon plane (Lezdinsh, 2008). This method really comes first in the open five-year competition among many other methods of earthquake forecast (with maximal magnitude error 0.4 point). The effectiveness of A. Ya. Lezdinsh' method proves the interrelation of seismic activity and LRA-fields - a significant influence of planets at interplanetary distances. This proof is difficult to refute. The reasons of the interrelation of tectonic processes and LRA-fields were described briefly in a number of papers (Vasiliev, 2008a, 2008b, 2009a, 2009b). According to these reasons, the processes, related to earthquake preparation, are the sources of the LRA-fields. At the same time, seismic activity is influenced by the total LRA-field. As a result, firstly, in the process of the earthquake preparation the precursors should occur in the form of LRA-fields anomalies (Vasiliev, 2008a, 2008b, 2009a, 2009b), and, secondly, the correlation of seismic activity with the actions of LRA-fields should arise - with the configuration of celestial bodies. The emergence of the precursors in the form of the abrupt anomalies of LRA-fields at 2-10 days before strong earthquakes was registered by the Smirnov's detector (Smirnov et al., 2008; Vasiliev, 2008a, 2008b, 2009a, 2009b). The correlation of seismic activity with the configuration of celestial bodies, including planets, is confirmed not only by the work of A. Ya. Lezdinsh but also by new statistics data about earthquakes in North America, Japan and around the globe (it will be described comprehensively in the nearest special paper). According to the statistical estimates, the revealed Mars influences on seismic activity are not random with the probabilities of 0.9998 - 0.99997.

5. The W_{NMPh} set is Empty or not Empty? - Resolution of the Paradox

To the substantiation of the position "the planets can not influence on the Earth" it is necessary to add: *the substantiation is correct for the class of energy fields*. Hence, the energy fields of planets and stars cannot significantly affect on the Earth processes. Scientific experiments and observations demonstrate the noticeable actions of planets and stars on the Earth. Hence, there are fields outside of this class. By definition, it is energy-free fields. Consequently, energy-free fields exist. Then, by definition, LRA-fields are energy-free fields.

This conclusion is consistent with the conclusion of S. E. Shnoll (Shnoll, 2001): *"The energy variation range for the processes under study equals tens of orders of magnitude. It is therefore clear that the "external force" that causes synchronous alteration of the histogram shapes is of the non-energy nature.*" - the end of citation. It is possible to give the independent proof of the energy-free fields existence. Using a telescope, famous astrophysicist N. A. Kozyrev registered true position of the planets, stars and galaxies (Kozyrev, 1977, 2005; Kozyrev et al., 1978). (The results of N. A. Kozyrev were confirmed by experiments of many independent researchers, in particular, in works of Lavrentjev and his group (Lavrentjev et al., 1990a, 1990b). Since the true positions of planets, stars and galaxies can be determined, then some field propagates from planets, stars and galaxies with the superlight velocity. However, in accordance with the special relativity theory (SRT), energy fields cannot propagate faster than light. Hence, and some energy-free fields propagate from planets, stars and galaxies. The authors of papers (Lavrentjev et al., 1990a, 1990b) put it prudently: "*there is the type of actions, that are out of the examination of modern physics*". According to the experiments of N. A. Kozyrev and his

followers, energy-free fields are capable to overcome interstellar distances almost instantaneously. This is not surprising, since SRT does not impose restrictions on the propagation velocity of energy-free fields. It is useful not to lose from sight that well-known laws of physics do not forbid the existence of energy-free fields and energy-free actions.

LRA-fields are energy-free fields. LRA-fields are amenable to physical cognition by the investigation of their actions on material objects (Section 4). Even, the physical model of LRA-fields was built. Consequently, LRA-fields belong to the W_{NMPh} set. *Consequently, the W_{NMPh} set is not empty*.

