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Kinetic Gravity

and

Growing Earth

Kiev * 2012

Краткое пояснение

Настоящая брошюра содержит необычную работу с необычной историей написания. Ее необычность обусловлена проблемой терминологии, назначением статьи и сложной темой, касающейся гравитации, которую необходимо было раскрыть как можно полнее и подробно объяснить. Статья готовилась для сборника трудов конференции «Свидетельства расширения Земли», состоявшейся на Сицилии 4 –9 октября 2011 г. Компъютерная заготовка «Геопрорыв в науках о Земле» была переведена на английский язык и опубликована [Blinov, 2011] в сборнике трудов конференции под названием «**Geophysical Advances on Earth's Evolution – Kinetic Gravity and Expanding Earth ».** В этой связи автор выражает искреннюю благодарность переводчику статьи и основному инициатору встречи на Сицилии д-ру Giancarlo Scalera.

.   К сожалению, названная работа, опубликованная в форме расширенных тезисов, существенно сокращена, в ней явно недостает информации для понимания затронутой сложнейшей проблемы. Поскольку английский перевод первоначального текста был сохранен, автором статьи было принято решение вынести первоначальный вариант названой работы (на русском и английском языках) на суд научной общественности.

При чтении «Кинетической гравитации …» следует учесть, что что *материя,* определение которой приведено в тексте статьи, рассматривается в качестве физической величины, а *энергия является неотъемлемым свойством материи воздействовать на соседние порции той же материи.* Энергии без материи не бывает.

.   Материя является главным действующим агентом в природе. Она представлена тремя основными состояниями: вакуумным состоянием (эфиром); полевым состоянием (различными видами полей); вещественным состоянием (веществом, обладающим массой покоя). Так как вакуумное состояние материи занимает огромный объем космического пространства, то *эфир является главным состоянием материи*. Образно говоря, эфирная материя является основой мира. Определяющим свойством материи является ее способность воздействовать на другие порции материи и переходить из одного состояния в другие состояния.

.   Не следует отождествлять вещество и материю, так как это различные сущности, несмотря на их генетическую общность. Вещество состоит из материи, является структурой из материи. Эфир тоже образован из материи. Немецкий эквивалент слову вещество – Stoff, а английский эквивалент может быть представлен словами substance или material. Основной характеристикой вещества является *масса покоя*. Полевые взаимодействия характеризуются *энергией и ее плотностью*, а для эфира и материи аналогичные параметры пока не установлены.

.   Без учета приведенных сведений о материи и ее состояниях, заимствованных из самой природы, весьма трудно понять суть гравитации и ее роль в формировании и эволюции небесных тел.

Kinetic Gravity and Growing Earth*

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ABSTRACT: The paper presents empirical evidence about the increase in size and mass of the Earth throughout its geological history. The rate of increase of radius, calculated by counting the increments of the crustal area of the oceans is about 2 cm/year. The parameters of the Earth (mass, radius, surface) are increasing at an exponential rate.

The planet is evolving towards becoming a star. During its evolution Earth has experienced an increased tectonic activity, a rising of its inside and outside temperature, an increasing degassing and atmospheric density, and an increase of its force of gravity. Oceans and the bulk of water appeared in relatively recent times. Since the Earth is an ordinary planet of a solar (stellar) system, the observed process of evolution is common to all celestial bodies.

The cause for these evolution is the nature of gravity, which is a flow of energy that carries matter from the surrounding space into the interior of the celestial bodies. The existence of the flow of matter and energy is supported by the increase of the size of the Earth's globe, by the experience of Shchegolev [1990] and by four consequences of the law of universal gravitation. The increase in mass of the globe can be deduced directly from the law of universal gravitation in his natural (kinetic) treatment.

It is accumulation of extensive natural empirical data on the globe and nature in general, able to reproduce Earth's history, relying solely on observation and experimentation. The enormous amount of physical information and data of Earth Sciences allows to turn the current hypothetical ideas about the origins and development of the Earth in the category of empirical generalizations, all based on irrefutable facts. However, the empirical generalization of such a complex problem cannot belong to one person, but it is the result of the large community of scientists who have worked studying the structure and origin of the globe.

Early speculations about the possible growth of the planet came from the materialist views of Rene Descartes, who believed [1950] that "the Gravity is not other than the fact that terrestrial bodies are pushed toward the centre of the Earth by a thin matter." Under "thin matter" Descartes intended the universal medium (ether) that fills all space.

