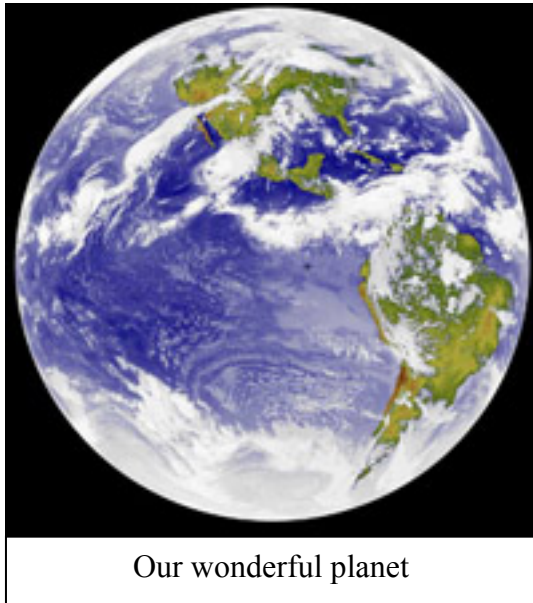


4.2. A cavity in the centre of the Earth?



One of the formulations of the celebrated Newton's law of universal gravitation of the bodies states: *“Each particle in the Universe attracts whichever other particle with a force (F) rightly proportional to the product of their masses (m_1m_2) and inversely proportional to the square of the distance (r^2) between them: $F = Gm_1m_2/r^2$, where $G=(6,6720\pm 0,0041)\cdot 10^{-11} \text{ N}\cdot\text{m}^2/\text{kg}^2$ is the gravitational constant. The stipulation is made that the distance is measured between the centres of the bodies, which doesn't mean that the gravitational force in some way “goes out” from these points, or that the whole mass of the bodies is concentrated in their centres. In fact all particles, comprising the material bodies, mutually attract themselves, but their summary action is such that the resultant force of attraction is directed along the line, connecting the centres of the bodies.*

The new Vacuum theory considers vacuum as a kind of matter, the tangential component of whose movement is responsible for the gravitational processes. In **p. 4.1** it was shown that the satellites move with definite velocities, corresponding to the velocities of the movement of vacuum along the orbits. In **p. 3.5** is calculated the density of the mass of the vacuum, which turned out to be 90% of the whole mass of the Universe, as it is expected that this mass has a decisive role in gravitation. In these and other researches, following Nature's prompting, it was assumed that the left (anti-clockwise) tangential movement causes the phenomenon of attraction, and the right – “repulsion” of all bodies possessing mass, including the quantum level (**fig. 18**).

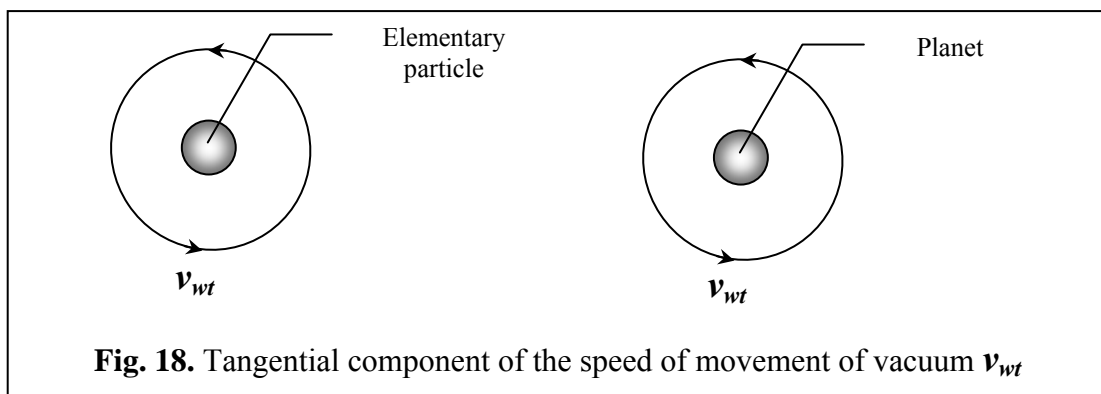


Fig. 18. Tangential component of the speed of movement of vacuum v_{wt}

Spirals, spirals...

As long as we emphasise the significance of the tangential component of the speed of movement of vacuum for the gravitational processes and phenomena, it is supposed that there also exists a radial component of the former, which in the general case determines a spiralwise movement. Nature, with its variety of forms, helps us again.

It has been noticed that in the northern hemisphere of the Earth the air vortices, as the hurricane storms, the tropic cyclones and the whirlpools (**fig. 19**, photos 1, 2 and 3), looked from

the side of the Northern pole, move leftwards, besides with a clearly expressed spiral for the last two.

Shrouding plants also grow upwards, outlining a left spiral (**fig. 19**, photos 4 and 5).

