On magnetism of the Earth

From the site http://www.ocean.washington.edu/people/grads/mpruis/magnetics/history/hist.html one can learn that the question of why the Earth has a magnetic field was one of the first to be asked in the arena of magnetic research and one that even today does not remain fully understood. In his work De Magnete William Gilbert proposed that the Earth’s magnetic field had its origin from inside the Earth. He proposed that there was a lodestone with a permanent magnetic field associated with it at the center of the Earth. Later, in the seventeenth century, Rene Descartes proposed that the Earth’s magnetism was channelled in one-way ducts through the Earth that exited and entered at the North and South poles. These theories are no longer accepted however. We now know that rocks aren’t strongly enough magnetized to account for the observed geomagnetic field, and that below depth of about 30 km rocks are so hot that they are above their Curie temperature and are nonmagnetic. Another difficulty with these theories is that the Earth’s magnetic field varies over time scales from about a decade to 10,000 years.

More recently Albert Einstein described the problem of the origin of the Earth’s magnetic field as being one of the five most important unsolved problems in physics. Things have become better since then, but attempting to model the geomagnetic field with any vigor has proven to be an elusive goal. It is now commonly believed that the Earth’s magnetic field is produced by fluid dynamos in the Earth’s mantle. Magnetic fields are produced when current moves around a coiled wire. The idea is that fluid motions play the role of a rotating current inside the Earth. Theoreticians are still arguing over the exact style of the fluid motion, but it is generally thought that the fluid motion is driven by some form of thermal convection and controlled by the primary equation of fluid dynamics, the Navier-Stokes equation.

In my opinion all those incommodities the modern science is meeting with while explaining magnetic phenomena, originate from a deeply rooted belief that magnetism is exclusively, inseparably, and obligatory associated with electric currents, that is with motion of electrons and ions. The scientists cannot imagine that magnetism can be incited by motion of other particles such as for example protons, or generally by motion of material bodies. The below expressed ideas are based on my strong belief that motion of astronomic bodies relative to ether is an identical, although not so far recognized source of those cosmic phenomena that have for centuries intrigued imagination of curious researchers.

If to imagine the body A of fig.2, 3, 4 and 6, 7, 8 of the Part1 of this Article as our Earth, then the direction of its translation designated with arrow 2 on fig.3 would represent the direction of the orbital
motion of the Earth around the Sun, while the rotation direction of the body A designated with arrow 2 on fig.6 could be presented as the direction of the Earth’s daily rotation.

Then the geomagnetic field could be imagined as a vector sum of magnetic fields of both types, i.e. the magnetic field created by its translation on the circumsolar orbit, and that created by its daily rotation about its own axis. The Earth’s mean orbital velocity making up 29.78 km/s, and the maximum daily rotation velocity (on the equator) only 465.1 m/s, the geomagnetic field would be expected to resemble one of the first type, whereas in fact it is a typical example of a field generated by a dipole magnet. The fact might be explained if the ethereal layer relative to which moves the Earth, would itself revolve around the Sun with practically the same velocity. This rather strange assumption founds on the following concepts.

In conformity with the Third law of Kepler all cosmic bodies in the solar system revolve around the Sun with velocities depending only on radii of their solar orbits. This equally relates to planets, asteroids, cosmic dust, gases, particles of the so called solar wind, and other particles. Although elons themselves are not directly subjected to the Third law of Kepler, but being in the medium of other particles, they themselves gather the same mean speeds as these relatively greater bodies and particles. This results in minimization of the magnetic field of the first type.