6. The Ability of O_{NMPh} Objects of the Physical Non-material W_{NMPh} World to Control Physical Interactions of Material Objects, Energy Balance of these Interactions, Energy Pumping-over and Transformation of Energy from one its Kind to Another

One more basic property of O_{NMPh} objects is their ability to operate interactions of material objects. Really, as noted above, physical non-material objects actions to material objects change physical states of the material objects. The change of the material object physical state demands more often the energy consumption or release. Let's assume (and we shall test it experimentally then) that as a result of the action of some physical non-material O_{NMPh} object to some physical material O_{M} object, the energy of the O_{M} object is increased by quantity δE, $\delta E > 0$. Where is the source of this δE energy? The O_{NMPh} object does not transmit any energy to the object O_{M}. Only objects of the material world have energy. If we assume, that during the action to the O_{M} object, the energy transfer to the object O_{M} from other material objects or processes don't occur, then the δE energy is scooped from anything, what is excluded. Hence, the action of the physical non-material O_{NMPh} object to the physical material O_{M} object switches on the energy pumping-over to the O_{M} object from other material objects or processes which population we shall designate as A_{M}. Analogously, if $\delta E < 0$, the action of the physical non-material O_{NMPh} object to the physical material O_{M} object switches on the energy pumping-over from the O_{M} object to other material objects or processes which population we shall designate as A_{M} too. Often, energy transfer between material objects is associated with transformation of energy from one its kind in another**.** *Consequently, under the $\delta E \neq 0$ assumption, firstly, non-material O_{NMPh} objects control interaction between the O_{M} and A_{M} material objects, which arises at these energy pumping-overs. Secondly, non-material O_{NMPh} objects control energy balance of the material objects interactions and transformation of energy from one its kind in another, if the transformation occurs.* The same refers to the momenta balance control. As you can see, the fact $\delta E \neq 0$ is important theoretically. This fact is not less practically important, as such fact may have far-reaching technological consequences. Therefore the following problem takes on special significance: whether the fact $\delta E \neq 0$ exists? Yes, exists. It follows from experimental data of Section 4.

Indeed, according to Section 5, Section 4 describes physical actions observations of non-material objects – LRA-fields. So, in V. N. Smirnov's experiments the gyroscope changes its average angular spin rate under the influence of LRA-fields. Consequently, the mechanical gyroscope E energy changes. Hence $\delta E \neq 0$. The actions of LRA-field of pulsar CP 1133 change seismic activity. Thus the energy of seismic activity changes. Hence, here again $\delta E \neq 0$. At the reorganization of the physicochemical parameters of fluid and solid bodies, vegetative and biological objects under the influences of LRA-fields (V. A. Zubow's group experiments) $\delta E \neq 0$ too. What plays here the role of material A_{M} objects set? It is clear in the first case. The gyroscope is actuated by the electromotor (Smirnov et al., 2006, 2008). The energy source of the gyroscope rotation is the electric power source. Hence, under the actions of LRA-fields there is the pumping-over of the energy between this source and the gyroscope with transformation of electrical energy to mechanical energy. In the second case, as mentioned above (Section 2), according to Weber, the energy of the pulsar gravitational waves is many orders of magnitude lower than that required for the detected pulsar action on seismicity (Sadeh et al., 1972). Consequently, the action of pulsar CP 1133 turns on the energy pumping-over between the seismic activity and some energy sources, others, than the pulsar CP 1133 itself. Probable mechanism of the energy pumping-over relates to changes of the physicochemical parameters of rocks and fluids sating them under actions of LRA-fields, that should lead to changes of the rocks breaking point. Interrelation of rocks motions and LRA-fields may also play the role here (Vasiliev, 2008a, 2009a, 2009b). In third case, the outside source of energy is not yet clear. Its searching was not accomplished. Consequently, the fact $\delta E \neq 0$ exists. Hence, the above assumption of Section 6 and its corollaries transform into reality. Consequently, at least some *non-material O_{NMPh} objects (but probably all or nearly all O_{NMPh} objects) are capable to control material objects interactions, energy balance of these interactions, energy pumping-over between the material objects and transformation of the energy from one its kind in another (by some non-energy, non-forcing way)*.

Therefore, origins of physical laws, controlling physical interactions in the material world, completely incomprehensible to us today, lie, most probably, in the world of non-energy objects, i.e. in the non-material

world. I think, that we observe non-energy, non-forcing action - control around us every day, but we are not aware of that (Vasiliev, 2004, 2009c). As a matter of fact, all physical natural processes occurring around us are controlled by physical laws of Nature. This control does not require energy expenses. It occurs by some strange to us non-forcing non-energy way. It is useful not to lose from a view that known laws of physics do not forbid existence of energy-free objects. The energy-free control of physical processes development and energy pumping-over is not something absolutely new for classical physics, it exists and in classical physics (Vasiliev, 2012a). The fact $\delta E \neq 0$ exists and must therefore have far-reaching technological consequences.

