

# Revisiting Gravity, Free Fall and Inertia

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This paper was extracted from my new book, **Aethro-Dynamics** (2009), [1] containing the latter half of Chapter 5, "Revisiting Gravity, Free Fall and Inertia". Based on the resolution of "Polarization" and postulating a corpuscular gaseous Aether, filling all space represents a fundamental cosmospheic pressure, the background force with a unifying equilibrating effect on all locally appearing forces and phenomena. The Aethro-kinematic "Sink-vortex" and the discovery of "Theory of Evolution of Matter" is the inert motor of the cosmos, causing Gravity, Free Fall and Inertia.

## 1. Introduction

Expanding on my previous book, **Aethro-Kinematics** (1994) [2], **Aethro-Dynamics** (2009) [1] contains five chapters and a "Constitution". Ferromagnetism, Electromagnetics and Electrostatics are investigated in detail, as to how these various locally observed macroscopic phenomena are caused by interaction with the underlying background pressure of the cosmospheic Aether. All this serves to observationally prove the existence of a universal background force; a cosmic corpuscular Aether. The first part of Chapter 5, not reproduced here, discussess mainly the known Aethro-kinematic theory of the Evolution of Matter, due to the consumption of the cosmospheic Aether by the evolving Cosmic Bodies and Systems. 5.2 through 5.3 present a detailed history of evolving Aether theories and their apparent death by the beginning of the 20th century. This paper begins with section 5.4, the resolution of the century old mystery of the origin and mechanism of Universal Gravitation.

Each numbered section in this paper will correspond with a section in my book, **Aethro-Dynamics** (2009), [1] beginning with section 2 for 5.4 in the book. Each subsequent section N will correspond with section 5.N+2 in the book, and each figure M corresponds with figure M+9 in the book.

## 2. The Temporary Reincarnation of Aether and Vorticity

It took science two centuries to recover from the delirious success of Universal Gravitation and to be able to spend some time on other natural phenomena.

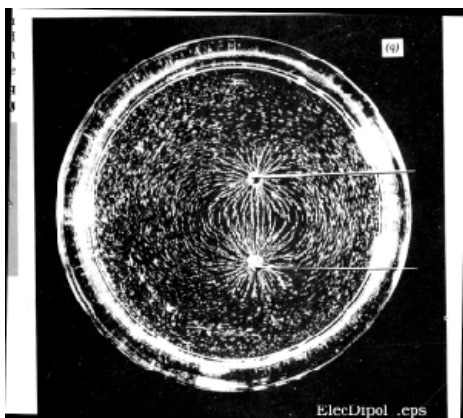


Fig. 1. Electrostatic dipole.

In the 1830s Faraday got involved in researching electric and magnetic phenomena and developed visual examples of their ghostly fields. He admiringly stated:

"Space was not nothing, or the mere location of bodies and forces, but a medium capable of supporting the strains of electric and magnetic forces. The energies of the world were not localized in the particles from which these forces arose, but rather were to be found in the space surrounding them." (Figure 1)

As in 1873 James Clerk Maxwell stated in his Treatise on electricity and magnetism:

"It is mainly with the hope of making Faraday's ideas the basis of a mathematical method that I have undertaken this treatise." (Figure 2)

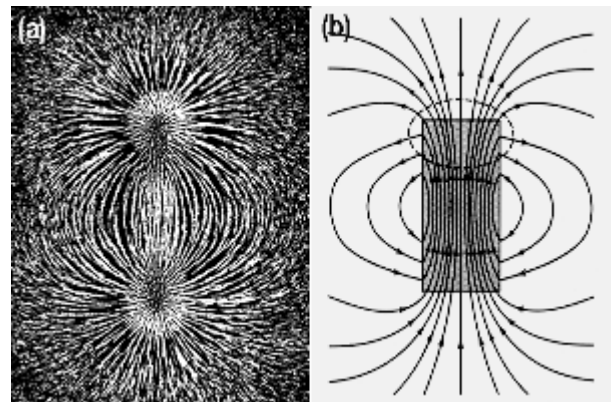


Fig. 2. Faraday Lines of Force

Thus, Maxwell constructed a mathematical field theory for electromagnetism and experimentally proved that the fluid-mechanical forces through these fields are not propagated instantaneously, but with the limited speed of light. He also showed that light is an electromagnetic wave and proposed to reinstate Huygens' 'all-pervading luminiferous Aether' as a mediator of light and all other non-contact, action-at-a-distance forces.

"We can scarcely avoid the inference that light is the transverse undulations of the same medium which is also the cause of electric and magnetic phenomena."

In the ninth edition of the Encyclopedia Britannica (1870), under the title 'Aether' Maxwell describes "the vast expanse of

this substance, some of it possibly even inside the planets, carried along with them or passing through them as the "water of the sea passes through the meshes of a net when it is towed along by a boat." Thus, Maxwell still preserves fluid-dynamics in his equations even if this 'mathematical field theory' was merely postponing the detailed conceptual understanding of action-at-a-distance-forces.

Since both electric and magnetic forces gradually decreased by the 'inverse square of the distance', Maxwell could apply Lagrange's calculus of variations to calculate the strength of electromagnetic potentials at any point in the field by simply accepting the precise validity of inverse square law. This artificial philosophical shortcut, however also meant the desertion of his initial goal to describe the real mechanics of the cosmic Aether.

Maxwell succeeded to mathematically describe these forces as "non-linear gradient vector fields of electric and magnetic potentials. The potential strength of this field, could be mathematically predicted from point to point at any distance, whether a material test object existed there or not. Toward the end of the century it was suggested that gravitational effects might also propagate at the speed of light and there were attempts to formulate a Maxwellian gravity field as an inverse square gradient vector field of gravitational potentials.