If all this is so, there nevertheless rests open a question why the axis of the geomagnetic dipole is tilted and shifted relatively to the axis of the Earth’s daily rotation? One might find the reply to the question after analysis of the existing information on the location and migration of the geomagnetic poles. Thus from the site [http://en.wikipedia.org/wiki/Earth's_magnetic_field](http://en.wikipedia.org/wiki/Earth's_magnetic_field) one can learn that the both geomagnetic poles wander independently one from another with speeds that may make about 40 km per year, the north magnetic pole wandering through isles of the Canadian Arctic Archipelago, while the south one – over the places situated at the opposite side of the Earth near the border of Antarctica. The maps showing location of the North and South magnetic poles borrowed from sites [http://en.wikipedia.org/wiki/File:NASA_54556main_nmppath2001_med.gif](http://en.wikipedia.org/wiki/File:NASA_54556main_nmppath2001_med.gif) and [http://en.wikipedia.org/wiki/File:Magnetic_South_Pole_locations.png](http://en.wikipedia.org/wiki/File:Magnetic_South_Pole_locations.png), are represented below on fig.9 and 10.
The maps allow noticing that the geomagnetic poles are located in those places of the globe that approach the respective geographic poles but are not covered by oceans or heavy snow or ice cloaks; instead they are placed in open terrains of the land, these open terrains being in the North – the arctic desert, i.e. the rocky base covered with ice and broken stones, and in the South – small coastal strips of land (which land makes up 4.5% of general surface of Antarctica) that are also similar to the arctic desert, and mountains. These small terrains of land either in the North, or in the South one can imagine
as magneto-conductive gaps between magneto-insulating water and ice covers. Just in these gaps are situated the magnetic poles of the Earth.

From fig.9 one can also notice that the North magnetic pole has already 100 years been wandering in the direction of the North magnetic pole, which might be explained by the snow cover melting on the isles of the Canadian Arctic Archipelago; as to the South magnetic pole, the precision of its location measuring, especially of 100 years old times, does not permit to draw any certain conclusions as to its migration tendencies.

Analysis of the above circumstances allows nevertheless to assert that the magnetic axis of the Earth strives to coincide with that of its daily rotation, and the magnetic poles of the Earth strive to coincide with its geographic poles, but at the North this striving is hampered by the magnetic impermeability of the North Atlantic Ocean and at the South – by that of the ice cap of Antarctic. Just for this reason the geomagnetic poles are placed in sites more magneto permeable but at the same time closer to the geographic poles.

In conclusion there ought to pay attention to the consolidated in literary sources belief of geomagnetic field inversions, which according to http://en.wikipedia.org/wiki/Earth's_magnetic_field may occur with an arbitrary frequency and with mean intervals of some hundreds years. These changes of the north magnetic pole to the south and vice versa supposedly may be determined by magnetic orientation of settled rocks, which would permit to paleontologists to calculate ancient shifts of continents and oceanic bottom resulting from continental plates tectonics. In this connection, I guess it would be much simpler to associate magnetic scores in rocks directly with plate tectonics and not to associate them with as to me inexistent inversions of the geomagnetic field.

On magnetism of the solar system planets

If the origin of geomagnetism represents one of the most exiting puzzles of nature, and if the official science has not yet succeeded to provide it with a convincing resolution, yet more unresolved incomprehensibilities are hidden in magnetic fields of other celestial bodies, particularly the solar system planets, their moons, and the Sun.

The rotation speed of the equatorial belt of Mercury is 3.026 m/s (http://en.wikipedia.org/wiki/Mercury_(planet)) that makes 0.65% of the respective rotation speed of the Earth. Its magnetic field on the equator is 300 nT, or 0.003 Gauss, which makes 1.2% of the respective magnetic field of the Earth, and accounting for their substantial mass difference (Mercury’s mass makes 0.055 terrestrial mass) it looks quite natural. The mercurial magnetic dipole is tilted off its rotation axis by less than 3° (http://adsabs.harvard.edu/abs/2011Sci...333.1859A), and this in spite of apparently homogeneous magnetic resistance of its surface. Nevertheless the available information (http://www.uwgb.edu/DUTCHS/planets/mercury.htm) about icy caps in mercurial polar regions may explain even this small tilt.

The daily rotation velocity of the venereal equatorial belt (http://en.wikipedia.org/wiki/Venus) making no more than 1, 81 m/s that is 0.39% of the respective velocity of the Earth, the absence of information about any magnetic field of Venus is quite understandable.