Now it is clear, why there is no accordance between supposed negligible energy of planets and stars actions and the actions results, as if the quantity of the supposed negligible actions energy plays no role. It cannot be a correspondence with something that does not exist that is with the energy of LRA-fields. It should be a correspondence with something another, conventionally termed NM-potential.

7. Base Properties of LRA-fields as O_{NMPh} Objects of the Physical Non-material W_{NMPh} World; Relation to Ideas of N. A. Kozyrev

Since LRA-fields set membership to the W_{NMPh} world and have ability to act with $\delta E \neq 0$, they have the above base properties of O_{NMPh} objects of the physical non-material W_{NMPh} world. Consequently, LRA-fields have the ability to control interactions of material O_{M} objects, energy balance of these interactions, energy pumping-over between O_{M} material objects and conversion of energy from one its kind in another. In particular, LRA-fields can freely leave black holes and carry information on their internal processes. They do not carry the momentum $\boldsymbol{p}$, act by non-forcing method and overcome restrictions of SRT on the propagation velocity. N. A. Kozyrev established experimentally that the momentum is no transfered at the almost instantaneous transfer of the actions studied by him. On this base, N. A. Kozyrev denied involvement of any field in transfer of the actions studied by him, whereas any physical field, as assumed in physics, always carries energy and momentum. Actually, this is just logical experimental result if to take into account properties of fields from the W_{NMPh} world. As a matter of fact, N. A. Kozyrev experimentally confirmed that energy-free fields exist, really do not transfer a momentum and overcome restrictions of SRT on field propagation velocity.

In order to explain somehow the almost instantaneous actions transfer without participation of any field, N. A. Kozyrev putt forward the hypothesis about liberation and absorption energy at changes of physical time density and about that time density changes instantly pervade all space, since time itself instantly run through the entire universe - "interaction in temporal aspect" in the terminology of Kozyrev's supporters (Eganova, 2005). It seems to me, this hypothetical property of physical time is more easily and clearly to term – *energy capacity* of time. So, according to N. A. Kozyrev, energy is transferred with superlight velocity. But, according to general relativity, changes of physical time density cannot pervade all space instantaneously, since changes of the physical space-time propagate with the velocity of gravitational waves (Vasiliev, 2012a) (Note 5). Energy transfer with superlight velocity caused distinctly negative attitude to N. A. Kozyrev's ideology as a whole.

But, if to deny the participation of any field, N. A. Kozyrev had no normal way out. But just the above "interaction in temporal aspect" can be removed from N. A. Kozyrev's concept without detriment to his other proofs and deductions in relation to his experimental material. For this it's enough to replace "interaction in temporal aspect" by almost instantaneous propagation of energy-free LRA-fields and by their energy balance control that eliminates above mentioned reasons of distinctly negative attitude to N. A. Kozyrev's ideology. At this, it is hypothetically possible, that the changes of time density (physical time energy capacity changes) exist but they are a result of LRA-fields actions which overcome interstellar distances almost instantaneous and control energy pumping-over from the time density and back (that is required according to N. A. Kozyrev's ideology). However, it is possible, that the energy pumping-over happens not from time density, but from some other physical object which is now difficultly observed or remains unknown (from dark matter?, dark energy? etc.)

Since celestial bodies and the Earth possess LRA-fields (according to the physical model, all physical bodies possess LRA-fields) belonging to the W_{NMPh} set, there is a channel of their ties with the W_{NMPh} world. It is reasonable to suppose, that the channel is an interaction channel. To somehow imagine a physical picture of the united material - non-material world, in papers (Vasiliev, 2004, 2009c) the initial *working hypothesis* was formulated:

1) Objects of the non-material world have some properties;

2) Objects of the non-material world can possess non-material fields;

3) By means of non-material fields non-material objects can realize some actions to non-material and material objects;

4) Material objects can also possess non-material fields and act through them to non-material objects and to material objects;

5) Laws of interaction through non-material fields are others, than known laws of the material world. The known physical laws of our material world remain valid for interaction of material objects through material fields and at direct material contacts.