Due to the combined works of Faraday and Maxwell, nineteenth century became the century of the Aether. Most leading physicists had faith in their combined effort to find mechanical understanding of all actions-at-a-distance. Thus, a full scale search was instigated for an acceptable physical and mathematical model of the Aether.

The list of physicist who contributed. included Thomson, Kirchoff, Bjerknæs, Leahy, Helmholtz, Stokes, Hertz, FitzGerald, Lorentz, and hundreds of other geniuses.

According to the historians of theoretical physics, in the territory of electricity and magnetism the Faraday-Maxwell theory turned out to be as powerful a synthesis, as Newton's laws of motion and Universal Gravitation. The general acceptance of Maxwell's theory toward the end of the nineteenth century marked a transition from an era dominated by action-at-a-distance occultism to the present philosophy of the field theories.

Unfortunately, in one of his last notes Maxwell suggested an experiment that could prove the physical existence of the Aether. Assuming that the medium is globally motionless and incompressible, it renders an 'absolute frame of reference' relative to which the Earth has 30 km/sec orbital velocity around the sun. Thus, it is a matter of a measuring device that could show a difference in the speed of light when measuring it in the direction of the Earth's motion, or opposite, or perpendicular to that.

In 1883 during the search for proof of the existence of Aether, American physicist, Albert Michelson followed up on Maxwell's suggestion in an attempt to measure the speed of light on the orbiting earth in different directions and various times.

The result was surprising and devastating to all science. Michelson interferometer experiments, in spite of constant improvement of its sensitivity, repeatedly produced the same 'Null result': The speed of light was the same in all directions and all times, thus independent of the earth's motion. Aetherists lost their hypothetical motionless Aether....

In 1905 Albert Einstein demolished the 'absolute frame of reference and the all-pervading Aether and mathematically re-instated the 'action-at-a-distance'.

Within a few decades Faraday and Maxwell's effort to achieve conceptual understanding was degraded by Einstein to the level of mere 'scaffolding', that served only to build the mathematical formalism, but should be systematically dismantled to avoid confusion.

This was rigorously executed by 20th century education. What has remained?

Although modern physics replaced Newton's instantaneous action with the measured propagation of the speed of light, they never inquired as to why should it take any time at all, for the transmission of actions at a distance in empty space? - Even Einstein felt uncomfortable enough to refill his 'empty space' with his previously demolished ether in order to make his theory of General Relativity work.

As in his Leiden lecture, Einstein declared (1920):

"According to this theory... space is neither homogeneous nor isotropic. This compels us to finally dispose the view that space is physically empty. But therewith the conception of the ether has again acquired an intelligible content, although the ether of the general theory of relativity is a medium which is devoid of all mechanical and kinematical qualities, but helps to determine mechanical and electromagnetic events."

Did he say, "intelligible"....?!

### **3. The Conclusions of the Masters of the Twentieth Century**

Now, we best close the nutshell on the conceptual evolution Aethro-kinematics, because, as it's getting more evident daily, the 20th century became that of 'Experimental Mathematics' where two probabilities lead to a third and that to a fourth without the potential conceptual convolution of finding out the cause of any of them.

Therefore, instead of judging the value of the conceptual evolution so far, let the authority of verbatim quotes from the giants of modern theoretical physics demonstrate what they thought we have ended up with:

Albert Einstein, Nobel Prize winner in Physics, in 1921 for The theory of the photoelectric effect, In his speech at the Solvay Conference in Copenhagen, he declared his condensed philosophical opinion about the Schroedinger Wave-equation and its Quan-tummechanical interpretation as the waves of probability, when he said:

"God doesn't play dice"

Niels David Bohr, Nobel Prize winner in 1922 for his contributions to Quantum Mechanics as a modern understanding of the atomic structure, replied to Einstein:

"Stop telling God what to do with his dice. Anyone who is not shocked by quantum theory has not understood a single word. There is no quantum world. There is only an abstract physical description. "It is wrong to think that the task of physics is to find out how nature is. Physics only concerns what we can say about nature."

Albert Einstein, in 1954, regarding his futile decades spent on a relativistic 'Unified field theory' and its relation to Quantum mechanics, Einstein wrote, to his dear friend, M. Besso:

"I consider it quite possible now that physics cannot be based on the 'field concept', i.e., on continuous structures. In that case, nothing remains of my entire castle in the air, gravitation theory included, and of the rest of modern physics."

Richard Feynman, Nobel Prize 1966 for the latest development of Quantum Electro Dynamics (QED), in his Caltech lecture 'The Strange Theory of Light and Matter', remarked:

"What I am going to tell you about is what we teach our physics students in the third or fourth year of graduate school. It is my task to convince you not to turn away from Quantum Electro-Dynamics just because you don't understand it. My physics students don't understand it either. Because I don't understand it either. Nobody does!"

Werner Heisenberg, Nobel Prize 1932 development of Quantum Mechanics:

"The incomprehensibility of natural phenomena itself is a natural phenomenon"

Hence, after four centuries of conceptual evolution in the theories of Physics, the human intellect faces the most perturbing philosophical choice between the admission of ignorance by Newton's 'hypotheses non fingo' and the religious occultism of the Quantum Electrodynamics, General Relativistic, Super-Gravitational, Super-symmetrical, 'Standard Model' with their mutual dream that once the Super Hadron Collider turned on to smash protons into quarks and gluons, it will prove that gravity is neither an Aristotelean homesickness of the rocks, nor a Newtonian instantaneous action at a distance, nor a Maxwellian gradient gravitational field, nor a curvature of Einstein's space-time, but merely a virtual 'exchange force' of the QED ejections and absorptions of an appearing and disappearing quantum-virtual exchange particle; the 'graviton'.

Then we can be sure that incomprehensibility is indeed a natural phenomena.