The equatorial velocity of the daily rotation of Mars is of 241.17 m/s or 51.9% of the respective velocity of the Earth. The mass of Mars makes 10.7% of that of the Earth and naturally its magnetism has to be less powerful than the geomagnetism, but in any event much more powerful than the magnetism of
Mercury. Measurements accomplished by spacecrafts and sondes, both American and Soviet have not registered the expected magnetism, that of itself seems strange. At the same time the same spacecrafts and sondes have revealed on the martial surface in polar and middle latitudes enormous amounts of water in form of ice. According to http://en.wikipedia.org/wiki/Jupiter the geographic poles of Mars are covered with icy caps of such dimensions, that if to melt the south of them, the melt water would be sufficient to cover the entire planetary surface to a depth of 11 meters. The rest of the martial surface is covered with permafrost that according to http://www.windows2universe.org/mars/interior/Martian_cryosphere.html has on the equator a depth of 2.5 km and on the south pole of 6 km. The so called cryosphere, which contains an important amount of ice and makes up the top layer of the planet’s surface, has according to http://www.lpi.usra.edu/meetings/hydrous2009/pdf/4016.pdf a depth on the equator of 7 km, and nearer to the poles – of 20 km.

The presented information cannot divert the idea that the martial surface is exclusively magneto impenetrable, and the fact that the magnetic field of Mars remains undetected becomes therefore quite understandable. In this context it would be to the point to compare the Earth with an electromagnet in form of solenoid with iron core, and Mars – with the same solenoid without core, because as we could learn from http://en.wikipedia.org/wiki/Electromagnet, electromagnets with iron cores permit to obtain magnetic fields thousands times more powerful than those without cores.

According to http://en.wikipedia.org/wiki/Jupiter Jupiter consists mainly of hydrogen, a quarter of its mass being of helium. In addition it may have a hard rocky core with heavier elements. However with regard to the ideas expressed in http://www.wbabin.net/files/4530_dunaev14.pdf, the presented information seems inconvincible, and Jupiter, if it could be seen through its atmosphere, would be rather similar to our Earth, if certainly do not forget that it is the greatest planet of our solar system and that its mass is 318 times greater than that of the Earth. The angular velocity of the daily rotation of Jupiter being double of that of the Earth, the linear rotation speed of its equatorial belt makes 12.6 km/s. It is not surprising that Jupiter has a magnetic field from 4.2 Gauss (0.42 μT) on the equator to 10-14 Gauss (1.0 – 1.4 μT) on the poles, which is 14 times stronger than the magnetic field of the Earth and makes it the most powerful in the whole solar system, except the magnetic fields of the solar spots (see http://en.wikipedia.org/wiki/Jupiter). The magnetic axis of Jupiter makes with its rotation axis an angle of ca 10°, which may suggest the existence in its polar regions of zones of enhanced magnetic resistance. These may be ice caps or other formations with analogues magnetic properties.

Saturn http://www-ssc.igpp.ucla.edu/personnel/russell/papers/sat_mag.html is the second by its dimensions planet of the solar system that rotates about its axis with approximately the same velocity as Jupiter with a period of 10 hours 39 min. As scientists believe, in the same way as Jupiter it mainly consists of hydrogen and helium. In spite of this the magnetic field of Saturn is much weaker than the jovial, characterizes by simplicity and axial symmetry, and its axis coincides with the planetary rotation axis, which seems to be the best proof of the planetary magnetism’s origin resultant from planetary daily rotation. Saturn’s magnetic moment calculated as its equatorial magnetic field intensity times the cube of the radius was, according to the data obtained by Voyager 1 in 1980 and Voyager 2 in 1981, 4.6 x 10¹⁸ Tm³, which was less than expected. Although according to their estimations the obtained value was 580 times greater than the analogues for the Earth, it was more than 30 times smaller than that of Jupiter despite the radius of the last was only 15% greater than that of Saturn. The last confirms the existing belief that the Saturnian surface is completely covered with a layer of fluid
http://en.wikipedia.org/wiki/Saturn, and although according to the scientists’ beliefs such fluid is liquid helium it is not ruled out that it may be water or another magneto impermeable liquid.