According to this hypothesis the material and non-material worlds are interdependent and interact between themselves by means of the non-material fields. The hypothesis reflects views to the role of LRA-fields in the indicated united world. The working hypothesis is offered forcedly in the most general outlines. During examinations the initial hypothesis should be improved, detailed, developed.

8. Some Contiguous Problems

Whether extrasensory individuals use non-material fields? It is not known now. How to investigate it? It is useful to use the specific properties of LRA-fields described by them physical model (brief abrupt flashes of the actions to psychics and from psychics) for the investigation. It is useful to investigate also whether psychics can act to LRA-fields detectors.

Physical mechanisms of LRA-fields actions are now unknown. There is a supposition that LRA-fields act by means of space-time properties changes (Shnoll, 2001) or by means of time density changes (Kozyrev, 1977, 2005; Kozyrev et al., 1978). In order to research experimentally and identify the mechanisms of energy-free fields actions it is useful to begin with laboratory experiments on the generation of LRA-fields as described in papers (Vasiliev, 2009a, 2009b, 2010).

Laws of Nature of the W_{M} material and non-material W_{NMPh} worlds are different. Nature laws are changing themselves at transition from the W_{M} world to the W_{NMPh} world. There is a problem: how Nature laws change themselves at this transition, that is, in the boundary layer of small (vanishingly small in a certain sense) energies – by step or continuously? The answer is now unknown. Let's assume, continuously. Then, if the energy E (most likely, densities of energy) tend to zero, Nature laws of the material W_{M} world should change themselves and start to resemble to laws of the non-material W_{NMPh} world. It means, that the extremely weak (in a certain sense) material fields (for example, electromagnetic) can have essentially other properties of interaction with substance and other laws of propagation, can gain properties of LRA-fields and etc.. That is, the area of extremely weak physical fields is an interesting area where we can expect and look for changes in laws of Nature and their approach to laws of the non-material world (2008c). In all likelihood, this area is not investigated experimentally, and, therefore, the validity of currently known laws of Nature is not established for it. In other words the research of the boundary layer may give interesting results.

Myriads of celestial bodies should create chaos of LRA-fields actions if LRA-fields do not attenuate in accordance with their propagation from their sources. On the one hand, we observe the chaos of fluctuations of physical processes rates. According to experimental data, the universal action of celestial bodies LRA-fields on behaviour of this chaos exists (Vasiliev, 2008a, 2009a, 2009b; Shnoll, 2009). Hence LRA-fields contribute in the behavior of this chaos. Therefore, probably, LRA-fields of many celestial bodies are one of appearance reasons both of the fluctuations and their chaos. On the other hand, we do not observe the chaos in behaviour of average angular velocity of the gyroscope at the moments of brief abrupt flashes of LRA-fields actions. Under LRA-fields influences of the Sun, Moon, planets, short-range stars and the far galaxy, the average angular velocity of the gyroscope at the moments of the brief abrupt flashes varies by a regular way (Section 2). Hence, LRA-fields have some signal attenuation, at least, in sense of their influence on the behaviour of physical processes average performances during the brief abrupt flashes. But why LRA-fields should attenuate (due to interaction with dark matter? with dark energy? with physical vacuum? or something else?)? There is no answer to this problem now. The total LRA-fields action of celestial bodies myriads can be understood more concretely only after investigation of LRA-fields dynamics and properties of their superposition. The brief abrupt flashes of LRA-fields actions arise at the moments of particular relative positions of celestial bodies and a local horizon plane (Vasiliev, 2008b, 2009a, 2009b, 2010). Maybe the constant and variable (in time) components of celestial bodies LRA-fields have different properties (including attenuation): the variable component creates the fluctuations chaos, the constant component creates the brief abrupt flashes.

Delusiveness of the objections against the non-energy fields existence were described in section Debates of paper (Vasiliev, 2012a).

9. Summary Results and Brief Explanations to Them

The material W_{M} world is defined in Section 1 as the world of the objects having energy E. The non-material W_{NM} world is defined as the world of remaining objects. The physical non-material world W_{NMPh} is defined as that part of the W_{NM} world, which is cognizable by physical methods.