#### 4. Newton's vs Descartes' vortex and Kepler's Mathematics

In the 'Principle' Newton mentioned, Alfonso Borelli, his colleague, as a possible inventor of the right mechanics of gravity. Borelli disagreed with Beeckman's 'occult jerky pulls' of attraction from the front, and he suggested that the Aether is made up of 'tiny hammers' flowing toward the primary body and repetitiously hammering the falling object from the back as individual mechanical collisions, producing the uniform acceleration of objects falling to the earth. Thus, he resolved the mechanical problems of a 'constant force' and 'uniform acceleration' of gravity, and also hinted the granular concept of the Kinetic Theory of Gases which was only formulated fifty years later by Bernoulli.

In spite of knowing about all these ideas, Newton still retained the statement that he only gave a mathematical description of the phenomenon of gravity. - Otherwise, he refuse

to speculate any further: - 'Hypotheses non fingo!' (No Hypothesis.)

Based on all the above and with the philosophical conviction, that 'empty space' and 'instantaneous actions at a distance' are pure metaphysical nonsense and nothing to do with comprehension, Aethro-kinematics in 1994 embarked to fill the gap of comprehension left by Newton's 'Hypotheses non fingo' by reinstating the all-pervading cosmic Aether and attempting to find an acceptable relation between Descartes' Solar-vortex system, and Kepler's three laws of planetary motion proven by observational data.

The fundamental idea of Newton's unification was that the successful mechanical concepts of the three laws of motion of earthly phenomena must also be applicable to the mechanics of the whole universe. For Kepler's mysterious harmony and Descartes dreamy Solar vortex, Newton had to replace the 'harmonious ratio of  $P^2/R^3 = K$  with some central mechanical force that obeys his own three earthly laws. Thus, beside the 'inertial mass' of resistance against 'acceleration', he postulated a new inherent attribute; that "all matter attract all other matter in the universe with a force proportional to the 'gravitational mass' and to the inverse square of the distance between their centers. (This 'centripetal force' was discovered by Huygens' swirling stones which helped Newton's mechanical derivation of Kepler's ratio. See Aethro-kinematics, Ch-6 [116]).

Thus, gravitation became the most general Newtonian 'non-contact force' of nature, as an instantaneous action at a distance with infinite velocity through empty space. Hence, Kepler's harmonious empirical clock-work was replaced by Newton's already well known mechanical concepts of 'force', 'gravitational mass', 'inertial mass', and the resulting 'acceleration'.

This was published in the 'Principia' with an additional postulate declaring that gravitational mass and inertial mass are explicitly equal!

There were, however, some disturbing uncertainties with Newton's equality postulate, that was addressed by Galileo's Principle of Equivalence and the experimentally proven facts that in the vicinity of the earth the gravitational acceleration of all bodies were uniform and in the same rate regardless of their varying inertial masses. Since these facts seemingly contradicted Newton's laws of celestial mechanics, he had to postulate away

Galileo's enigma by assuming that gravitational and inertial mass are exactly equal and opposite inherent attributes of matter. Thus, when two differing objects are in free fall, although the larger mass has greater attraction force, it also possess a greater inertial resistance. Thus, the exact equality of the two opposing attributes cancel out one another and resulting an equal rate of acceleration for all freely falling bodies.

The argument about this equality has never been presented or finished by science.

Stating this problem should start with the fact, that both 'gravitational mass' as the source of acceleration of one object toward another (attraction) and 'inertial mass' as the source of resistance of the same acceleration, were both Newton's own definitions as the two opposing attributes of the same matter. He also stated that these two inherent attributes are not only opposite but also exactly equal. But all these were happening in

Newton's brain and no physical reasons were discussed to back up their equality.

The theoretical objective of Aethro-kinematics was to reinstate the ideal gas of cosmic Aether, applying Newtonian mechanics and a fluid-dynamic design for Descartes' Solar-vortex and a planetary clock-work based on Kepler's 3<sup>rd</sup> Law  $P^2/R^3 = K$ .

Obviously, the first argument of Aethro-kinematics had to refute Newton's demolishing attack against Descartes' Solar-vortex theory, based on the mathematics of the circular vortex, where as Newton stated, the ratio of the radius and the period was  $1/R^2$ .

Aethro-kinematics discovered a fluid-dynamic vortex system in agreement with Kepler's equation of  $P^2/R^3 = K$ . Descartes' circular vortex combined with Huygens' centripetal force, where the orbital velocity and the radius was in Kepler's ratio;  $1/\sqrt{R}$ .

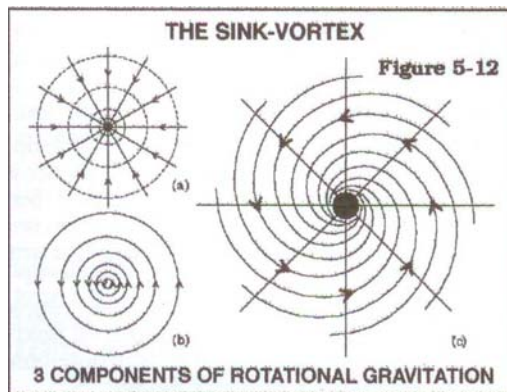


Fig. 3. The Sink Vortex

This 'Sink-vortex' had three components of motion: radial-centripetal, tangential-orbital and vortical-rotational motions as shown on Figure 3. Kepler's empirical data hinted that the square of the orbital velocity of each planet is affected by a factor which is inversely proportional to the square of the radius. But if the cause of Newton's gravitational attraction of all matter to all other matter is wrong then the question became; what could be the cause of the force that replaces Huygens' rope that is continuously deflecting the rock or the planet from their initially straight inertial path?

This discovery has simultaneously inspired Aethro-kinematics to theorize about the individually evolving Donut-vortex-electrons out of 'natural vorticity' and from there on, a continuous step by step evolution of subatomic particles and further accretions to individual atoms and molecular, macroscopic, cosmic bodies, solar-systems and galaxies. All these seem to be the natural evolutionary condensation and conservation of the cosmospereic kinematic Aether into dynamic matter.