Developing this idea, Descartes explained that the constant pushing of bodies toward the Earth centre can be observed only in the case of existence of

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an energy flow of thin matter. Later, the idea of a material flow toward the centre of the Earth was thoroughly proposed by the Polish-Russian engineer Ivan Osipovich Yarkovsky [1888, 1889, 1912], who considered the ether and earth substance (material) as essences of the same nature, [Beekman, 2005]. Naturally, the flow of matter from outer space into the depths of bodies was accompanied by the Yarkovsky formation of chemical elements and the growth of the celestial bodies. A more detailed view about Descartes and Yarkovsky can be found in the book by Bembel et al. [2010].

To derive the law of gravity, you can use a modern demonstration of the fact that the gravitational field has a kinetic energy. The existence of the kinetic energy of the gravitational field is shown in the experiment with a rocket floating near the Earth surface. The rocket does not makes work, and the kinetic energy of the particles of fuel balances the kinetic energy of the gravitational field. In the case of equality of the two kinds of kinetic energy, with a constantly working engine, a possible fixed position of the missiles can be obtained.

The energy density at each point of the gravitational field can be designated with the quantity

$$\varepsilon = \delta c^2 \qquad\qquad\qquad (e2.1)$$

where δ is the mass density of the field, and c is the speed of light. Along with this, each point of the gravity field is characterized by the gravitational acceleration g. Because these two features belong to the same point, then between them must be a relationship

$$\delta c^2 \sim g. \qquad\qquad\qquad (e2.2)$$

To give the status of equality to (e2.2), in the right-hand side of this expression the proportionality factor β must be introduced:

$$\delta c^2 = \beta g. \qquad\qquad\qquad (e2.3)$$

The dimension of the coefficient β follows from the expression (e2.3). It is expressed in g/cm^2. With these dimension, the meaning of the β is a specific surface density of mass. The coefficient β can also be understood as the energy density of the field of gravity per unit of gravitational acceleration.

After multiplying both sides of (e2.3) on the test mass m in the body, obtained by the elementary force F, acting on a mass m from the field of gravity

$$F = mg = \frac{m \delta c^2}{\beta} . \qquad\qquad\qquad (e2.4)$$

To continue the deduction of the law of universal gravitation, here it is used the Yarkovsky's concept that to any body, including the body A of mass M, there is the energy flow of matter, which has the rate c and the energy density δc^2. In this case, refers to the kinetic energy density of gravity. Since the gravitational field there exists continuously in the space surrounding the body of A, then the flow of energy to the body must come from all directions continuously. These conditions make it easy to calculate the mass of the absorbed flux ΔM during a time Δt. Absorbed mass ΔM is the mass of the

stream which passes to the body but for the time Δt over a spherical surface $4\pi R^2$, located at a distance R from the centre of mass of body A.

$$\Delta M = 4 \pi R^2 \delta c \Delta t \qquad (e2.5)$$

In this case, the average specific rate of the accretion {absorption) of mass M will be

$$æ = \frac{\Delta M}{M \Delta t} . \qquad (e2.6)$$

The joint solution of equations (e2.5) and (e2.6) gives an expression for the field mass δ in the flow at distance R from the centre of the body A.

$$\delta = \frac{æ M}{4 \pi R^2 c} \qquad (e2.7)$$

After substituting the values of δ in (e2.7) in expression (e2.4), we obtain

$$F = \frac{æ c}{4 \pi \beta} \cdot \frac{m M}{R^2} . \qquad (e2.8)$$

It is easy to guess that the expression (e2.8) represents Newton's law of gravitation in which the first fraction on the right hand side is the gravitational constant f.

$$f = \frac{æ c}{4 \pi \beta} \qquad (e2.9)$$

Within the Newtonian formulation of the problem the quantities $æ$ and β are constant. This follows from the fact that π, c, f – are common constants, and the value of δ and g in (e2.2) vary in the same manner for the body A (inversely proportional to R^2). Due to that the $\beta = \textbf{\textit{const}}$ in expression (e2.2). If, however, β, c, and f are constant, then from (e2.9) follows uniquely $æ = \textbf{\textit{const}}$. The unusual character "$æ$" has a meaning: the tie of Latin letters "a" and "e" is an acronym of the English words "absorption of the ether" or "ether's absorption", which means the absorption of the ether.

The Newton's law of gravity (its kinetic interpretation) directly implies the increase of the mass of the attracting body A. In the expression (e2.6), the increment values can be replaced with the differentials. As result, it is obtained

$$dM = M \, dt. \qquad (e2.10)$$

Separation of variables and subsequent integration gives

$$ln \, M = æ \, t + p . \qquad (e2.11)$$

The constant p can determined from the boundary conditions. At $t = 0$, $p = ln \, M_o$. Substituting the value of p in formula (e2.11), we find

$$ln \, M = æ \, t + ln \, M_o, \quad \text{or} \quad ln \, (M / M_o) = æ \, t. \qquad (e2.12)$$

After exponentiation of the last expression, we get:

$$M = M_o \, e^{\alpha t},$$ (e2.13)

where M_o is the body mass at the initial time, and e is the basis of the natural logarithms.