The following is shown in Sections 2 and 6 by physical methods. The W_{NMPh} set is not empty. In other words, O_{NMPh} objects of the physical non-material W_{NMPh} world *exist*. O_{NMPh} objects of the physical non-material W_{NMPh} world have no the energy, mass and momentum. They are inertialess. The special relativity theory (SRT) does not impose restrictions on propagation or motion velocity of energy-free O_{NMPh} objects. SRT does not forbid to them to overcome interstellar distances almost instantaneously. At equivalence of inertial and gravitational masses, O_{NMPh} objects are not affected by the gravitational field. Therefore, they can freely leave black holes and carry information on their internal processes. O_{NMPh} objects act to O_{M} objects of the material word. They act to material O_{M} objects by unusual *energy-free and non-forced way*. At least some *non-material* O_{NMPh} *objects (but probably all or nearly all* O_{NMPh} *objects) are capable to control material objects interactions, energy balance of these interactions, energy pumping-over between material objects and transformation of the energy from one its kind in another (by some non-energy, non-forcing way)*. The same concerns to the control of the material objects momentum balance. Therefore, it is possible that origins of physical laws, completely incomprehensible to us today, lie in the world of non-energy objects, i.e. in the non-material world. Instead of energy and strength physical non-material O_{NMPh} objects have something the other that allow them to act, that could be called as the *non-material action potential or shortly - as* NM-*potential*. The NM-potential revelation would be a step ahead of physics.

According to the experiment, the long-range action fields (LRA-fields) exist (Sections 3, 4). It is evinced in the actions of planets and even stars to terrestrial processes (Sections 3, 4). However LRA-fields do not belong to the W_{M} set. Therefore LRA-fields are not subjected to material world physical laws. According to the material W_{M} world physical laws, LRA-fields cannot exist really. Therefore becomes clear why physics of material processes negates the LRA-fields existence – you see, LRA-fields are outside the activity field of the material processes physics. LRA-fields belong to the W_{NMPh} set (Section 5). Thus, having found LRA-fields, we have met with the disclosing of physical non-material O_{NMPh} objects and with non-material actions on material objects.

Really, from the experimental data, from validity of the energy conservation law and from validity of the thesis «planets cannot influence the Earth by means of energy fields» logically follows: LRA-fields are energy-free fields (Section 5). The existence of energy-free fields follows also from independent experiments of well-known astrophysics N. A. Kozyrev and his followers (Section 5). LRA-fields are accessible to physical research on the basis of registration their actions on material objects. Even, the physical model of LRA-fields was built (Vasiliev, 2004, 2008a, 2008b, 2009a, 2009b, 2010). (The physical model discloses existence of three various kinds of LRA-fields and their properties.) Hence, by definition, LRA-fields are O_{NMPh} objects of the physical non-material W_{NMPh} world (Section 5). Therefore the problem of the non-material objects physics development arises (Vasiliev, 2004, 2009c). From this point of view, the development of LRA-fields physical model is a step in given direction. Now it is clear, why it is absent any accordance between the supposed negligible actions energy of planets and stars and the actions results, as if, the quantity of the supposed negligible actions energy plays no role. There cannot be a correspondence with what that does not exist, that is with LRA-fields energy. Therefore LRA-fields have all the base properties of O_{NMPh} objects which are listed above. In particular, LRA-fields do not carry a momentum, SRT does not forbid to them to overcome interstellar distances almost instantaneously. N. A. Kozyrev established experimentally, that the actions of planets and stars can be transmitted to the Earth almost instantaneously, but the momentum is not transmitted really at this. It experimentally confirms the deductions about the O_{NMPh} objects properties (Sections 2 and 7). It is useful to note: *LRA-fields have the ability to control interactions of material* O_{M} *objects, energy balance of these interactions, energy pumping-over between the material* O_{M} *objects and the conversion of energy from one its kind in another* (Sections 6, 7). (Energy-free control of physical processes development and pumping-over of energy is not something absolutely new for classical physics, it exists in classical physics (Vasiliev, 2012a). According to the LRA-fields physical model (Vasiliev, 2004, 2008a, 2008b, 2009a, 2009b, 2010): firstly, LRA-fields depend on interior structure and interior processes of their sources; secondly, all physical material bodies possess LRA-fields. Therefore LRA-fields mastering should give new resources to research interior processes of the Earth, planets, stars, black holes, other physical bodies, to forecast earthquakes, solar flares etc. (Sections 3, 4, 7) that is partly confirmed in practice (Section 4). Besides the mastering of LRA-fields (by analogy to electromagnetic fields mastering) should have far-reaching technological consequences, in particular,

it should enable us to establish fast telecommunication on interstellar distances, to act to interior processes by means of LRA-fields. The same concerns the mastering of the O_{NMPh} objects as a whole.