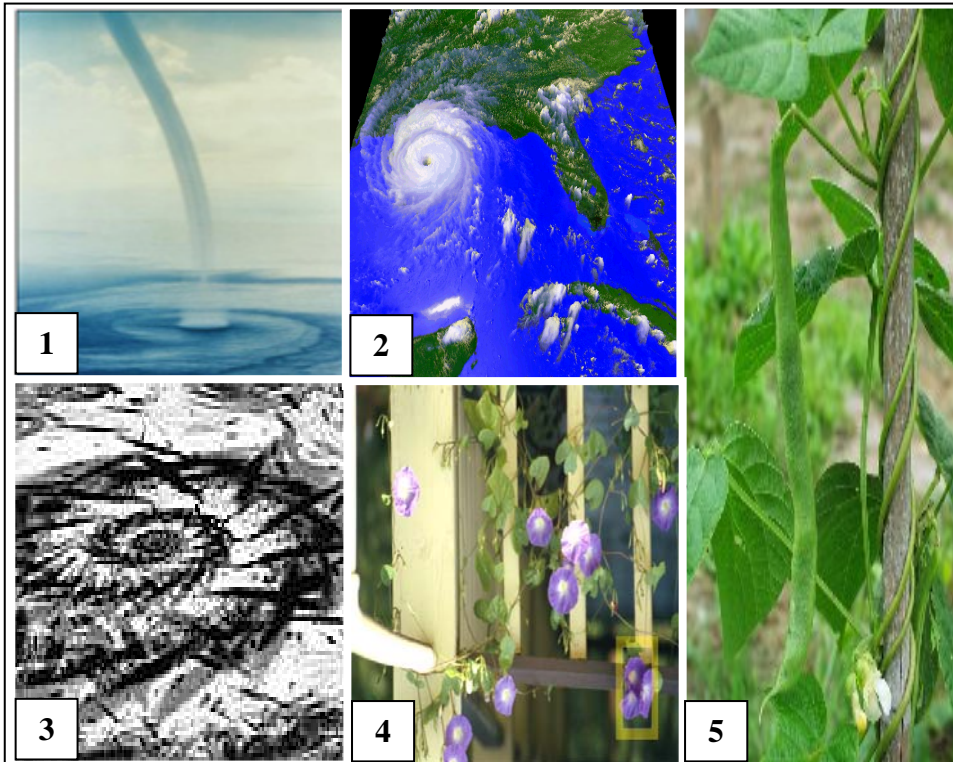


Fig.19. Left spiral-wise forms in the Earth’s northern hemisphere:
1- Tornado; 2- Tropical cyclone (typhoon); 3- A whirlpool; 4,5- Winding plants.

Scientists have established that the same movements in the southern hemisphere are rightwards. In fact, from the viewpoint of the North Pole of the Earth, the forms in both hemispheres are one and the same – left spirals, which speaks of one common cause, acting upon the bodies (particles) on the Earth. Usually the Coriolis force is pointed out as a cause for these movements, a result of the rotation of the Earth upon its own axis (let’s note – again a left movement), although he himself has spoken about a formal

acceleration, not about a force.

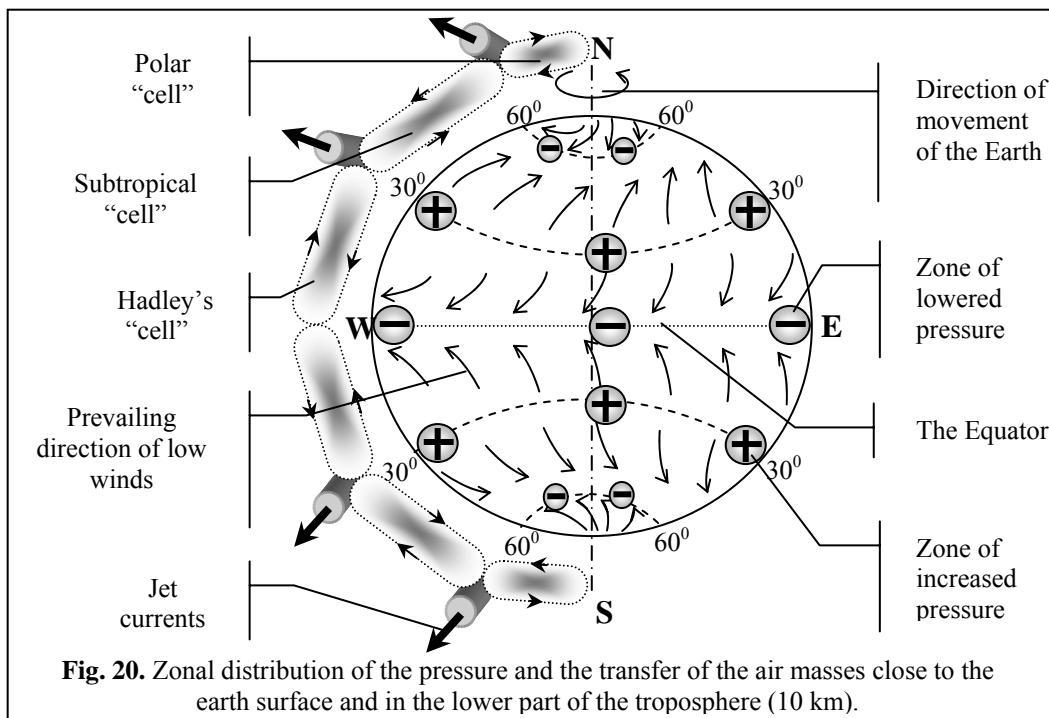


Fig. 20. Zonal distribution of the pressure and the transfer of the air masses close to the earth surface and in the lower part of the troposphere (10 km).

Winds, winds...

If we assume that some events can be explained through the Coriolis force (albeit formally), others are discovered, for which an additional explanation is necessary. In **fig. 20** are featured the three big “cells”, which influence the overall movement of the air masses around the earth’s surface and the lower part of the troposphere.

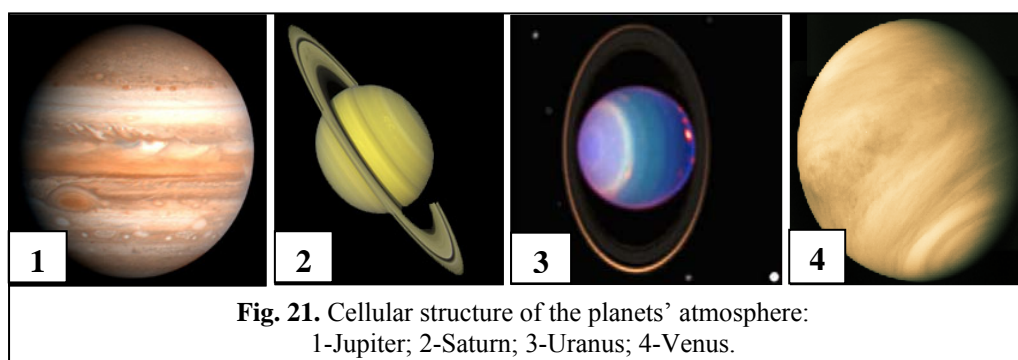
What do we observe in the figure?

First, the amazing beauty of symmetry – three equal “cells” in the northern hemisphere and three absolutely corresponding ones in the southern one, in parallel to the Earth equator. Each of them occupies 30° northern or southern latitude and encompasses averagely from 0 to 10 km height. The very existence of precisely three (six) “cells” is not explained by traditional theories. While the digression of the winds can be explained through the Coriolis force, the question of why ground winds directed towards the equator dominate in the zones between the equator and the 30th parallel and between the 60th parallel and the poles, and ones, directed towards the poles – in the zone between the 30th and the 60th parallels – doesn’t have a satisfactory answer.