This method of deriving the equation (2e.8), describing the law of universal gravitation, is called [Blinov, 2011] phenomenological. In [Blinov, 2009] are described three more ways to get the law of gravity, deducing finally the same formula of Newton. Unfortunately, all these different ways cannot be explained in this short paper. To have different ways in getting the law of gravity constitutes a reliable criterion of truth in favour of the kinetic concepts of gravity, while the theory of the potential, not taking into account the period of time, can not explain in what, and why is spent the enormous energy needed to missiles to motionless sway, not producing any work. In the theory of relativity, an inequality of the inertial reference systems can be found   [Blinov, 2010], which leads to additional energy in the process of mental experiments (transitions from a reference frame to another). Since energy cannot exist without matter, the appearance of energy in the mental experiments oversteps on the absurd – the appearance of matter from nothing.

Equation (2e.13) describes the increase in mass of a gravitating body in the course of time and applies not only to Earth, but also to all other celestial bodies. Since the ether is the only essence of the universe, and is a component of the matter woven into its structure, it is relatively easily transformed into ordinary terrestrial material (substance). Transformation of the flow of matter into a (in the ordinary state) contributes to the fact that the substance itself is a dynamical structure of quasi-closed motions of matter.

Since the motion of the matter occurs in microscopic quantities, and in modern physics there is no acceptable definition of matter, it became necessary to clarify the concept of matter, objectify it, and providing the most comprehensive.

Matter – is   uncreated   and indestructible, ever-moving, infinitely divisible, from which all objects, things, and the structure of the real world descends. Matter in nature is represented by an infinite set of states, among which there are three basic states [Blinov, 2003, 2011]: the vacuum state of matter (represented by the physical vacuum, an array of ether); the ordinary ***material,*** or ***substance*** state (represented by particles and bodies having rest mass); the field state of matter (existing in the form of field structures corresponding to the gravitational, magnetic, electric and other fields). Judging by the huge volume occupied by the physical vacuum (ether), ***the main state of matter is the vacuum state***.

It is then clear that the matter during its cycle can change from one state to another state. In this regard, there is nothing surprising that in the vacuum (of the matter, and not of nothing) ***there are formed particles of substance*** (***of material***). Basically the same amount of material in the form of neutrons is produced in the nuclei of chemical elements. I have proposed some ideas about possible nuclear reactions in the books "Growing Earth" [Blinov, 2003, 2011] and "Physics of Matter" [Blinov, 2007, 2009].

It should be mentioned, that ***it is impossible to identify the matter and the material or substance***, because of they are different essences**.** The matter **is** *Primal Essence* according to its definition, but the Earth's *substance is the structure of matter*, it is formed from the matter. All protons, neutrons and others particles consist of matter. Therefore, the substance (material) is secondary formation. Thus, the difference between these essences is evident.

The previous conception of gravity, ascending to Descartes and Yarkovsky, has an important feature: the structure of the mathematical expressions includes two unknowns (*œ*, and *β*) in the presence of only one equation (e2.9). Therefore, the way to determine the numerical values of these unknowns is to find an additional equation, which is hidden in the records of rock formation of the Earth's crust. Deciphering this record and find an additional equation is contained in the following of this paper.

Geophysical advances in Earth Sciences might not have occurred if on the half of the twentieth century would have not been developed tectonic maps of continents, followed by (second half of the twentieth century) deep-ocean research (dredging, magnetometry, observations from submersibles) and drilling of the ocean floor.

Tectonic maps of the continents have to deserve special attention. Indeed, the geologists have based their reconstructions of the formation of the globe from gas, dust and meteorites, i.e., from ordinary *substance*. In this case, the formation of the earth's crust would begin immediately after the accretion of the planet on its entire surface. Therefore, it was natural to expect that different parts of the continents should have almost uniform crust with little differences in thickness and age. But contrary to expectations on the maps of the continents it is clearly discernible a mosaic of different ages regions and different crustal typologies from the most ancient (shields) to the youngest alpine structures.

On the maps of continents, scientists have identified a relatively ancient parts of the crust, the so-called shields, in which were found the most ancient areas - Archean core shields. Continental shields, in turn, are part of the vast areas of continental-platforms. Besides all of this hierarchy of crustal shields and platforms, it was then discovered the apparent decrease in the age of rocks and minerals from the nuclei shields in the direction of the oceans. This the pattern of the continental structural zones and of the crustal age obviously led many scientists to think about the evolution through geologic time of the continental crust formation, and about the increase of the area of the globe.