'Accretion' was defined as the growth or increase in size by gradual external addition, fusion, or inclusion, and increasing internal complexity. Based on the principle of conservation of angular momentum, when natural vorticity added rotation to the isotropic Aether, it created accreting matter under the pressure of the isotropic cosmosphere.

Matter is merely a dynamic condensation of the kinetic Aether. It follows, that the evolving cosmic matter has to consume the surrounding free Aether and this consumption

inevitably produces the centripetal components of the sink vortices.

Aethro-kinematics, thus postulated a centripetal, spiral gravitational inflow of Aether into all accreting Matter. This was the 'Theory of the Evolution of Matter'. The gaseous cosmic Aether is the substratum of subatomic, atomic and macroscopic matter.

Its constituents the Aethrons are philosophically equivalent to the indivisible 'Greek Atoms' except that they are in the subatomic order of magnitude and their random motion and constant collisions creates an all-pervading, isotropic pressure at all point of the cosmos, including on all points of the already accreted matter.

Thus Aethro-kinematics did complete its initial goal; quantizing and mechanizing the constant force of gravitation based strictly on Newtonian mechanics. Nevertheless, Newton's unification of earthly and celestial mechanics has been contradicted by Galileo's Principle of Equivalence and could only work with the acceptance of his preinstalled postulate of the perfect equality of his own two inherent attributes of the 'gravitational mass' and 'inertial mass'. - This excuse can be used as it is needed, to nullify Newton's Equations predicting different rates of acceleration due to the inverse proportionality 'inertial mass' in the case of 'free fall' toward the Earth or to other cosmicbodies. Science did not accept this excuse. They kept experimenting to measure the two attributes in various ways; the gravitational attribute as weight and the inertial resistance by acceleration. The latest result is proving equality, one part in a billion.

Frankly, Aethro-kinematics did accept this explanation as the best experimentally proven truth, until in further research of Newton's private communication it surfaced that even Newton himself was not genuinely convinced about his own postulates.

Newton based this hypothesis on his third law of action and reaction, but within a century, scientist realized that the 'centrifugal force', - that seemingly an opposite to the 'centripetal force', - is merely an apparent force, causing an optical radial recession when observed from the rotating system itself. If Huygens' string broke, the stone would not fly away radially, as would be expected. but it would continue to move at uniform speed on the last inertially straight tangential direction, perpendicular to the radius. The 'centrifugal force' is merely an absence of the 'centripetal pull'.

## 5. Descartes / Kepler Clockwork and Newton's Gravity

1. Instead of Maxwell's motionless Aether, Aethro-kinematics presumed an isotropic, homogenous cosmosphere in which, 'local anisotropies' could naturally occur. Cosmic drifts could form and dissipate, turbulence and vortices can appear and disappear, but in the vast universal scene, the cosmic isotropic pressure is the underlying cause of the conservation of kinetic and dynamic energy of the Aether, which is in general isotropic, but any local organized anisotropy is born out of what can be classified as 'dynamic'.

2. Thus, a three dimensional picture is forming around all cosmic bodies, representing an Aethro-kinematically organized,

rotating vorticity, call it a 'gravitational field', or a 'Sink-vortex', driven by the evolutionary consumption of the external isotropic cosmosphere for the sake of internal manufacturing of condensed 'Aetheral matter'.

The dynamics of this vortex was first recognized empirically by Kepler's laws which described it not fluid-dynamically, but through the observed motion of the visibly condensed members of the solar system, giving the recipe in an empirical formula;  $K = P^2/R^3$  which shows the ratio for all the planets in the whole-solar-clock-work.

3. Descartes' assumed that the solar system is a circular Aether vortex, coming from the natural vorticity of the cosmic fluid. The rotation of this vortex was supposed to create all sub-vortices on permanent orbits, predicted by Kepler's celestial clockwork.

Nevertheless, Descartes' circular vortex was missing the essential physical cause, that could produce all that. The original cause for Huygens' 'Centripetal Force' was the Aethrokinematic

Evolution of Matter; a steady consumption of the cosmic Aether by the evolving cosmic bodies. Without this, gravitational force would remain a mystery.

4. Galileo's Principle of Equivalence; that all objects in free fall to the earth have equal rate of acceleration, clearly showed that in 'free fall' Newton's second law,  $a = F/m_i$  is invalid. In this case the inverse proportionality of the inertial resistance is invalidated.

But in his argument Newton also suggested that the equal rate acceleration of differing inertial objects naturally follows from the equivalence of the 'gravitational mass' and 'inertial mass'. A larger object possess a greater attraction force, but also an equally greater inertial resistance against that acceleration. This argument seems to make Galileo's Principle invalidated for all freely falling bodies in all gravitational fields.

But Newton also had an other mathematical problem with the mutual attractions between the Sun and the planets. Recall the equation  $F_g = M_s \times M_p / r^2$ ; This means that the total force of attraction between the Sun and any planet is proportional to the product of the two masses. Nevertheless, the total mass of all planets is less than 0.01% of the mass of the Sun, thus it should be immeasurable compared to the Sun.

It follows, that the planets' masses were neglected in the calculations of their acceleration and period of orbit and its distance from the Sun. This data comes from Kepler's empirical formula of  $P^2/R^3 = K$  and other details from the empirical observation.

Therefore, in a roundabout way Newton contradicts his own initial postulate that gravity is a universal 'mechanical force'. Thus, the planets are also in free fall around the Sun and so are the Moon and the man-made satellites around the Earth. Thus, what Galileo's Principle of Equivalence really postulated was that Newton's mechanical gravitational force does not exist at all. Not only in the vicinity of the earth, but not anywhere in the cosmos.