Second, the presence of swift (up to 400-600 km/h) tropospheric jet currents, which circle around the Earth leftwards at about 10 km height. In M. Martinov’s book “The weather and its forecasting” (S. “NI”, 1971, p. 42) it is mentioned about a jet current in the zone of the equator, too. While there are replies to the questions “where”, “when”, “how”, and “how much”, the question “why” continues to excite us.

The reason for the mentioned events, according to Vacuum theory, is probably one – **the left spiralwise movement of vacuum matter**, in particular around the Earth. The left rotary component of this movement is responsible for the leftwise rotation of our planet about its own axis, for the leftwise rotation of the Moon around the Earth, for the leftwise movement of the air masses in the jet currents, etc. The stepwise movement along the screws of the spiral, at intervals of about for 10 km height, explains the formation of the air “cells”.

Let us concentrate our attention at the processes, taking place on the surface, situated at such a distance from the Earth. In the zones between the equator and the 30th parallel and between the 60th parallel and the poles, the vacuum spirals “spike” this surface from the direction direction of the equator, and in the zone between the 30th and the 60th parallel – from the poles, causing the respective movement of the air masses. In this case, the zones with increased and decreased pressure and the ground wind are an effect from what occurs at 10 km height. Precisely at the 30th and the 60th parallels (probably also at the equator) the vector of the velocity of vacuum is parallel to the equator, forming the jet currents with its whole amplitude.



The question arises whether this phenomenon is unique for the Earth. The photos of some atmosphere possessing planets (**fig. 21**) show zones, amazingly similar to these in **fig. 20**. This is what was actually expected, since the reason is one, common for all material bodies, be they planets or atoms.

Contemporary science and technique don't dispose of instruments which could register the vacuum matter, but by some objects, processes and events and their forms, considered as effects, we can judge about the cause – the spiralwise moving vacuum (**fig. 22**).

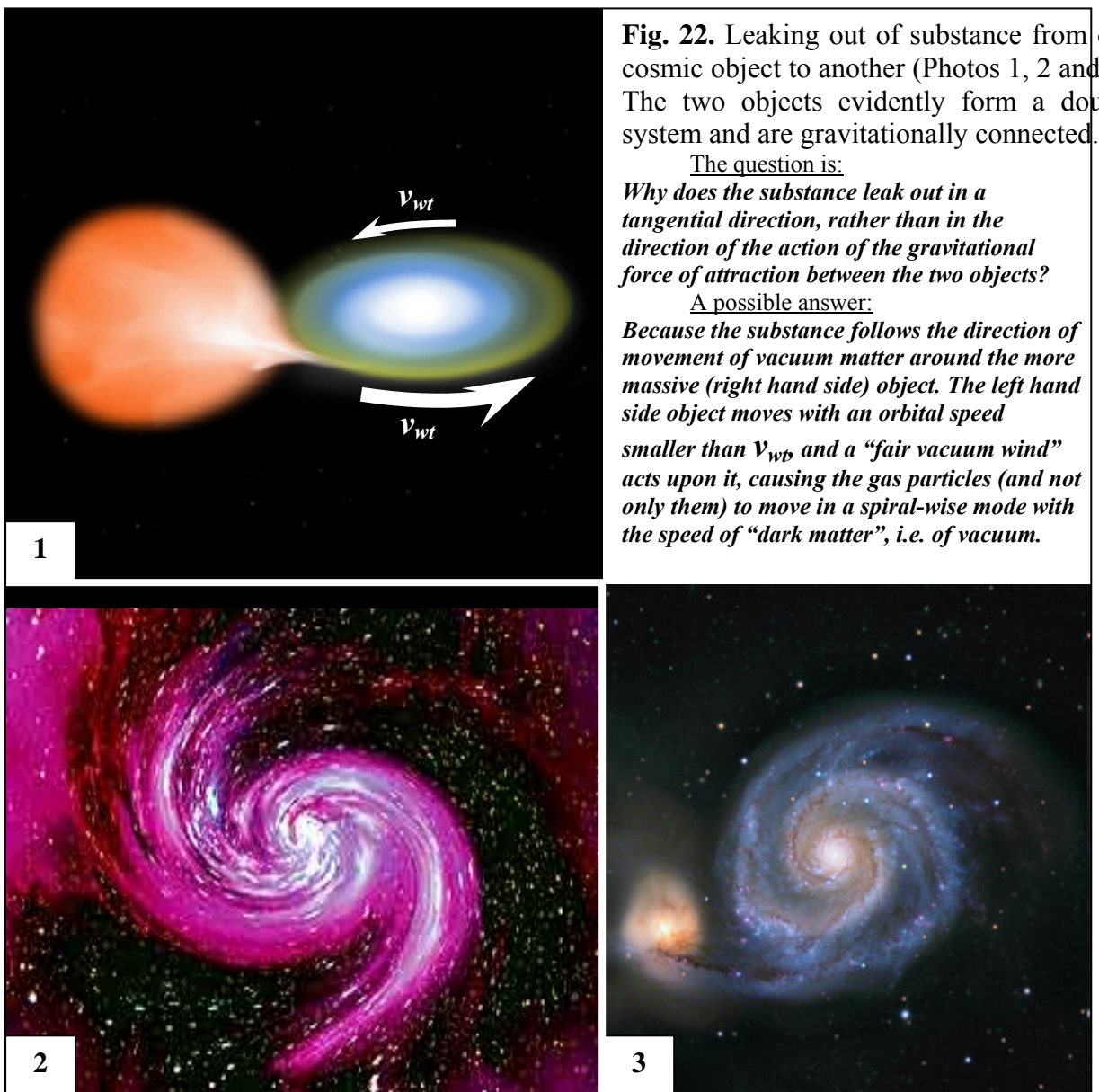


Fig. 22. Leaking out of substance from cosmic object to another (Photos 1, 2 and 3). The two objects evidently form a dot system and are gravitationally connected.

The question is:

Why does the substance leak out in a tangential direction, rather than in the direction of the action of the gravitational force of attraction between the two objects?

A possible answer:

Because the substance follows the direction of movement of vacuum matter around the more massive (right hand side) object. The left hand side object moves with an orbital speed smaller than v_{wt} , and a "fair vacuum wind" acts upon it, causing the gas particles (and not only them) to move in a spiral-wise mode with the speed of "dark matter", i.e. of vacuum.