The idea of expansion of the continents was developed by many researchers. Among them, N. S. Shatsky [1964], V.I. Popov [1960] E.V Pawlowsky [1953], V.G. Bondarchuk, [1970] J. Wilson, N.P. Semenenko, etc. The idea was developed also by M.S. Markov [1982], B.G. Lutz [1973], N.P. Vasilkovsky [1971], A.M. Goodwin, L.P. Sviridenko, etc.
According to the concept of expansion of the continents the continental crust is the result of the transformation of the primary simatic crust (lunar-type) formed during the geologic time. The concept of the primary lunar crust type was naturally associated with incorrect hypothesis of the formation of the planet from the already existing ordinary substance (material)**.**

In the first phases, the irreversible transformation of the primary crust occurred in the course of geosynclinal processes around the nuclei of the Archean shields. Then the conversion process has gradually covered all the new areas. Transformation of the crust in the zones dividing the nuclei merged into single structures of shields, then to gradually cover the areas of modern platforms and finally - these area are separated by the current geosynclinal regions. The formation of continental crust was accompanied by the occurrence of tectono-magmatic and thermo-chemical processes characteristic of geosynclinal cycles.

When analyzing the formation of continental crust, a very important rule has been found: **the formation of structural-age zones of the continental crust were formed at an accelerating rate.** This regularity is observed systematically on the tectonic maps of continents. Shatsky [1964] has found an accelerated process of formation of continental crust displayed on the maps (Fig.1), determining that the growth of the platforms (parts of continents) is represented by a rising curve. To confirm this relationship, Khain et al. [1982] presented numerical data on global growth rates of areas of continents, which in Lake Baikal, the Caledonian and Cimmerian phase of folding were respectively 0.05, 0.1 and 0.2 km²/yr. These figures confirm the rapid lateral growth of continents.
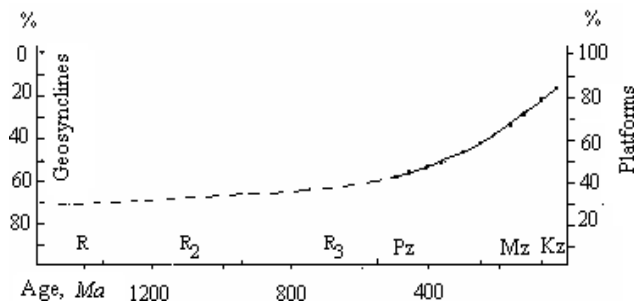.

Fig. 1. Accelerated formation of continental crust [Shatsky ,1964]

The process of formation of the continents – accelerating in time – predetermined the nature and direction of its associated geological phenomena and gave rise to a whole series of consequences, also accelerating in time. Geology has by numerous examples of a progressive increasing rate of basic geological processes. The progressively rapid development of significant geological events is described in greater details in Blinov [2003, 2011].

Considering the long-term irreversible process of formation of the continental crust, Vasilkovsky [1971, p.135], called this global process of the '*main geological pattern*'. It is a really important process, because it highlights and describes the basic problem of geology – the formation of the crust (continents and oceans) on the huge time interval of Earth's history. With the *main geological pattern* it is possible to describe all the associated and subsequent tectono-magmatic and geological processes, including the genesis of minerals.

Main geological pattern – it is an empirical generalization of geological processes, recorded on the continent (in the oceans, too, there is mosaic of seafloor of different ages) and demonstrate the formation of the Earth's crust by phases of increase of its area. It would seem that the empirical basis for understanding the growth of the crust of continents and oceans is undeniable, so the idea of expansion of the earth's crust should be in full agreement with the concept of Earth's expansion, and should have been widely adopted and finally extended to the oceanic areas of the globe. However, contrary to all logic, the preference was given not to reliable empirical data, but to the erroneous hypothesis of the Earth formed from the ordinary ***substance*** (***material***).

According to these hypotheses in the beginning the Earth was covered with an uniform primary lunar crust type. Then, it is assumed that the primary crust began to transform into the modern continental crust. This process of conversion reached only the boundaries ocean-continent. Because there was not reliable data on the structure and age of the oceanic crust until the middle of the twentieth century, it was assumed that the process of transformation of the lunar crust of the oceanic basins have not yet spread to the oceanic crust of the constant size Earth, where it would be found the primary – very ancient – lunar crust type. Great was the surprise of scientists, when detailed studies of the ocean floors established that the crust of the oceans is relatively young and also arranged in a banded different-age pattern. The ocean crust's age never exceeded 200÷220 million years.