Instead, it is the equal rate of acceleration produced by Kepler's Clock-work, an 'inertia free fall', produced by The Aetheral Solar Sink-vortex.

But then what was wrong with the Aethro-kinematic Sink-vortex inflow theory based on Borelli's repetitious back-

hammering of the free falling objects? This was merely his futuristic quantization of gravity which tapped the analogy of a repetitious collision series replacing the false belief of a constant force. Borelli's tiny hammers perfectly mimicked the carrying of a solid object by a flowing fluid. That is, the inflow mechanism explicitly described Newton's mechanical force, where  $\text{Acceleration} = F / m_i$ , and thereby directly opposed the Principle of Equivalence, which postulates Kepler's 'inertia-free fall'.

Well, let's admit that the fundamental idea of Aethrokinematics to design a cosmos strictly based on Newton's three laws of earthly mechanics was somewhat haphazard...

Back to Kepler's empirical mathematical clock-work of  $P^2/R^3 = K$ , Descartes' grand speculation of vortices and Galileo's discovery of the equal rate of accelerations of the various objects in free fall, - we must also add Huygens' rope representing the centripetal force on his orbiting rock. Only then, we could present a full description of the force that keeps planets on the orbits about the 'Sink-vortex of the Sun'.

But the question still remains; what can replace Huygens' Centripetal Rope?

Newton mathematically proved, that it could not be Descartes' circular vortex, thus he must have figured a different origin to that force. He never even disclosed the cause of the initial straight motion of the planets as one component of the orbit. By demolishing Descartes' vorticity, Newton not only denied rotation but also rejected the inertial straight line motion that was centripetally deflected into a circle. Newton's attraction was only curving an imaginary isotropy of 'space' into elliptical orbits. Einstein's non-Euclidean gravitational acceleration field supposed to produce a space curvature at a distance, propagating with the limiting speed of light. The Theory of Quantum Gravity is hoping to find in atom-smashing a virtual sub-sub-atomic exchange particle, the 'graviton' which transfers its momentum through space via high frequency virtual collisions.

Nonetheless, we still don't know how can the Aether, that disappears through the surface of the consuming cosmic body, transfer its negative centripetal momentum to deflect the inertially straight motion of rocks, objects, or planets.

Here is one solution: Huygens' stone must have started with a straight inertial motion until he firmly grabbed the rope at a given length, and started to turn with it in a circle.

He unknowingly started the stone on a straight inertial path, and when the rope straightened let the stone turn him around, creating an angular momentum. Thus, the Sink-vortex version of Descartes theory would fluid-dynamically explain both the initially straight inertial motion and muscularly produced centripetal component.

This theoretical analogy to the initiation of circulation in the isotropic Aether still needs a straight line inertial motion which is then deflected into a vortex by a centripetal effect created in the medium. This is rendered by the Aethro-kinematic Sink-vortex.

## 6. The Aethro-Dynamic Comprehension

This work is the continuation, or the following volume to Aethro-kinematics, published in 1994 at Amazon.com. It has been planned to consists of five parts:

1. Foreword
2. 'Ferromagnetism'
3. 'Electro-magnetics'
4. 'Aethro-electrostatics'
5. Revisiting gravity, free fall and Inertia

The basic conclusion drawn from the Aethro-dynamic exercises in 'Ferromagnetism' and 'Electro-magnetics' is that Maxwell's choice of using fluid-dynamic equations to describe Faraday's physical 'lines of force' and 'fields of forces' and 'magnetic flux' was to exemplify their deep conviction of the existence of a supermundane Aether fluid in which these ghostly clouds are forming, and circulating through, around and between magnets, batteries, conductors, and in general through 'macroscopic matter'.

The most fundamental discovery of Aethro-dynamics from these exercises came with the realization that the all-pervading gaseous Aether also exhibits an all-pervading static kinetic energy in the form of an isotropic cosmospereic pressure exerted at every point of the cosmos, including the already accreted matter. This energy has been found a fundamental cosmic force of equilibration that tends to dissipate local disturbances into the greatest possible volume of space, by spherically expanding compression waves, or if a system is dynamically durable, the same cosmospereic tends to equilibrate, condensate and encapsulate it to permanency within the least possible volume of space.

Encapsulation is materialization!

In 1876 Maxwell wrote on Electricity, Magnetism and Gravitation:

"...we are naturally led to inquire whether the mutual attraction of gravitation, which follows the same inverse square law of the distance as electricity and magnetism, is not also traceable to the action of a surrounding medium? - But, a paradox is caused by the Newtonian theory of mutual attraction of all matter and for this phenomena the energy of the medium must be decreased by the presence of the attracting bodies. As I am unable to understand in what way a medium can possess such properties, I cannot go any further in this direction in searching for the cause of gravitation."

Nevertheless, he had underestimated himself, or at least his mathematical genius. He indeed found a mathematic formalism that made it possible to calculate the force at any point of space from the inverse square law without having a mechanical understanding how the energy of a medium could be decreased by the presence of matter. Resorting to Lagrange's Calculus of Variations made him capable to calculate the strength of electromagnetic and gravitational vector potentials at every point in the field by simply accepting the precise validity of the inverse square law.

Maxwell created an equation for electromagnetic field which was later applied to gravity as the 'non-linear, gradient vector field of gravitational potentials'. 'Non-linear' meant, that the strength of the force field is non-linearly decreasing in proportion to the 'inverse square law' with the distance between the attracting bodies. The gravitational potentials are given by the product of the two masses divided by the square of the distance between them. This method is also valid for a single gravitating

body and gives the proper values in its field whether there exists a secondary mass, or not.

But Maxwell's Aether model was a motionless, incompressible gas and had no answer to his enigma 'how the kinetic energy of the Aether could be decreased' due to the presence of two gravitating bodies. The answer only came with the Aethro-kinematic 'Theory of the Evolution of Matter', suggesting that matter is dynamically condensed Aether in the interior of cosmic bodies, which results in a constant central consumption of the cosmospereic.