The photos of these cosmic objects show us at least two things:

First. The splendid form of the objects, but this form prompts us (verifies) the rotary (tangential) movement of vacuum, and photos 2 and 3 are a bright demonstration of its spiralwise movement;

Second. In each of all three photos are seen two objects, which are joined in couples, or at least interact gravitationally between themselves. According to Newton's law of universal gravitation, the gravitational force should be directed along the distance between the centres of the masses of the objects, respectively the particles that they exchange should move in this direction, too. However, the particles move in the direction of the least resistance – i.e. along vacuum's "current".

Let us make a stipulation. All results are obtained on the basis of qualitative investigations and their strong point is that they reply to the questions “why the things happen to occur precisely like this”, but since certain arbitrariness is allowed at the selection of the examples, their validity could be disputed. In this sense Henri Poincaré, on the occasion of the formulation of physical laws has said: “*we choose these rules not because they are correct, but because they are most convenient ... to put it in other words, all these rules, all these definitions are only fruit of an unconscious agreement.*”

A model of the origin of the Solar system

If we have reached a certain agreement, then we can continue with the essence of the topic – may it not be that our planet (and perhaps not only it?) is hollow? For the purpose we shall use a model of the formation of the planets of the Solar system, accepted by most scientists around the world (**fig. 23**).

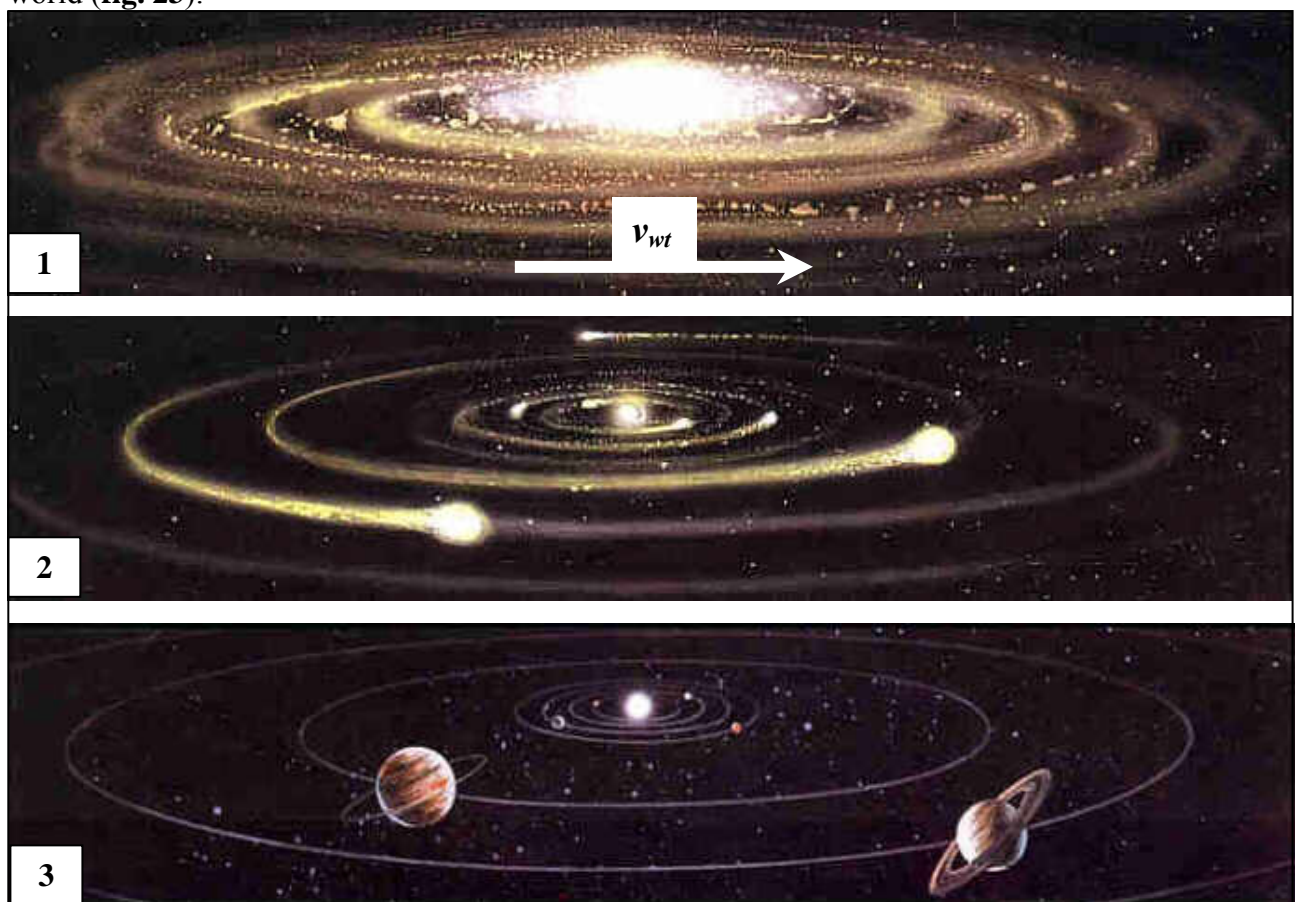


Fig. 23. Model of origin of the solar system:

- 1 – The Sun, with gas-like, dust-like and other particles;
- 2 – Condensation of matter around the largest particles;
- 3 – Contemporary state of the planets.

In the first picture from **fig. 23** is featured the Sun and the cloud of particles, which move jointly organised (leftwards) around the mass centre of the system. Usually, this state of affairs is taken for granted, without looking for the moving force that has caused the motion. Our explanation is that this, which is not seen (since it doesn't radiate and doesn't reflect the light), and is drawn in black in the pictures, is vacuum (dark) matter, moving in the described manner, captivating the visible (light) matter.

The second picture reflects the process of condensation of matter around local (orbital) mass centres, for which can serve greater particles or a group of particles. Let's recall that all

particles attract themselves mutually. The vacuum interpretation of the model is in agreement with the model, explaining the cause for the condensation of matter and its movement.

And so, it is a matter of time to arrive at the picture, we observe now. The planets have “cleaned up” to some extent the space around themselves (pic. 3), creating local fields of circular (again left) motion. is the movement of the majority of the natural satellites of the planets is an evidence for this. Indeed, exceptions from the rule are also observed, but it is considered that these satellites are “aliens”, caught up at a later stage of the development of the Solar system and we agree with this, since the small exceptions only confirm the rule.

The second stage, when the planets are actually formed is especially interesting. What information about it is at our disposal, for instance about our planet?