From the point of view of the wrong hypothesis of the Earth formed from the already existing ***material*** (***substance***) the phenomenon of the opening of young ocean floor is really astonishing and inexplicable. Instead, in the views of Descartes, Yarkovsky and many others who share the idea of the growth of the heavenly bodies, what was observed in the study of the oceans are expected phenomena. The oceanic floors are a continuation of the expansion of the continental areas, i.e. a further growth of the continents, and an expansion of the planet that started early in geologic time, with progressively changed conditions. After all, it is not by chance that Shatsky (Fig. 1) described the formation of continental crust by a rising curve, which is consistent with the law of growth of the mass of equation (e2.13). In this regard, the mid-oceanic ridges are belts of intense growth (spreading) of the ocean floor. On the continents – on their geosynclines and aulacogens (stretched structures the Earth's crust [Milanovsky, 1981]) – the growing-rate is smaller

A large amount of geologic data are available about the accelerated evolution of geological processes. It is very important in shaping our views on the acceleration of the geological evolution of the planet to have quantitative estimates of the volume of the different geologic formations, to study rifting, the development of geosynclines and to define the capacity of the ocean basins – linked to the water volume of on Earth –assessing the amount of rocks of different ages.

Quantitative assessment of geological processes have confirmed the previously suggested progressive strengthening in time of the tectonic-mechanical activity of the Earth. Definitely enough has been done in respect of volcanism

by Maleev using data on rates of sediment accumulation and subsidence of the geosynclines. The change and increase of the sediment rates in the rift depressions of the Western Arctic shelf investigated Verba et al. [1990]. Their result is shown on fig. 2 in comparison with data by L.I. Salop (the rate of subsidence of the geosynclinal trough, 1973).
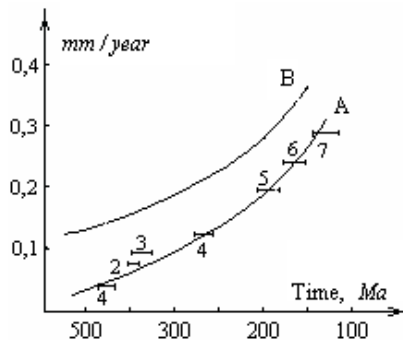

Fig. 2. Change in time of the rateof sedimentation: A –Verba et al.; B – L.I. Salop, 1973

An important work has been done by Maleev [1978, p. 137] about volcanism, using data on rates of sediment accumulation and subsidence into the geosynclines: "Thus the directivity of the tectonic-magmatic processes shows an acceleration of the volcanic activity, which manifests itself in an increasing removal of volcanic pro-products in shorter time intervals.

The same interpretation is confirmed by Ronov et al. [1979, p.11]: "Thus in global scale, during neogey, i.e. Late Precambrian and Phanerozoic, there was an overall increase in the intensity of volcanism". Later Khain et al. [1982, p. 35] not only confirmed this conclusion, but extended it to all the tectonic events: "Earth's tectonic activity does not weaken, but instead increases from the Early Precambrian towards younger and younger ages neogey".

The increase in tectonic activity of the planet is consequence of the main geological pattern, which is characterized by an accelerated formation of crust. And if the increase in the tectonics of the planet was not discovered by geological observations, it would have been predicted on the basis of the main geological patterns, and on the kinetic gravity concepts of Descartes and Yarkovsky. Likewise, could be predicted acceleration in time of mineral genesis, mineralization, sedimentation, emission of water from the depths, etc. But the acceleration of these processes was discovered by methods that are independent from the main geological pattern.

In this light, is particularly important the conclusion of Mikhailov [1981, p. 24] on the rapid development of biological organisms and super-genesis in the Phanerozoic: "The Precambrian super-genesis could not be emerge (or formed), without a strong chemical weathering of the crust, similar to known deposits in the younger periods of geologic history". And moreover, p.25: "In the subsequent history of the Earth, pulsations and progressive increase in the role of super-genesis mineralization have been observed. The maximum of this process has occurred in the latest stage of its development. Oligocene-quaternary continental deposits that have accumulated over the past 30 million years, contain more than half the world's ore reserves of aluminium, iron, manganese and silicate ores of nickel and cobalt, gold, platinum and many other minerals. "The problem of acceleration of geological processes are not limited to these examples.

On the acceleration of the tectono-magmatic cycles wrote G.P. Polu-arshinov, renowned pioneers of this representation as G. Stille and G. Bubnov, as well as more recent studies of Bulakhovsky [1966] and Shuvalov (1980). The gradual increase in activity of the Earth and the reduction of the time lapses between orogenic phases was noted by Z.A. Svarichevskaya and Yu. P. Selives-trov. Data about the acceleration of the geological evolution have accumulated so greatly that they have already become material of textbooks. Thus, Vladi-mirskaya et al. [1985, p. 400] noted: "Related calculations performed by J. Gil-lyuli for the Phanerozoic, and L.I. Salop for the Precambrian, indicate an incre-ase in the rate of geosynclinal subsidence during the geological history. "And on page 40 we find: "The unfolding of geological evolution, as we have seen, is not linear. An acceleration of this process can be envisaged …". Acceleration of geological processes is the direct suggestion that all these processes have occurred and are occurring on the growing Earth.