N. A. Kozyrev's hypothesis that time density changes (more exact, energy capacity changes of physical time) instantaneously pervades all space and transfers energy by this manner with superlight velocity ("interaction in temporal aspect" in the terminology of Kozyrev's supporters (Eganova,2005) may be improved. It is logical to replace it (without detriment to other proofs and deductions of N. A. Kozyrev in relation to his experimental material) by the almost instantaneous propagation of energy-free LRA-fields, their control of the energy balance and, probably, their control of the time density (Section 7), that eliminates the above reasons of the distinctly negative attitude to the ideology of N. A. Kozyrev as a whole.

The experimental data analysis gives the conclusion: LRA-fields have some signal attenuation at least in sense of their influence on the behaviour of average performances of physical processes during the brief abrupt flashes (Section 8). Mechanisms of O_{NMPh} objects actions, in particular, of LRA-fields are not clear now. In order to research experimentally and to identify the mechanisms, it is useful to begin with laboratory experiments on the LRA-fields generation as described in papers (Vasiliev, 2009a, 2009b, 2010). The Nature laws of the material W_{M} and non-material W_{NMPh} worlds are different. The area of extremely weak physical fields (for example, electromagnetic fields) is an interesting area where one may expect and look for changes of Nature laws and their approach to the laws of the non-material world (section 8).

The above thoughts were obtained as a result of the experimental data logical comprehension. In this paper the version of the physical non-material world properties and the energy-free LRA-fields existence is described. This version originate from the following: from validity of classical physics conception about the actions transfer at a distance by physical fields; from validity of the energy conservation law, from validity of thesis: "the planets cannot influence the Earth by means of energy fields". It is possible to search for alternative versions, for example, by violation of the energy conservation law, due to incorrectness of the above thesis, due to quantum effects and etc. Quantum effects are unlikely able to explain LRA-fields actions to average angular velocity changes of the gyroscope or average characteristics of other macroscopic physical processes. One may try to suppose the violation of the thesis due to noticeable influence of extremely weak fields (for example, electromagnetic fields). But then, at first, it is necessary to solve the problem: why the weak energy field acts much more strongly then the incomparably more strong energy field? Secondly, energy of action to the Earth of an energy field of far stars or galaxies is so insignificant that hardly someone will dare to hope for the action of this energy. Thirdly, then it is necessary to devise something concerning the energy balance. In fact, for example, the action energy of CP1133 pulsar to seismic activity is lower than the energy change of the seismic activity on many orders (Sections 4 and 6). In other words, this cannot be explained by the actions energy, but it is possible to explain this if to consider that extremely weak energy fields start to gain properties of non-material fields, that is properties of the energy-free actions and NM-potential (Section 8). It is possible to try to suppose violation of the thesis due to energy pumping from somewhere or anywhere and by somehow to the energy fields of celestial objects in accordance with their propagation to the Earth. But then it is necessary to solve the problem: whence and how the pumping occurs? Other hypothetical assumptions are not excluded. The version of the present paper has, per se, only one uncommonness: the physical non-material world exists and acts to the material world, LRA-fields exist and are energy-free fields. This uncommonness is not a certain assumption. This uncommonness follows from the experimental data and such logic reasonings which do not violate known physics laws. This version is interesting and pithy. The future will show what version is closer to the truth. Debates about the existence of energy-free fields occurred, but they were not effective (Vasiliev, 2012a). The delusivenesses of the objections against the non-energy fields existence were described in section Debates of paper (Vasiliev, 2012a). The effective controversy on all directions of ideas is useful here. Yes, LRA-fields existence contradicts to current physics conception, but only because current physics is bounded by investigations only material processes. However to ignore, because of it, LRA-fields existence is non-constructive and harmful to science since similar contradictions between reality and its current physical model always enclose potential for science development (Section 3), which is unpractical to lose. Current physics does not investigate the non-material world. It is the truth. But it does not follow from anywhere that physics should not or cannot engage the non-material world. Simply physics had no experience in this matter hitherto.