Uranus http://en.wikipedia.org/wiki/Uranus has an axial tilt of 97.77 degrees, so its axis of rotation is approximately parallel with the plane of the Solar System. This gives it seasonal changes completely unlike those of the other major planets. Near the time of Uranian solstices, one pole faces the Sun continuously while the other pole faces away. Only a narrow strip around the equator experiences a rapid day-night cycle, but with the Sun very low over the horizon as in the Earth’s polar regions. Each pole gets around 42 years of continuous sunlight, followed by 42 years of darkness. Near the time of the equinoxes, the Sun faces the equator of Uranus giving a period of day-night cycles similar to those seen on most of the other planets. Uranus reached its most recent equinox on December 7, 2007, and during the flyby of Uranus by Voyager 2 in 1986 its southern pole was almost precisely directed on the Sun. One result of this axis orientation is that, on average during the year, the polar regions of Uranus receive a greater energy input from the Sun than its equatorial regions. Nevertheless by unknown reason Uranus is hotter at its equator than at its poles.

According to the now accepted standard model of the Uranian structure the last is composed of three layers: a rocky (silicate/iron-nickel) core in the center, an icy mantle in the middle and an outer gaseous hydrogen/helium envelope. The icy mantle is not in fact composed of ice in the conventional sense, but of a hot and dense fluid consisting of water, ammonia and other volatiles, and this fluid, which has a high electrical conductivity, is sometimes called a water–ammonia ocean. Nevertheless with regard to the doubts expressed in my http://www.wbabin.net/files/4530_dunaev14.pdf, the above exposed planet’s structure seems improbable.

Fig.11 represents a schematic image of the magnetic field of Uranus composed according to results of its flyby by Voyager 2 in 1986.

![Fig.11](image)

On fig.11 S i N denote the southern and northern magnetic poles. The geographic poles are underwritten as South pole and North pole. By an arrow with the inscription Sun there is marked the direction on the Sun and by a dotted line – the Equator.

The observations accomplished by Voyager 2 revealed the specificity of the Uranian magnetic field both in that its axis was shifted relative the geometric center of the planet and that it was tilted by 59° to its rotation axis. Actually the magnetic dipole was shifted from the center of the planet towards the northern geographic pole (southern rotative pole) by one third of the planet’s radius. Such singularity of the magnetic field’s geometry entails the asymmetry of its value. In spite of the average field strength
on the surface of the planet being 0.23 gauss (23 µT), in the southern hemisphere it can be as low as 0.1 gauss (10 µT), whereas in the northern hemisphere it can be as high as 1.1 gauss (110 µT).

In comparison, the magnetic field of the Earth is roughly as strong at either pole, and its "magnetic equator" is roughly parallel with its geographical equator. The dipole moment of Uranus is 50 times that of Earth, that is not surprising if to consider that its rotation velocity at the equatorial belt is of 2.59 km/s (for the Earth it is 465 m/s), and the equatorial radius of Uranus is 4 times more than that of the Earth.

There comes a thought that the above described magnetic field pattern of Uranus noticed during its flyby by Voyager 2 is a consequence of those astronomic and their related climatic particularities, which occur on the planet through its solstices and repeat there from year to year, each of them of the duration of 84 terrestrial years. It is quite possible that through 84 long terrestrial years the above pattern may undergo substantial changes and that in every 42 years (period between winter and summer solstices) the magnetic field pattern may change to the mirror-opposite. Truthful information on the above climatic particularities and their changes failing, it would be impossible to make a definite idea on the subject.

The above expressed idea on possible geometric changes of the magnetic field of Uranus during its long astronomic year may equally apply to the magnetic field of Neptune with its astronomic year duration of 164.79 terrestrial years. This period of time is quite sufficient for the fulfillment of substantial and durable climatic changes and for the adaptation to them of the dipole magnetic field of the planet.