An important peculiarity the concept of the growth of the globe is the possibility of understand and explain not only the tectonics of the Earth, but a whole set natural phenomena [Blinov, 2009, 2011], (e.g., progressive evolution of life on earth, the increase in time of the force of gravity, the emergence in the Meso-Cenozoic of the bulk of water). It is important that natural phenomena are explained only in terms of this concept. All other representations are not suitable to explain the characteristics of the historical development of the Earth. This indicates the good agreement of our ideas with the natural world around us. We are approaching the attainment of truth.

This is because Plate tectonics is based on the false hypotheses of a formation of planets and stars from the ordinary ***substance***, i.e. from the smallest fraction of the cosmic dust and meteorites . Let us remember: the main amount of matter is represented by the physical vacuum (ether). Therefore it is clear, that from a small portion of the material world cannot create a whole world. It is a very appropriate consequence the negative appraisal of plate tectonics. Renowned geologist as M. Gorai and S.W. Carey called plate tectonics "a myth", and A.M. Maulenov [1987, p.39] praised it as "... yet another impasse of theoretical thought in the geology." Justified criticism of plate tectonics was also presented in the Conferences in Moscow [Milanovsky,1984] and Sydney [Carey, 1981].

A very important part of the geophysical advances in Earth sciences has been the discover and the mapping of the patterns of distribution of the age of the oceanic crust areas, Fig.3. This pattern is similar to the continental one found by Shatsky (see Fig. 1). Indeed, Fig. 1 and 3 reflect the same curve, divided by time and space. Their generality follows from the fact that both curves are generated by the main geological pattern natural law. But the curve in Fig. 3 is more informative because to describe it a mathematical expression was found [Osipishin & Blinov, 1987] about the cause of the increase in mass of the planet over time (see formula e2.13). This short paper does not allow to show how is obtained the formula in   Fig. 3, in which A corresponds to the area the Earth's surface for various ages of the past. A_o – is the area of surface of modern Earth. The derivation of formulas is contain in   the   works [Blinov, 2003, 2011]

and [Osipishin & Blinov, 1987].   It is worth noting a complete similarity structure of formula (e2.13) and the formula in Fig. 3. The similar structure these formulas allows to get the missing equation, which was discussed earlier in this article, and to determine the numerical characteristics constituting the gravitation constant (Eq. e2.9) in the law of universal gravitation. It should also be noted that a structural similarity of formulas in different fields of knowledge (physics and geology) can not be accidental, such a similarity is due to the unity of nature as well as the fact that both formulas satisfactorily reflect the reality.
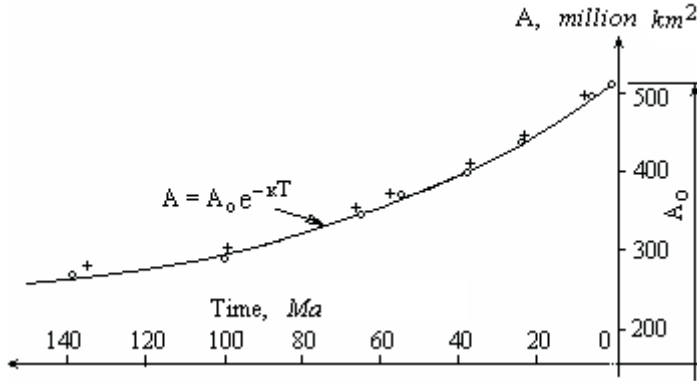

Fig. 3. The accelerated formation of areas of the oceanic crust. Circles denote the values of area A, calculated at the beginning of geological epochs. Small crosses are data from Ronov et al. [1986].

In Fig. 3 the data of Ronov et al. (small crosses) are somewhat different from our areas calculations [Osipishin & Blinov,1987]. The slight discrepancy is explained by the fact that Ronov was counting on the area maps to determine the volume of ocean sediments, so the final result does not include the area of marginal and inland seas. The crosses in Fig. 3 are somewhat higher than circles, but in general, the results of both calculations agree well.