1. The substance is in a dust-like and gaseous state;
2. A local configuration of particles with a common mass centre (the future centre of the Earth) is formed;
3. The particles whirl about this centre, and taken together around the Sun, as well;
4. Each particle (group) is (possesses) a sub-local centre, about which vacuum moves in a spiralwise manner and contains a tangential component, responsible for the gravitational processes (**fig. 18**);
5. As a result of the universal leftwise circular motion, all particles mutually attract themselves (**fig. 24**).

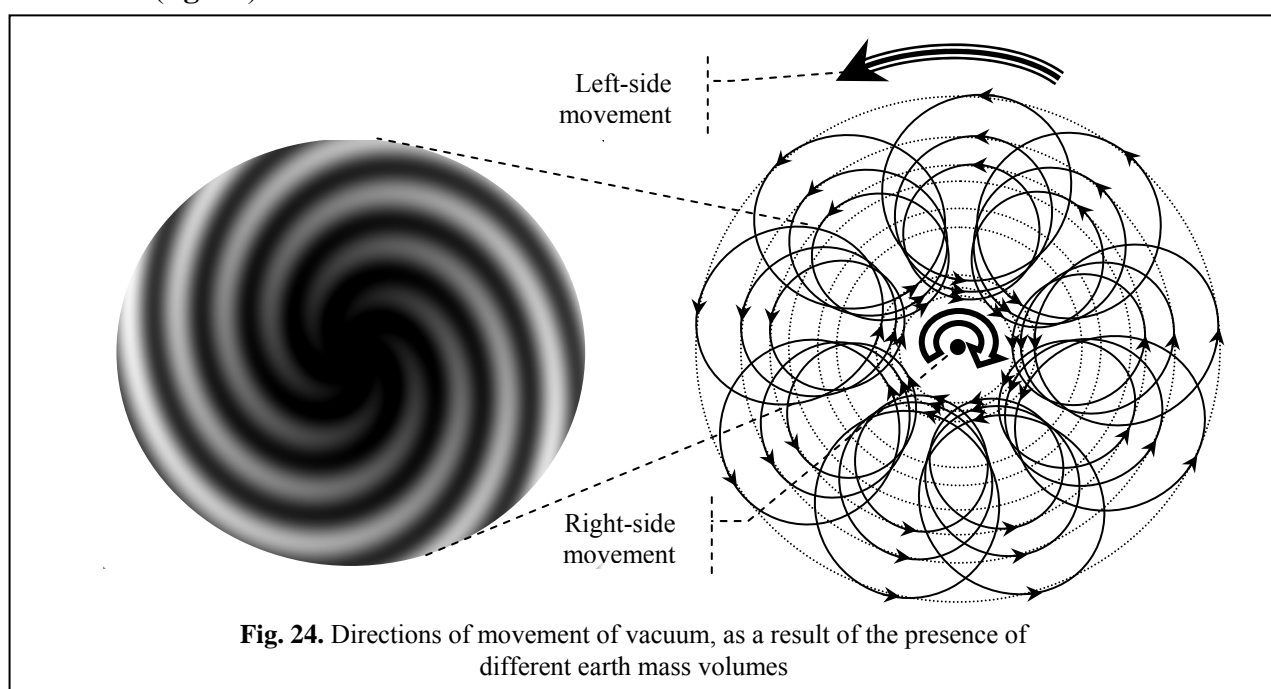


Fig. 24. Directions of movement of vacuum, as a result of the presence of different earth mass volumes

Figure 24 is composed, on the basis of the information available to us. Taking into account that a leftward circular motion of vacuum is created around each particle (group, mass volume), we notice:

- a left summary tangential component of the movement of the vacuum matter in proximity to the earth’s surface, responsible for the effect of the gravitational attraction of the bodies towards the centre;
- a right summary (resultant) movement in proximity to the future earth’s centre, causing the effect of the “repulsion” from the centre.

In the l.h.s. of the figure (under a magnifying glass) is shown the probable spiralwise movement of vacuum around one centre (volume, sub-local centre) of earth mass, down to the atomic level.

In order to understand the nature of the process of the formation of the Earth, the following thought experiment is proposed. Let us transport ourselves in time and let us move discretely (by segments) towards the future centre of our planet, armed with contemporary knowledge and technical equipment. Taking breaks at definite distances from this centre, we measure the force of the gravitational attraction and we establish that it increases, with some precision, under the Newton's law, or, with greater precision, in accordance with Einstein's General relativity theory.

Reaching the radius at which are situated the outermost particles of the future Earth, we measure the maximum of the force and this does not surprise us, since we see that all particles that form the gravitation are "below us". Consequently, the "tendency" of movement of the particles will be in a direction of congestion of the Earth towards its centre. We also continue to move in this direction and start to notice that gravitational force decreases. This was expected since less and less mass remains "below us", but we are slightly embarrassed that a difference from the familiar laws has appeared.

The surprise is total, when we measure "weightlessness" at, for instance, half way of the distance between the surface and the centre of the Earth. Here we take a long break in order to analyse the occurred situation. The calculations show that the earth mass "below us" is exactly as much as the one that has remained "above us". The two masses attract us with equal in magnitude forces with different directions, the one is directed towards the centre, and the other – towards the surface.