The above expressed idea, although indirectly, may be confirmed by that, according to information found by Voyager 2 during its voyage to Neptune in 1989 [http://en.wikipedia.org/wiki/Neptune], the magnetic axis of Neptune is tilted to that of daily rotation on 47° and shifted on 0.55 radius. Such geometry might be provoked by important seasonal changes resulting from the considerable inclination of the planetary rotation axis to its orbital plane (28.32°) and the considerable year duration equal to 164.79 terrestrial years.

The above presented overview of the planetary magnetic fields needs, as it seems to me, to be concluded by the following notation. The existence of the planetary magnetic fields, as well as that of the Earth is explained by modern science based on the fluid electric dynamo theory. The supporters of the planetary magnetism explanation by the existence of fluid dynamos declare that the fluids responsible for their origin have to be different, and the working conditions of these dynamos have to be also different. For instance, according to these theories the electro conductive fluid responsible for the terrestrial dynamo would be the circulating exterior of the terrestrial core liquid iron, while in Jupiter and other so called gaseous planets such liquid might be metallic hydrogen, and in the jovial moon Ganymede – watery salty solution.

There are circumstances that cannot evade our attention. Thus all the planets except Venus and Mars, of which the practical absence of magnetism was explained there above, have magnetic dipoles with powers clearly dependent on their dimensions and velocities of their daily rotation. Noteworthy is also the fact that the inclination of the dipole magnetic moment of planets can be quite truthfully explained not by their interior structure, of which we can only speculate, but by the climatic particularities, composition and structure of their exterior layer, about which there exist quite persuasive scientific data. The said circumstances show that the origin of the planetary magnetic dipoles lies in the daily rotation of the planets themselves, and in this connection there would be proper to remark that the
efforts spent on exploring the said electro conductive liquids, would be more rational to spend on explication of these magnetic dipoles directly by the rotation of the astronomic bodies themselves.

**On magnetism of planetary moons**

The above thoughts concerning the origin of the planetary dipoles fully concern their moons.

As it is known our Moon [http://en.wikipedia.org/wiki/Moon](http://en.wikipedia.org/wiki/Moon) rotates about its own axis synchronously with its orbiting around the Earth, and the linear rotation velocity of is equatorial belt makes 4.627 m/s that is approximately 1% of the rotation speed of the equatorial belt of the Earth. Mass of the Moon makes according to the official data 0.0123 terrestrial mass that is noticeably less than the mass of Mercury. Accounting for the Moon's surface is mainly composed of hard volcanic rocks it is only natural it has the external magnetic field of the order from one to a hundred nT, i.e. tree times less than in Mercury. According to the same site the Moon has not any global two-polar magnetic field of its own.

According to [http://en.wikipedia.org/wiki/Titan_(moon)](http://en.wikipedia.org/wiki/Titan_(moon)) Titan, the greatest natural satellite of Saturn has a diameter nearly 50% greater than that of our Moon and is 80% more massive. In spite of that in 2004 it was the subject of exploration by the spacecraft Cassini–Huygens, any information about its magnetism is practically inexistent, which may be explained by that at least its top layer is half-and-half composed with a magneto impermeable water ice and a rocky material.

As affirms [http://en.wikipedia.org/wiki/Ganymede_(moon)#Magnetosphere](http://en.wikipedia.org/wiki/Ganymede_(moon)#Magnetosphere) the greatest of the jovial moons and the greatest of all planetary moons of the solar system Ganymede, was in 1995–2000 the subject of meticulous explorations with help of the spacecraft Galileo. The explorations revealed that Ganymede has its own permanent magnetic field independent of the magnetic field of Jupiter. Its magnetic moment is of nearly $1.3 \times 10^{13} \text{T} \cdot \text{m}^3$, which is thrice as much as the magnetic moment of Mercury. Magnetic dipole of Ganymede is tilted of its daily rotation axis at 176°, which means that it is opposite to the magnetic moment of Jupiter. The dipole’s magnetic field created by this permanent moment is on the equator as strong as $719 \pm 2 \text{nT}$, comparatively to the Jupiter’s magnetic field strength at a distance to Ganymede - nearly 120 nT, and near the poles —1440 nT.