The formula of Figure 3 can be transformed into an expression showing the increase of the Earth Volume, replacing the age (–T) with the physical time $t = -T$,   we obtain the relationship

$$V = V_o \, e^{3/2 \kappa t} \tag{e2.14}$$

To get from (e2.14) a formula for the increasing of mass, both sides of (e2.14) must be multiplied by ρ – the Earth's average density. The result is

$$M = M_o e^{3/2 \, \kappa t} \tag{e2.15}$$

exponents, and the coefficient k in expression (e2.15) is determined by the parameters of the curve (exponential) in Fig. 3. According to [Blinov, 2004, 2006] numerically $k = 6{,}1 \cdot 10^{-9} \ year^{-1}$. Since $\text{æ} = 3/2 \ k$, then this value is determined by the number $9{,}15 \cdot 10^{-9} \ year^{-1}$,   or $\text{æ} = 2{,}9 \cdot 10^{-16} \ sec^{-1} = 2{,}9 \cdot 10^{-16} \ g/g \cdot sec$.

Determination of specific absorption of the energy flow of matter æ allows us to calculate other characteristics of the growing Earth: the rate of increase of radius $dR / dt = 1{,}95 \ cm/yr$, the coefficient $\beta = 10{,}4 \ g/cm^2$; the rate

of increase in mass of the globe **dm/dt** = 1,73 · 10^6 *tonn/sec*; the kinetic energy density on the surface of the Earth **βg = δc²** = 10200 *erg/cm³* with **δ** = 1,13 ·10^{-17} *g/cm³*; rate of increase of the gravitational acceleration of **dg/dt** = ~ 3 *μGal/yr*.

   Analysis of the numerical distribution of the areas of the oceanic crust by age shows that our planet is growing unevenly. Most rapidly grows southern hemisphere and the Pacific region. As a result, the continents are displaced to the north and the ancient equatorial belt is strongly deformed and is located in the northern hemisphere.

   Astronomers have discovered in the late 20-ies of XX-th century the opening of the Pacific, when Wegener was trying to detect the drift of continents. But they, measuring the angular distance between the observatories and assuming a constant Earth size, could not correctly interpret the obtained results [Blinov, 2003, 2011 and Shcheglov, 1974]. To Astronomers – contrary to the Wegener's statement – the parallels of the Atlantic Ocean appeared shrinking, and the Pacific Ocean extending, but this is just a phenomenon that must inevitably occur on the growing Earth, if measured using the central angles while assuming a constant Earth's radius. Moreover, a preferential expansion of the Southern Hemisphere, has been found by a group of laser measurement, by Smith et al. (1990). In processing the data [Smith et al., 1990] the author obtained a steadily lengthening great circle, which runs in the Southern Hemisphere, and the reduction of the arc of the same circle, spanning the Northern Hemisphere [Blinov, 2010, p. 238]. This report [Smith et al., 1990], as well as several other measurements [Blinov, 2003, 2011] fully confirm the concept of a growing Earth.

   Since all the heavenly bodies have a gravitational field, they all grow and change constantly. If we consider a single asteroid, having accumulated enough mass it will turn into a planet, then become a large planet such as Jupiter, which will evolve towards stellar stage of development
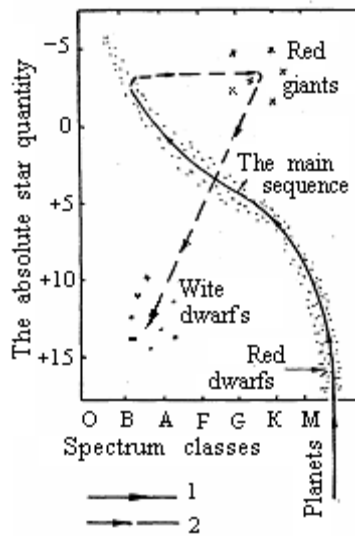
Fig. 4. The arrangement of stars and planets on Hertzsprung-Russel diagram: 1–gradual transition of stars from one class to another; 2 – spontaneous transitions with the development of stars caused by transients.

   Stellar stage of evolution is displayed on the Hertzsprung-Russell diagram, (Fig. 4) compiled initially only for the stars. Because the coordinates are clearly associated by a mathematical relationship (the absolute magnitude-luminosity relation), the pattern of stellar evolution is also called the spectrum-luminosity diagram. The diagram has been supplemented by the author [Blinov, 1993]

plotting also the planetary evolution

The bulk of the stars (~ 85%) is located on the diagram in a relatively narrow band, called the *main sequence*. Above the main sequence are placed white and blue giants - star of large mass and high luminosity. Spectral types of stars - O, A and B. Along the sequence (from top to bottom) luminosity and stellar mass decreases. In the lower right corner of the diagram are stars with small mass ($M_Z > 0,08$ $M_{☼}$ and low luminosity; they are referred to spectral classes K and M). These stars are called red dwarfs. They constitute a large group of stars in the galaxy, stars with even lower mass are called brown dwarfs.