Cosmic bodies are the ovens of the universe, the dynamic pressure cookers of matter consuming the immense inventory of the raw cosmic Aether. The gradient density increase is proportional to the inverse square of the distance also means that the fluid is getting less and less rarefied. The static pressure gets stronger and stronger with distance, until the rarefaction becomes zero and the cosmic pressure becomes isotropic. Maxwell's negative gradient field is fluid-dynamically justified and Lagrange's shortcut is conceptually explained by the Aethro-kinematic theory of the Evolution of Matter and the resulting consumption of the cosmospereic between two cosmic bodies. A decrease in the kinetic energy of the fluid Aether is indeed happening in the vicinity of both cosmic bodies, directly proportional to their consumptions and inversely proportional to the square of the radial distance between their centers.

What about the Aether density between two mutually attracting masses? Is the center of mass also the fulcrum of the gradient fields where the Aether is rarefied the most?

Remember, we are analyzing rotating systems, where the objects are orbiting about each other according to Newton's principle of the center of mass.

We should realize here, that during in a single century the Earth centered universe was transformed in the human mind to a Sun-centered universe. Copernicus discovered that the planets orbit the Sun and Kepler discovered the mathematical formula  $P^2/R^3 = K$ , the orbital time squared divided by the cube of the radius is a constant. Thus, there really exist a rotating planetary system around the sun. Descartes invented an ingenious solution, even if it was mathematically faulty. There is an Aetheral vortex around the sun that carries the planets and must be the fluid-mechanics of gravitation.

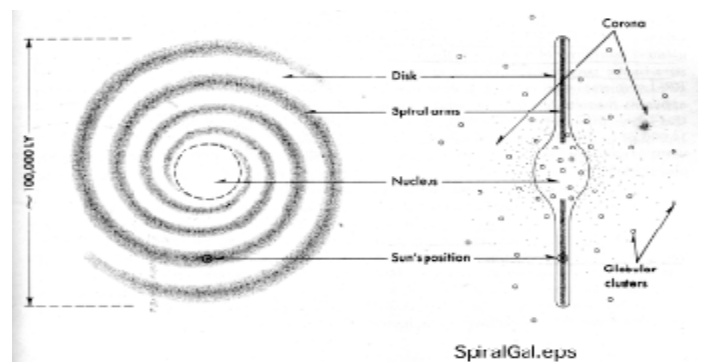


Fig. 4. Spiral Galaxy, discovered 1927

Figure 4 shows the first spiral galaxy that was only discovered by human on the 200" Palomar telescope in the 20th century.

The general problem before Descartes proposal of the Solar vortex in the all-pervading Aether was that gravity was thought to be a massless instantaneous action at a distance force through empty space. There was never a picture of an astronomical rotating system in the human mind, thus Descartes imagination must have associated the Solar system with the circular vortex remembering the tornadoes in the atmosphere.

## 7. Lengthening of the Mean Collision Free Path

In the macroscopic world, between the successive collisions, the atoms of an ideal monatomic gas move with constant speed along a straight line. The average distance between such collisions is called the 'mean collision-free path'. The Aethrons of the Aether also have non-zero dimensions, therefore collisions do occur. Thus, the mean collision-free path is related to the size of the Aethrons (possibly a millionth of the modern atoms) their number per unit volume. As the density of the Aether changes, so does the length of the collision free path. The gradation of the mean collision free path acts as a 'centripetal acceleration field' on every single Aethron and therefore Aethron by Aethron, it also acts on the subatomic, microscopic, macroscopic, or cosmic body.

This also means that any individual Aethron in the cosmosphere will have a preferred direction in which it can move collision free further than in any other direction. Each individual Aethron that already passed through the porous surface of the material body, - let it be a member of a dynamic system of a 'solid' construction, or that of a Donut-vortexelectron, or its dipole circulation, or an atom, or molecule, or a member of the free gas trapped within the immense number of cavities in the construction. Thus, each Aethron, already serving as condensed matter with a specific motion, harmonized with the falling body, will have a better chance to move collision free in the path of the disappearing Aethron toward the center of the sink further than in any other direction. Thus, the whole organized falling body will have a tendency to fall collision free toward the center, due to the centripetal lengthening' of the collision free path.

Since this preference exists in the ultimate order of magnitude of the Aethrons, it equally affects the state of motion of all matter independent from its construction, composition, or inertial attributes of the freely falling objects. Thus, in free fall. every Aethron of the whole construction, including the internal medium, uniformly accelerates, at the same rate without inertial resistance.

In the most fundamental way, this recognition shows that natural phenomena cannot be comprehended by simply attributing each of them to a different inherent attribute of matter in 'empty space'. Postulating an innate property of matter as the cause of a phenomenon is already a denial of any mechanical understanding.

Aethro-dynamics postulates an all-pervading Aether with the simplest possible fluid-mechanical attributes and interactions between this basically isotropic cosmosphere and the already dynamically condensed Aetheral matter. The result is our turbulent Cosmos, the unavoidable Evolution of Matter and the inertially free falling gravity.

In the Earthly gravitational free fall, this explains Galileo's 'Principle of Equivalence':

Not based on the tricky equality of Newton's inherent gravitational and inertial masses, but on the lengthening of the collision free path in the gravitational density gradient, which affects all matter on the fundamental level of the cosmospheic Aether pressure.

## 8. Finally - the Mystery of Inertia

The permanent equilibration of the surplus density of Aethrons in the Donut-vortexelectron system represents the ultimate macroscopic unit of Newtonian 'inertial mass'.