The Ganymede’s magnetic axis being inclined to its rotation axis not at full 180 but only at 176 degrees one might explain by a possible irregularity of its surface magnetic permeability, particularly near its astronomic poles, while as it seems to me, the explanation of its magnetic moment orientation in opposition to the magnetic moment of Jupiter one should look for in their interaction particularities related to more general problems regretfully yet poorly explored by modern science.

**Michelson-Morley experiment, why it resulted so as it did?**

Physical theories of the end of the 19th century based on, that similarly as water waves propagate in water, and in a same way as sound waves need respective propagation medium such as for instance air or water, the light waves need their “luminiferous ether”. The light being able to propagate through vacuum, the last was believed to contain the light propagation medium; and the Earth continuously moving either while rotating around its own axis with an equatorial speed of 465 m/s, or while orbiting the Sun with a speed of 30 km/s, or together with the Sun around the center of our Galaxy, it was believed that the movement of the Earth through ether has to create a noticeable “ethereal wind”.

In 1887 the American scientists Albert Michelson and Edward Morley fulfilled the famous experiment [http://en.wikipedia.org/wiki/Michelson%E2%80%93Morley_experiment](http://en.wikipedia.org/wiki/Michelson%E2%80%93Morley_experiment) with the aim to determine this ethereal wind and at the same time the fact of existence of the “luminiferous ether”. The result
obtained by the experimenters had allegedly proved the absence of the luminiferous ether and was used later in favor of the Einstein’s special relativity theory.

The experiment was carried out with the instrument later named as interferometer. In the instrument a white light of a single source went through a half silvered mirror used to split it in two beams travelling at right angles to one another. After leaving the splitter, the beams travelled out to the ends of long arms where they were reflected back into the middle on small mirrors. They then recombined on the far side of the splitter in an eyepiece, producing a pattern of constructive and destructive interference based on the spent time to transit the arms. If the Earth is traveling through an ether medium, a beam reflecting back and forth parallel to the flow of ether would take longer than a beam reflecting perpendicular to the ether because the time gained from traveling downwind is less than that lost traveling upwind. The result would be a delay in one of the light beams that could be detected when the beams were recombined through interference. Any slight change in the spent time would then be observed as a shift in the positions of the interference fringes. If the aether were stationary relative to the sun, then the Earth’s motion would produce a fringe shift 4% the size of a single fringe. At any given point on the Earth’s surface, the magnitude and direction of the wind would vary with time of day and season. By analysing the return speed of light in different directions at various different times, it was thought to be possible to measure the motion of the Earth relative to the ether.

As it is known, the result of the Michelson-Morley experiment has manifested itself as negative in such a sense, that no shifts of the interference fringes have been revealed; and this as it was already mentioned, was considered as a proof of the luminiferous ether’s absence. Such assessment of the said negative result, confirmed by more precise results of numerous later experiments, performed in particular using modern laser equipment, was in my opinion unfounded. It seems to me that the negative result only testified that the model of ether and the character of interaction of ether and light, laid to the conception of these experiments do not correspond to the reality. The revolving of the Earth around the Sun, as it was mentioned above, is going on with practically the same speed as the revolving of ether itself; and as to impact on the speed or frequency of light of the Earth’s daily rotation, it would be proper to remark that in literary sources there is no sign of any influence on the light speed or frequency of any magnetic fields and particularly of that of the Earth.