In Fig.4, to the standard Hertzsprung-Russell diagram a curved line has been added that indicates the direction of the evolution of stars. The solid portion of the curve reflects a gradual change in the stars characteristics of stars and the dotted area – the spontaneous transitions. The ribbon of the main sequence is formed, it is due to a *gradual change in the parameters of the stars*.

Analysis of the distribution of stars (v.s), their mass shows that red and brown dwarfs are the largest group of stars in the galaxy. This fact contradicts the hypothesis of star formation with the already existing *material*, since the condensation of gas and dust should have been much more likely to form massive stars, rather than low-mass stars. With the growth of the heavenly bodies, it has to be expected that planets and small stars must be very much (compare with the population of Earth).

Giant stars are located in the upper right corner of distribution in Fig. 4. They are few in the galaxy, but due to high luminosity, them are easily detectable. Because of the red color and large luminosity, these stars are called red giants.

In the orthodox astronomy cannot reasonably explain the evolution of planets and stars. Growth of the heavenly bodies falls into this class. Concept of growth of the heavenly bodies is a continuous chain of events. Here the Earth's main geological pattern is correlated with the main sequence for stars that are accumulating mass, moving up the main sequence stage of evolution and are yellow, white and blue stars. At masses close to 50 solar masses (50 $M_{☼}$) within the stars begin nonstationary processes, stars explode, throwing off the external shell. Exploded star inflates and turns into a red giant.

Once thrown away the external stars shell is dispersed and in place of the red giant it is usually found a white dwarf – the remainder of the nucleus of the former stars. Because the formation of red giants and white dwarfs are processes not associated with a gradual increase in mass, these types of stars are on the Hertzsprung-Russell diagram in separate groups. White dwarfs are the final stage of stellar evolution. These unstable body or re-explode or dissipate their mass by radiation, converting condensed matter and substance into vacuum. This completes the cycle of matter in nature.

The reasons for a limitations in the upper limit of the masses of stars are relatively simple. The fact that the inflow of masses of the star is proportional to its mass M_z and the mass loss by radiation is much faster, it is proportional to $M_z^{3.9}$, so the period of accumulation of mass necessarily comes a time when losses are compared with the income and the star stops further growth. But it

must also be taken into account that in massive stars nonstationary processes associated with stellar winds appear, increasing the mass loss of massive stars.

In the conception of the growth of the heavenly bodies, the formation of stellar systems is quite different. The more probable scheme is as follows: when the Sun reaches its maximum mass and explodes, the planetary system of Saturn will be too grown up beyond the spheres of influence of the exploded sun to be thrown away. But the Saturn system will be an already almost ready star system. Uranus and Jupiter with their satellites could be ejected by the explode into outer space. In a similar way can occur the "reproduction" of the other star systems. Furthermore, the stars can grow from single asteroids or comets, with the subsequent capture of satellites.

Conclusion

Geophysical progresses in Earth Sciences was made possible by the accumulation of large amounts of empirical data in Physics [Blinov, 2007, 2009, 2010], in the Earth Sciences [Blinov, 2003,2011; Carey, 1981, 1988; Milanovcky, 1984; Scalera & Jacob, 2003; among others]; and in Astronomy. The main part of this progress is the discovery of regularities in the distribution of the oceanic crust areas over the ages. These scientific advances have allowed the rising of the expanding Earth hypothesis to the rank of empirical generalizations and have made possible to begin the understanding of the true causes that govern the natural processes.

In the conception of the growing Earth [Blinov, 2003, 2011] there is nothing of hypothetical, because everything is based on observations and experiments. Even our view of kinetic gravity was confirmed experimentally. This is shown with the experiment of the heating of a steel sphere, performed by A.P. Shchegolev (1990), [Blinov, 2007, p.148]. The central region of steel sphere ($r = 50$ mm), mounted on a precision balance, was heated by a laser beam through a hole drilled up to the center of the sphere. During the experiment, the laser heats the steel sphere, and the weight of the sphere become smaller than the initial at 200 *mg*. After the cooling of the sphere, its weight is restored. In the control experiment with the same ball, heated in an electric furnace and transferred to the precision balance for cooling, weight changes were recorded.

The change in weight of the ball is explained by the emergence of an energy flux directed from the center of to the surface of the sphere: the flow of thermal energy reduced the gravitational flow toward the center of the sphere. The result of applying opposing fluxes of energy decreased the weight of the steel sphere. The experiment of Shchegolev (1990) confirmed the kinetic nature of gravity. Besids, ***the discovery of the secular increasing of the solar activity*** take place. A.L.Chizhevsky had route about that still in 1969. [Chizhevsky, Shishina, 1969, p. 30] .

Consequently, the conception of a growing Earth has been fully confirmed by experiments and observations and is therefore an empirical generalization, which should guide the daily geologic practice, the study of climate change and the space explorations.

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