Acknowledgements

The author thanks the academician the Russian Academy of Science (RAS) A. S. Alekseev, Dr. A. V. Dmitriev, Dr. A. D. Gruzdev, Dr. A. V. Mihalcev, the member - correspondent RAS A. V. Nikolaev, physics V. (N.) P. Tataridou and Prof. M. N. Yudin for pithy discussions and practical support. The author thanks experimenters

Dr. V. A. Zubov, A. Ja. Lezdinsh, Dr. A. G. Parhomov, Dr. V. N. Smirnov, and Prof. S. E. Shnoll for constructive cooperation, placing at author's disposal experimental results and pithy discussions.

Notes

Note 1. Developed by Kurchatov Institute of Atomic Energy and MEPhI (Moscow).

Note 2. The detector has directedness.

Note 3. Developed by Institute of Theoretical and Experimental Biophysics,

Russian Academy of Science.

Note 4. The author can not agree with the explanations given in papers (Zubov et al., 2008, 2012), but believes that their experimental part deserves of attention and development to a systematic scientific observations.

Note 5. It is useful to explain, that instantaneous penetration into the entire universe cannot be related to changes of *physical* properties of time, but it is related to the *mathematical* space-time coordinate system which is imposed on the universe artificially by a researcher (Vasiliev, 2012a). The *mathematical* space-time coordinate systems (which has no physical properties) is instantly imposed by a researcher on the entire universe (but does not run through it), of course, without intervention of any physical agent. Such lapping *of the mathematical* time does not mean that the *physical* properties of time, as *physical* substance, instantly pervade the entire universe. For example, the mathematical time is applied instantly to the entire universe, but changes of the space-time metric propagate from their sources not instantly, but gradually - with the velocity of gravitational field propagation.

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Appendix 1. Is it Possible to Cognize the Non-material World?

Where is the proof of impossibility to investigate non-material objects? There is, naturally, no such proof; it is not required like also, since it "is obvious" and so all. But since the proof is not present, the conviction in the

impossibility to explore non-material objects carries actually not scientific, but psychological character based, as it were, on scientist's experience.

First of all, let us note: the conviction, that the non-material world is non-cognizable, is based on the philosophical stereotype that is widespread and deep-rooted in the science. This stereotype is usually formulated by its supporters in the following way: "*If something is non-material then to describe, feel, measure and cognize this is impossible in principle. And if you can describe, feel, measure and cognize this, then we can talk only about something material*. *The word-combination "physics of non-material" is the same absurdity as "the upper bottom", "black whiteness" or "warm coldness."* Here, firstly, notion of the non-material is obviously substituted by notion of the non-cognizable, and material and non-material are separated by an impenetrable wall. Secondly, the stereotype is not how something generally recognized in scientific philosophy. In philosophy, there are no single definitions of the material and non-material notions, what is easy to see by acquaintance, at least briefly, with existing philosophical schools. At many philosophical schools the dividing dualism is radically rejected. Monism, for example, proceeds "*from gnosiological views on which the matter and spirit are only various sides of the same being*" (Brockhaus and Efron Encyclopaedic dictionary). Many philosophers consider, that only the monistic philosophy can be true: "*there cannot be no doubt that the true philosophy can be only monistic: the basic requirement of any philosophical system consists in carrying out of the single beginning, and to refuse this requirement, means to refuse opportunity to understand the world as the whole, as cosmos (order). ... on dualism to stop it is impossible: having understood distinction of spirit and matter, it is necessary to search for associations in the supreme concept... All new philosophy, beginning from Descartes, went on this road and it is necessary to believe, that future philosophy will follow this direction ...*" (in the same place – in the encyclopedia). The last citation is conformable to the physical conception about the unity of the material - non-material world stated in this paper. At last, thirdly, the stereotype enters into the contradiction with philosophically-religious doctrines about interaction of spirit and matter. And in fact spirit, by definition, is not matter, and there where there is an interaction of parts, there is an opportunity to cognize one part through behaviour of other part. In addition, many believers, according to religion, feel the God during prays. And, according to the definition of supporters of the stereotype, the God is material then. There is an inappropriate confusion. Therefore the stereotype, despite of its apparent simplicity and logicality, suffers by crudity and does not correspond to the contents of philosophy as a whole. But, the most important, the stereotype not only does not allow the science to come nearer to investigation of the non-material world, but it does not allow at all to construct a working hypothesis, proceeding from which, it would be possible to begin attempts of the non-material world investigation. Therefore, the given stereotype is not harmless for the science as could be seem at first sight. In other words, the stereotype prevents the development of the natural sciences, rejecting an opportunity of the scientific investigation of the non-material objects.