Conclusions:

1. Orbital movement of the solar system planets does not incite magnetism of the first type, because ethereal particles while interacting with other material bodies and particles, moving with velocities specified for them by the Third Law of Kepler, although not being themselves subordinated to this Law, acquire velocities at least close to those of these material bodies and particles.
2. The solar system planets’ rotation around their own axes (daily rotation) incites magnetism of the second type, known in literature as magnetism of planetary dipoles.
3. Magnetism of planetary dipoles depends on planets’ dimensions, velocities of their daily rotation, and magnetic permeability of their surface layer.
4. In the case of uniformity of the planet’s surface layer magnetic permeability, the planetary magnetic dipole axis has to coincide with the axis of its daily rotation, and the dipole itself - to be directed conforming to the right hand rule, i.e. analogously to a solenoid with the current direction coinciding with the direction of the planet’s rotation.
5. No-coincidence of the magnetic dipole’s axis and that of the planet’s daily rotation may be explained by the decrease of the surface magnetic permeability near the geographic poles.
6. Availability, strength, and geographic particularities of the planetary magnetic dipoles depend not on the internal structure and dynamics of the planetary internal layers, but on the planets’ dimensions, velocity of their daily rotation, their climatic and geographic particularities, as well as of their external layers’ structure.

7. The magnetic poles of the Earth are located in those places of the globe that are close to its geographic poles but not covered with oceans, or thick snow or icy covers; instead they are located in open terrains of land, these open terrains being in the North – the arctic desert, i.e. the rocky base covered with ice, and broken stones, and in the South – small coastal strips of land (making 4.5% of full surface of Antarctica) that are also similar to the arctic desert, and mountains. These small terrains of land either in the North, or in the South one can imagine as magneto-conductive gaps between magneto-insulating water and ice covers. Just in these gaps are situated the magnetic poles of the Earth.

8. The absence of the magnetic field of Venus can be explained by the weakness of its daily rotation.

9. The magnetic field of Mars remains unrevealed because of the magnetic impermeability of its surface, the main part of which is covered with ice.

10. The inclination of the magnetic axis of Jupiter to its rotation axis of nearly 10° may witness the existence in its polar regions of zones of enhanced magnetic resistance. These may be ice caps or other formations with analogues magnetic properties.

11. The magnetic moment of Saturn is 30 times smaller than that of Jupiter in spite of its radius is smaller than that of Jupiter by only 15%. The magnetic axis of Saturn coinciding with its daily rotation axis, there are reasons to believe that the surface of Saturn is completely covered with a layer of liquid, and in spite of, according to scientists’ beliefs, such liquid is liquid helium, one could not rule out that such might be other magneto impermeable liquid, e.g. water.

12. A peculiar pattern of the magnetic field of Uranus, observed during its flyby by Voyager 2 is a result of the peculiarities of those astronomic and related to them climatic conditions that come about on the planet at the times of solstices and repeat there from year to year, each as long as 84 terrestrial years. It is quite possible that throughout 84 long terrestrial years this pattern undergoes substantial changes and that every 42 years (period between wintry and summer solstices) the planetary magnetic field pattern might change to the mirror opposite.

13. Conclusion 12) concerning possible changes of the magnetic field of Uranus throughout its long astronomic year may to the same degree concern the magnetic field of Neptune with its astronomic year’s duration of 164.79 terrestrial years. The above period of time is quite sufficient for occurring substantial and durable climatic changes and for adaptation to these changes of the dipole magnetic field of the planet.

14. All the planets except Venus and Mars, of which the practical absence of magnetism was explained in Conclusions 8, 9), having magnetic dipoles with powers clearly depending on their dimensions and velocities of their daily rotation, and the inclination of these dipoles to the axes of daily rotation being truthfully explained not by their internal structure, of which we might only speculate, but by their climatic particularities, composition and structure of the external layers, about which we have truthful scientific information, there come a conclusion that the efforts spent to search electric liquid dynamos would be more rational to spend on the explanation of these fields directly by the rotation of the said astronomic bodies themselves.

15. The negative result of the Michelson-Morley experiment witnesses that the model of ether and the character of interaction of ether and light laid to its conception are far from reality.