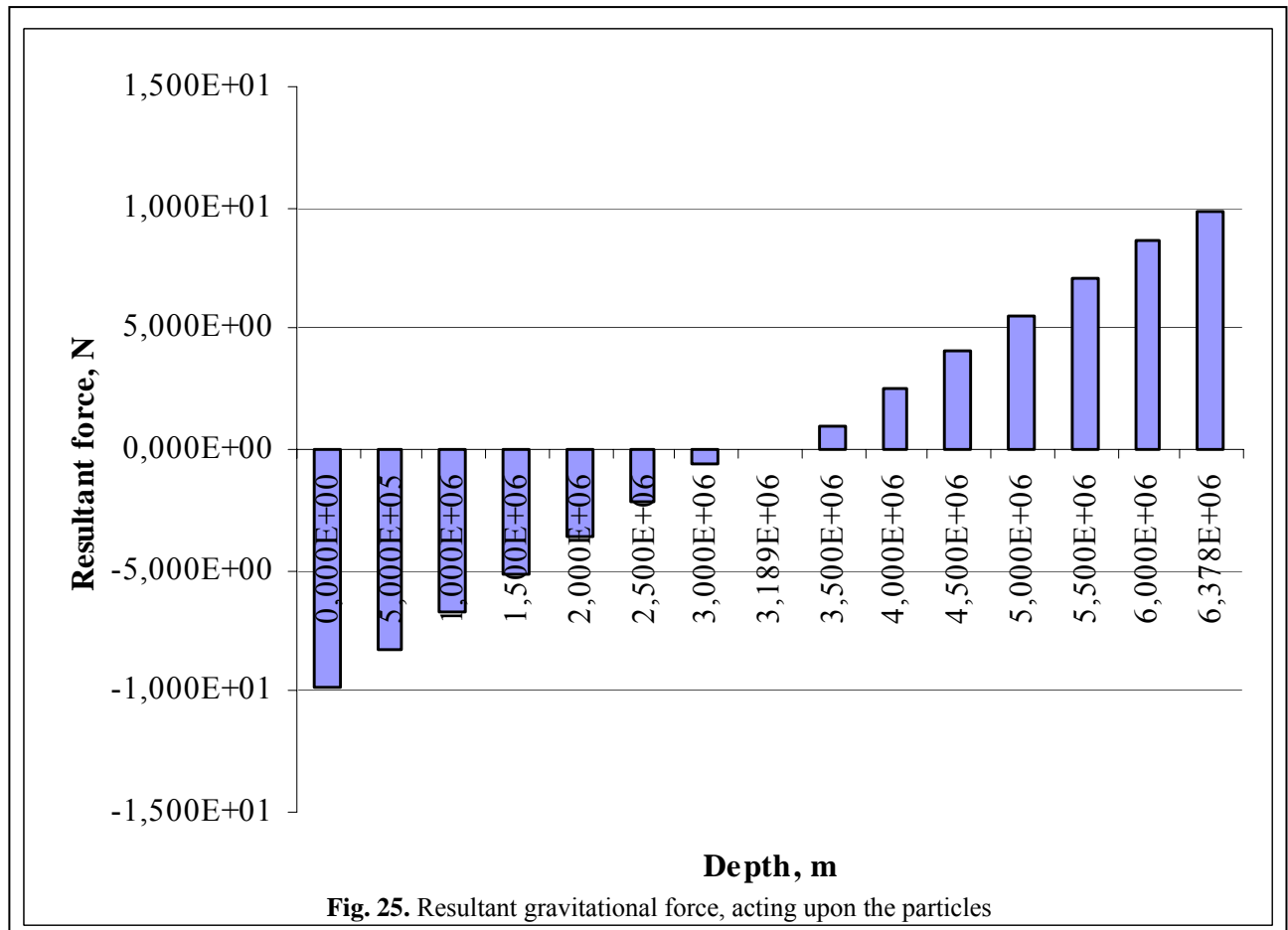
If we make some more steps towards the centre, we shall register an increasing resultant force of "repulsion" towards the surface. In fact, there is no repulsion, but a greater force of attraction is present, proportional to the greater earth mass "above us" and the square of the distance to the surface. Certainly, when the whole mass remains "above us", the force will be maximal in amplitude and the "tendency" of the particles in this volume will be to pack in the direction to the surface.

As a result, the particles in the volume around the surface and these around the centre will tend towards each other, congesting the Earth to some average radius, until the present density of the planet is reached. It is logical to assume that a cavity, resembling the form of the Earth sphere, will be formed around the centre. A part of these results is reported in **table 5** and featured in **fig. 25**.

Table 5. Results from the calculations of the gravitational force acting upon the particles

r, m	\underline{V}, m^3	\bar{V}, m^3	\underline{M}, kg	\bar{M}, kg	\underline{F}, N	\bar{F}, N	$R_3 - r, m$	$\underline{F} + \bar{F}, N$
6,378E+06	1,087E+21	0,000E+00	5,983E+24	0,000E+00	-9,810E+00	0,000E+00	0,000E+00	-9,810E+00
5,878E+06	8,507E+20	5,236E+17	4,683E+24	2,883E+21	-9,041E+00	7,691E-01	5,000E+05	-8,272E+00
5,378E+06	6,516E+20	4,189E+18	3,587E+24	2,306E+22	-8,272E+00	1,538E+00	1,000E+06	-6,734E+00
4,878E+06	4,862E+20	1,414E+19	2,677E+24	7,783E+22	-7,503E+00	2,307E+00	1,500E+06	-5,196E+00
4,378E+06	3,515E+20	3,351E+19	1,935E+24	1,845E+23	-6,734E+00	3,076E+00	2,000E+06	-3,658E+00
3,878E+06	2,443E+20	6,545E+19	1,345E+24	3,603E+23	-5,965E+00	3,845E+00	2,500E+06	-2,120E+00
3,378E+06	1,615E+20	1,131E+20	8,889E+23	6,226E+23	-5,196E+00	4,614E+00	3,000E+06	-5,814E-01
3,189E+06	1,358E+20	1,358E+20	7,479E+23	7,479E+23	-4,905E+00	4,905E+00	3,189E+06	0,000E+00
2,878E+06	9,985E+19	1,796E+20	5,497E+23	9,887E+23	-4,427E+00	5,383E+00	3,500E+06	9,567E-01
2,378E+06	5,633E+19	2,681E+20	3,101E+23	1,476E+24	-3,658E+00	6,152E+00	4,000E+06	2,495E+00
1,878E+06	2,774E+19	3,817E+20	1,527E+23	2,101E+24	-2,889E+00	6,922E+00	4,500E+06	4,033E+00
1,378E+06	1,096E+19	5,236E+20	6,034E+22	2,883E+24	-2,120E+00	7,691E+00	5,000E+06	5,571E+00
8,780E+05	2,835E+18	6,969E+20	1,561E+22	3,837E+24	-1,350E+00	8,460E+00	5,500E+06	7,109E+00
3,780E+05	2,262E+17	9,048E+20	1,245E+21	4,981E+24	-5,814E-01	9,229E+00	6,000E+06	8,647E+00
0,000E+00	0,000E+00	1,087E+21	0,000E+00	5,983E+24	0,000E+00	9,810E+00	6,378E+06	9,810E+00

A remark. To fill in the table, the following data are used: Mass of the Earth – $5,983.10^{24}$ kg; Radius of the Earth $R_3 = 6,378.10^6$ m; Average density of the Earth – 5505 kg/m³; Mass of the probe body - 1 kg; Gravitational constant – $6,67.10^{-11}$ N.m²/kg², and denotations: r – distance to the centre of the Earth, \underline{V} - volume of the Earth “below us”; \overline{V} - volume of the Earth “above us”; \underline{M} - mass of the Earth “below us”; \overline{M} - mass of the Earth “above us”; \underline{F} - gravitational force of attraction towards the centre; \overline{F} - gravitational force of attraction towards the surface; $(R_3 - r)$ – distance to the surface; $\underline{F} + \overline{F}$ - resultant gravitational force, acting upon the particles.