That is, the equilibrium state of motion of this dynamic unit, - relative to a frame of reference, attached to the cosmic isotropy, is a state of rest, with zero drift velocity. It follows, that any displacement of an electron from its equilibrium state in the cosmic isotropy, that is, any 'force' to 'accelerate' this unit against its persistence in its cosmic equilibrium requires an external kinetic energy greater than that possessed by the total number of excess Aethrons already organized in the dynamic unit and encapsulated by the cosmosphere. That is, in Newtonian nomenclature:  $F = m_i \times a$ , where, F is for the 'force',  $m_i$  for the 'inertial mass' and a is for 'acceleration'.

Thus, the equilibrium state of any encapsulated dynamic unit is in a state of rest, with zero velocity relative to a frame of reference attached to the local cosmic isotropy.

It follows, that persistence of the 'inertial mass' in its state of rest might not be the Newtonian intrinsic property of the 'inertial mass', but rather the extrinsic resistance effect between any encapsulated matter and the isotropic pressure of the cosmospheic Aether.

Obviously, this hypothesis would explain away Newton's mysterious, animalistic, ad hoc inertial persistence of matter, but there would be a justified immediate refusal of it, based on the presumed fluid-mechanical attributes of the frictionless ideal gas, Aether.

Accordingly, as it has been believed earlier, the Aethrons were in constant random motion with an average speed of light and having perfectly elastic collisions, then their ultra swift motions would still make the gas almost perfectly frictionless and able to dissipate local disturbances with the speed of light. Thus, it is quite unimaginable, that moving a solid object in this medium with the low macroscopic speeds could require a great 'force' expressed in Newton's definition as; Force = acceleration/inertial mass.

There is no simple short cut to refute this objection, thus it requires the clarification of a few seemingly unrelated concepts:

1. Let us first attempt to clarify the aeon old emotional illusions of living things about weight, inertial resistance and friction, and their struggle to save as much muscle energy as possible, for moving objects, or themselves. Of course, plants had a direct approach to these problems. simply grow toward the best possible equilibrium. But animals already had to develop some complex nervous-systems with brains to react in each phase of the natural selection for the fittest.

The conscientious recognition came with Galileo, who succeeded in separating weight and inertia and friction and

showed that most of the energy to move an object goes into overcoming the friction of its gravitational environment. This resistance mainly caused by the weight pressing an object into the surface that keeps it from moving closer to the center of the earth. Thus, Galileo conjectured that if all frictional forces were eliminated, a little push would move an object for a long way, in fact, it would move with the same uniform speed on a straight line indefinitely. In the last few seconds of the history of living organisms, humans found out how relatively easy it is to push a refrigerator in the weightlessness of the space-station in the sky.

2. Nevertheless, science went further and created some surprising experimental data to re-incarnate the problem of inertia. Recall the 'relativistic mass-increase theory' that emphasizes the infinite increase of the 'inertial mass' in case of motion approaching the speed of light. At that time both mass and inertial mass were thought to be conserved. In 1901 W. Kaufman succeeded to accelerate electrons to immense speeds and discovered that while in Newton's mechanics a unit of acceleration could be added to the speed of a particle by exerting the same unit force on it repeatedly, - he found that when approaching the speed of light every unit of additional acceleration required a greater force than the last unit. This extra energy requirement was in such a proportion that for reaching the speed of light, it needed infinite energy. Since acceleration = force divided by inertial mass, Kaufman concluded that the inertial mass of the electron must be increasing as its speed approaching that of light. This became one of the principle, called 'relativistic mass-increase' which is the base of Einstein's postulate that the speed of light is the cosmic limit of motion.

## 9. The Relativistic Inertial Mass Increase

The first scientific reaction to this was the 'Lorentz-Fitzgerald contraction hypothesis' based on the existence of Aether and its potential resistance against extremely high speed motion that might contract matter in the direction of motion.

In 1905, this was adopted by Einstein's Special Theory of Relativity as the ultimate speed limit for all motion in the Universe. However, instead of the Aether hypothesis he simply postulated that the 'relativistic mass increase' to infinity is due to the fact that the speed of light is the limiting speed in the Universe.

Nevertheless, in Aero-dynamics there is a well known phenomenon, that called the 'sound barrier' which is caused by the 'increasing inability of the air' to dissipate the rising density in front of a speeding airplane that approaches the 'speed of sound', thus, it is logical to conclude that the Lorentz formula could describe a 'light barrier', that is, the increased inability of the gaseous cosmospheic Aether to dissipate its increasing density in front of the object when it is approaching the speed of light.

Figure 5 is a proof of the mathematical identity of the two phenomena:

1. shows the 'relativistic mass increase' as the Newtonian inertial mass increases in proportion to velocity divided by the speed of light.
2. shows the Aero-dynamic version with the difference, that here the fluid resistance of Newton is being increased in

proportion to the velocity of the object divided by the 'speed of sound'. The dotted line in both tables shows how the density and resistance grows from the classical inertia to the relativistic mass increase to infinity.

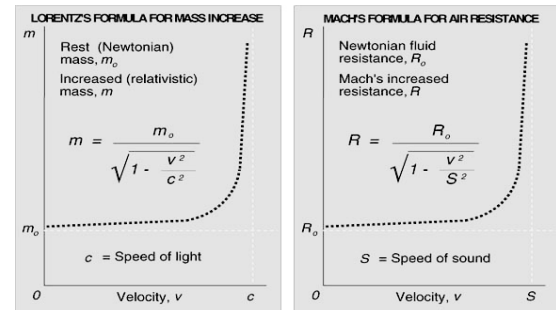


Fig. 5. Lorentz vs Mach, Light vs Sound

Since the average speed of the Aethrons is the speed of light, just as the average speed of the air molecules is proportional to the speed of sound, - the mathematical identity of the two phenomena is simply undeniable. But could there be a 'Light-barrier' due to the extreme density of the Aether in front of the accelerated particle? - Einstein postulated that light is the absolute limit of motion in the universe. Think about the shockwaves and sonic-booms due to the extreme condensation of the air ?!