In contrast to the above stereotype other, scientific, much more simple definition of the non-material objects is given in Section 3.2.1. This definition is much more important and more productive for natural sciences and it is more easy and more clear for all people. This definition opens the opportunity to construct the working hypothesis and the non-material objects search and research principles by methods of the further materialistic natural sciences development (Vailiev, 2004, 2009c). At this, according to the scientific philosophy, the non-material world does not look non-cognizable, separated by impenetrable wall from the material world. On the contrary, the non-material world looks as an active interacting part of the single material - non-material world. Obviously, the scientific recognition of the non-material objects research opportunity by physical methods would be the principle change of physical conceptions. Therefore, naturally, it is impossible to expect for an instant recognition of the ideas developed in the present work. This matter is so unusual, that it requires all-round wide discussion in order to come to the generally recognized conclusion.

Appendix 2. Distinctions of Calculation of Gravitational Actions on the Earth

In order to calculate the gravitational actions of planets on the Earth correctly, it is necessary to take into account the Earth free fall in external gravitational field. The Earth moves in "vacuum", and it is nothing prevents the Earth falling. If external gravitational field is homogeneous (constant) on the Earth, then this field is not perceptible at the Earth (as we do not feel gravitational attraction inside freely falling elevator). However, due to very weak non-homogeneity (small gradient) of the external field at the Earth, the external gravitational field acts very weak on the earthlings. As an indivisible body, the Earth falls freely as a single whole in the external field with some averaged acceleration A_{AV} of free fall. Due to the weak gradient, a little different A acceleration of the free fall corresponds to the different points of the Earth, because the external gravitational field operates slightly differently at different points of the Earth. An earthling or device at the Earth may feel only this very small difference $(A_{AV} - A)$ produced by weak gravitational influence of the external field to the earthlings.

Such object at the Earth is affected by action of the external gravitational force equal to the absolute magnitude of the difference $(A_{AV} - A)$ multiplied to the mass of the object. This force and should be compared with the force of attraction to an experimenter. All this, naturally, is taken into account in the theory of tides, which repeatedly tested experimentally.

Appendix 3. On Expert and Automated Estimations of the Histograms

S. E. Shnoll is known as an extremely conscientious, careful researcher who will check the result hundred times before he will publish it. Nevertheless, among specialists sometimes there is a mistrust to results of S. E. Shnoll. It happens because of the discrepancies of expert and automated (by computer) estimates of the histograms. However, these discrepancies are natural at the given stage. In paper (Vasiliev, 2008c) I so explain, why it happens. I had worked in geophysics through my whole life and had been in the time when computers had not been yet applied in geophysics. They were simply absent in geophysics. At that times interpreters selected time-distance curves of seismic waves perfectly and handy, that is correlated impulses "by eye" - an expert estimate. Their interpretation worked in practice perfectly. The problem on the automated correlation simply did not arise. Computers have appeared then. Very competent mathematicians had attracted for the development of working correlation algorithms. To surprise of geophysicists, there was no use from it; algorithms did not work in practice, similar impulses were correlated irregularly. Many years of the work of many geophysicists were required, it was required to insert a lot of financial assets to create programs and algorithms which work in real-life environment well. The programs began to work really only after immersion in them a lot of specific finds of the geophysicists which took into account specific features of field materials. In geophysics, as distinct from the histograms, there are alternating-sign signals of quasisinusoidal type when the cross-correlation function rapidly decreases at the reciprocal phase shift of seismic signals. Therefore it is not so surprising for me, that first class algorithms of first class mathematicians had not helped to S. E. Shnoll's group immediately. And now, interpreters select time-distance curves better, than a computer.

According to the recent private S. E. Shnoll's message for me, the algorithms of the automated histograms estimation have achieved the acceptable level at last, can replace extremely labourious expert estimation and give in practice results similar to expert estimation results.