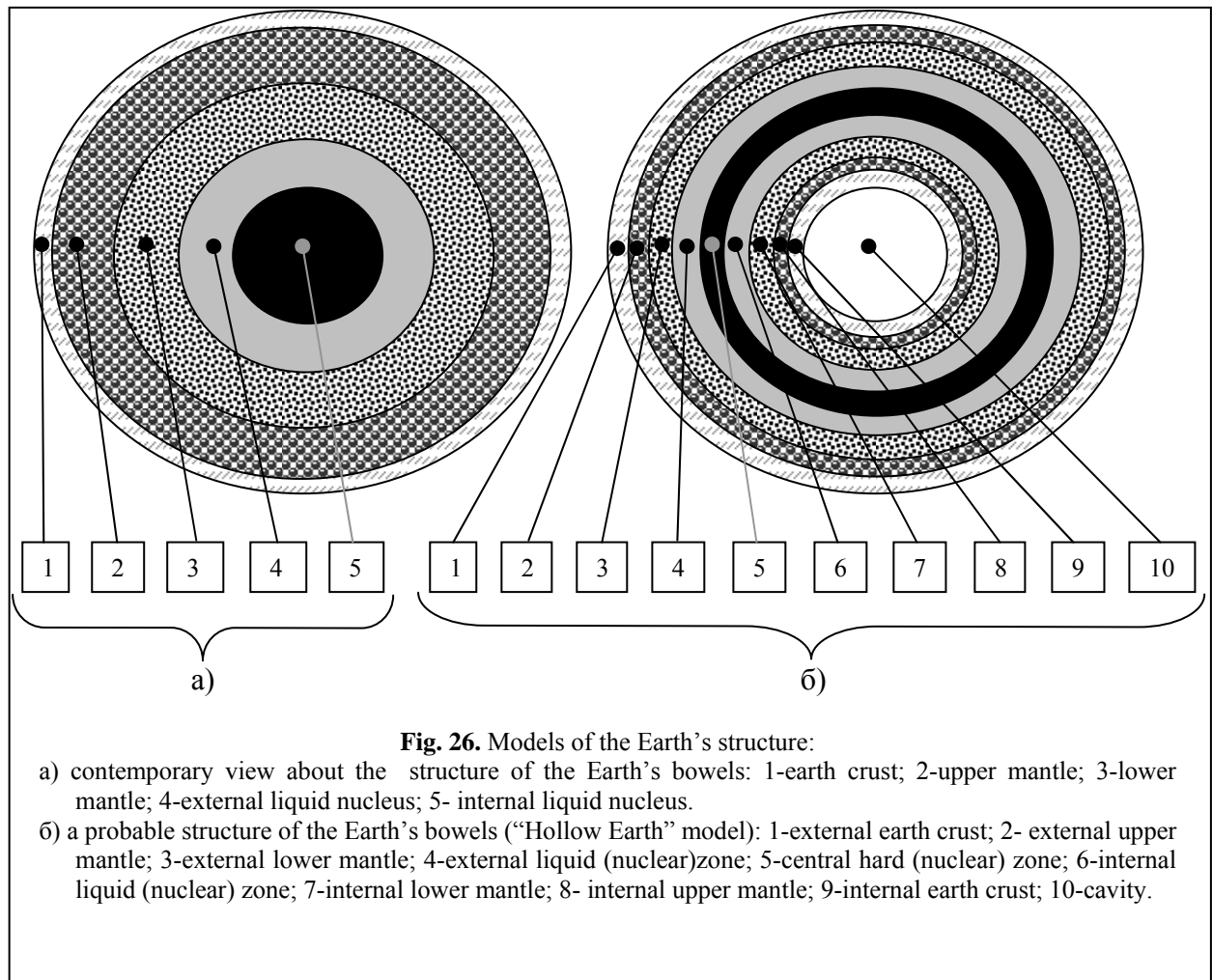


The l.h.s. from the graphic in **fig. 25** reflects the phenomenon of attraction of the bodies (the force is negative), and the r.h.s. – “repulsion” (the summary force is positive). – And something more. Despite the numeric results are obtained through simple arithmetic, they should be used for making a qualitative assessment of the considered processes. Due to a lack of data about the change of the actual density of the Earth in depth, we used the data about its average density.

Models of the structure of the Earth

On this basis we propose a new model of the structure of the Earth (**fig. 26**). The model that has greatest popularity among the scientific circles is featured in the left part of the figure. Following the logic of this model and the scientific information about it, the new model is made on the r.h.s. Despite its, at first glance, exotic and absurd nature, it doesn’t contradict any of the physical laws familiar to us. On the contrary, it confirms categorically the unity of Nature on

deterministic basis, i.e. on the cause-effect links between the processes and the phenomena, of which the great scientists mentioned above are ardent adherents.



As the model is based on a fundamental cause, the eternal and inextricable motion of a solely one substance – dark vacuum matter, it may turn out to be in force for the remaining planets from the Solar system and their satellites, and why not for the Universe as a whole.

Cosmological aspect of the new model

The model of the Expanding Universe, bearing its origin from the moment of the Big Bang, dominates nowadays. What kind of problems are observed in this model:

1. To the question of “what has been there before the Big Bang”, it is usually replied that the question is irrelevant, since there has been neither space nor time up until this moment;

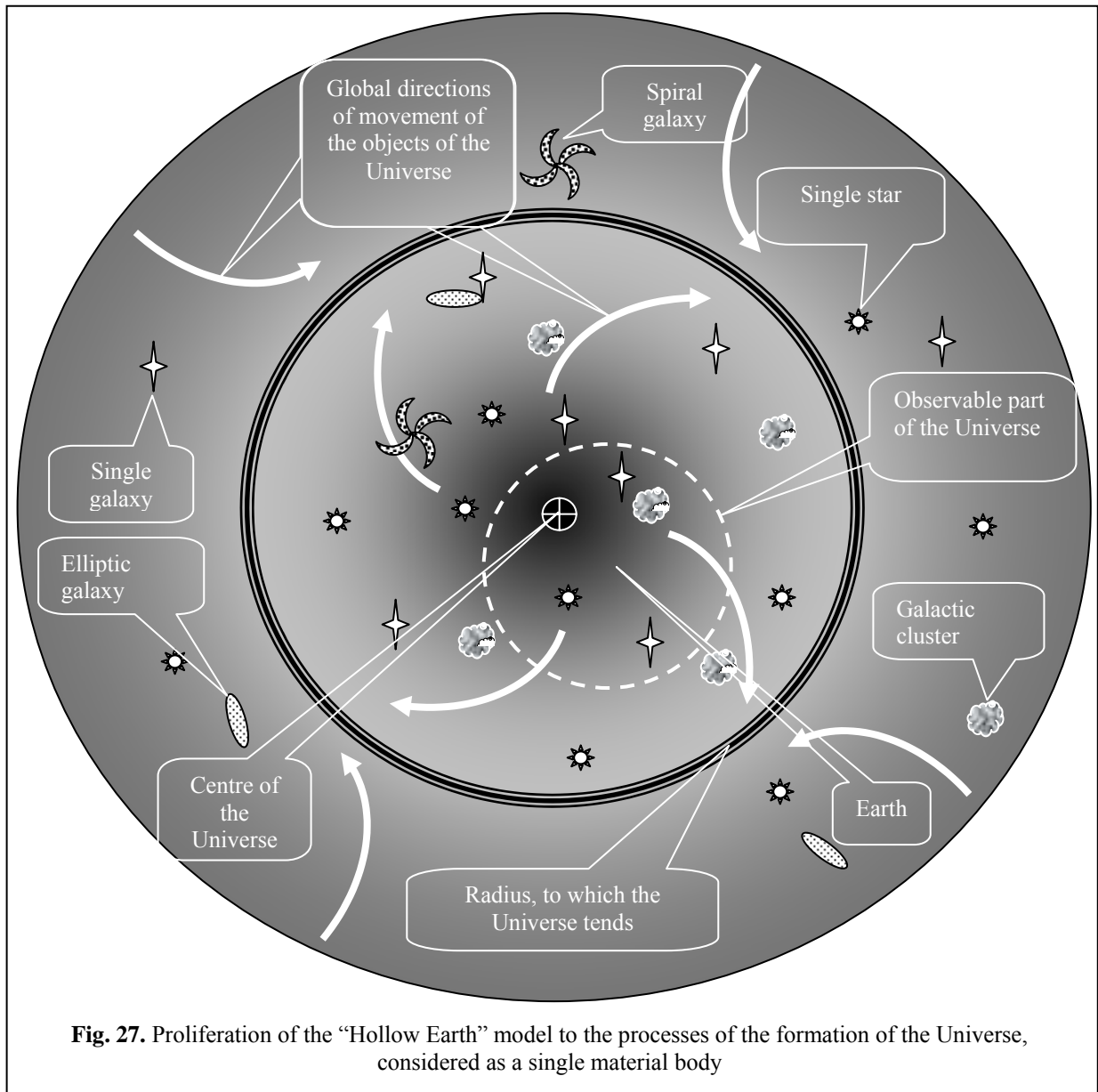
2. Using Hubble's law, it can be easily calculated that from a certain distance on the speed of escaping of the distant objects of the Universe will exceed the speed of propagation of light, which contradicts to Relativity theory;

3. Running away of the objects is not observed within the limits of the galaxies and groups of galaxies;

4. The difficulty in explaining the movement of the sleeves of the spiral galaxies, which doesn't obey the familiar to us laws is great, and the efforts are directed towards the search for a hidden (dark) mass, responsible for this movement;

5. The so-called "lambda-problem" from General relativity theory is familiar to the experts.

Here is how the new model for explaining of some problems in a cosmological aspect inscribes itself (**fig. 27**).



If we assume that the Universe is in the stage of formation, by analogy with the second stage of the formation of the Earth (**fig. 23**, picture 2), then the model "Hollow Earth" offers us:

- left global movement of vacuum in proximity to the "surface" of the Universe, responsible for the effect of the gravitational attraction of the objects (the bodies) towards the centre;
- right global (summary) movement of vacuum in the interior of the Universe, causing the effect of gravitational "repulsion" from the centre.

It is possible that the effect of the “expanding” of the Universe (“running away” of the galaxies) in the part we observe is due to this cause. In fact, the Universe “expands” as much as it “contracts”, and tends to Bondi’s model of a Stationary Universe.

The essential question indeed is at what stage of its development the Universe is. If it **is already formed**, analogically to the Earth, the planets, the Solar system, the galaxies and the galaxy clusters, where no expansion or contraction is observed, then the arrows from **fig. 27** merely show the directions of movement of vacuum, and we observe the effect of “aging” of the light of the distant stars in its propagation through the material vacuum. If the Universe **is still forming**, then together with the last effect, we should also register an expansion of the volume we observe. Moreover, we should observe acceleration in the movement of the distant galaxies. In order to succeed in registering also the reverse process (contraction), we have to be able to extend the observed volume beyond the radius towards which the Universe tends.

Finally, taking the risk of annoying the reader, I will remind that the obtained results have mostly qualitative value. Definitely this model also possesses shortcomings of its own and doesn’t give an unequivocal reply to the question from the subject. Its chief advantage is that it gives hopes for a uniform description of Nature, replying to the numerous questions of “why”. Certainly, it is the experiment, which will verify, specify or refute the theoretical aspects of the proposed work.

Conclusions:

1. New evidences are obtained, which confirm the primary role of the tangential movement of vacuum matter in the gravitational processes. In the general case, this movement is most likely spiralwise, containing a tangential and a radial components;

2. A possible explanation of the causes for the formation of Hadley’s cells and the jet currents in the Earth’s atmosphere is given;

3. A new model of the structure of our planet, which doesn’t contradict the natural laws known to us, is proposed. The conjecture of the existence of a cavity around the Earth’s centre is not more fantastic than the generally accepted assumption that the whole mass of the planet is concentrated in its centre, as we wonderfully know that this is not correct;

4. Proliferating the model in a cosmological aspect, the models of the acceleratingly expanding Universe (in the area of the part observable by us), and of the stationary Universe (as a whole) are supported.