Newton's law of hydrodynamic resistance states, that the frictional force opposing the steady motion of a solid spherical body in a fluid is proportional to the density of the fluid, the cross-sectional area of the body and the square of its relative velocity  $v_2$ .

However, this could lead to the simultaneous recognition that if the Lorentz formula describes the 'extreme resistance' of the mechanically condensed Aether and the phenomenon can be recognized as an increase in the 'relativistic inertial mass' as the source of increased resistance against any change in the state of motion, then logic shows that the 'normal resistance Aether' could be the single direct cause of inertia itself.

## 10. Reverberation of Aethrons within Accreted Matter



SteelWool1.eps

Fig. 6. Steel wool & cross-sectional area

Consider now, Figure 6 shows a ball of 'steel wool', used in households, to clean pots and pans. This is merely to accentuate one factor in Newton's calculation, the difference in the 'cross-



sectional area' of a solid object and a blob of steel-wool moved against a fluid. The steel-wool is made up of a 0.2 mm wide flat steel thread and regarding the Newtonian resistance, its cross-sectional area is not two but three dimensional. That is, it presents a surface area for the permeating medium and its rebounding particles not only at that surface of the macroscopic blob, but on every infinitesimal crosssectional surface of it through the whole 3D object.

This figure also emphasizes the possible turbulence and the reverberation effect that may develop in the front, on the sides and in the cavities behind steel-wool threads. Recall a baseball moving through air and the separation of its boundary layers causing delaying wakes and vortices. Similarly, imagine the internal cavities of the steel-wool filled with internal Aether, while a constant external force is pushing on its container. Due to a possible reverberation of the kinetic energy of the internal Aethrons between the immense number of cavity surfaces, there must exist a 'proportional delay in the acceleration' of the structure relative to the external cosmic isotropy.

The basic motto is, that the vector quantity of 'motion' is indestructible, it cannot be created, nor destroyed. 'Force' does not create or cancel motion, but only transfers it from one carrier to the other. Anything different than the random motion is a 'superimposed drift velocity', which once locally created cannot be destroyed, but merely reverberated among the members of a semi-closed system. Applying these to the motion of a 'material construction' relative to the isotropic cosmic Aether, we must also consider the subatomic circulatory texture of electromagnetic cohesion, that keeps atoms and molecules together in a 'massive system'.

Therefore, Aethro-dynamics postulates that the total resistance of a material structure against changing its state of rest relative to 'cosmic isotropy' is directly proportional to the strength of the external force, the cube of the velocity of the object relative to the local Aether and the resulting decrease in the speed of dissipation of disturbances due to the complexity of the internal structure in which Aethrons can be repeatedly reflected.

Thus, the Aethro-dynamic resistance of the 'inertial mass' in the state of uniform motion relative to the isotropic Aether is due to the interaction between the intrinsic structure of the 'mass' and the internal reverberation effect of the trapped internal Aethrons within the structure. This is the cause of inertial resistance, which is proportional to the extent of reverberation, or time dilation of passing through the complexity of the moving structure.

Newtonian concepts are describing changes in the state of motion of mass relative to 'Newton's absolute immovable space', or as Ernst Mach and Einstein preferred to relate inertia to 'the fixed stars'.

Aethro-dynamics postulates that an 'inertial frame of reference' must be attached to the local isotropy of the cosmic gaseous Aether. But this itself has no resemblance to the general concept of a static frame of reference, but it is a statistical average of all the locally superimposed dynamics of the cosmos: any bit of matter, all the way down to each Aethron, possess a cumulation of all the instantaneous motions of the cosmos.

A speck of sand on the beach, at rest, is rotating with the earth and orbiting around the Sun and with it around the Milky Way

and with that, the local group of galaxies, and the galactic clusters...and the whole cosmos...whatever that is...

But the instantaneous local isotropy of the cosmic Aether is made up of infinite components of motions coming there from infinite distances and times, thus averaging out into a local cosmic isotropy and it doesn't affect local components, such as the motion of the complex dynamic material structure relative to this special cosmic isotropy and the 'inertial retarding' of the reverberation of the individual Aethrons.

Indeed, the Newtonian 'inertial mass' is no different from the simple concept of the Aethron density in accreted matter. It is a reaction of the average 'motionlessness of cosmic Aether' to the extreme complexity of a material construction in relative motion. This interaction is misinterpreted Einstein's relativistic 'inertial mass increase'; simply an extreme Aether density in front of the object, approaching the speed of light. The opposite effect, described by Galileo's Equivalent principle; the suction force of consuming bodies, decreasing the density of the Aether, lengthening the 'collision free path' of the Aethrons and causing a gravitational free fall of all objects with equal rate acceleration, depending only on the central distance of the orbit, but irregardless the inertial mass.

### 11. Conclusion

In 1994 Aethro-kinematics reinstated the cosmic Aether as a Newtonian fluid with the ultimate units of mass; the Aethrons.

The constant motion and collisions of the Aethrons are assumed to create an isotropic static pressure on every point of the cosmos.

From Descartes' Aether and its natural vorticity, comes the potential evolution of a 3D Aethro-kinematic Donut-vortex-electron-dipole. A spinning and rotating toroid condensed and encapsulated by the cosmospereic pressure (Figure 7)

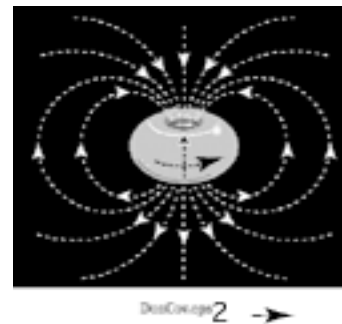


Fig. 7. Donut-vortex-electron-dipole.

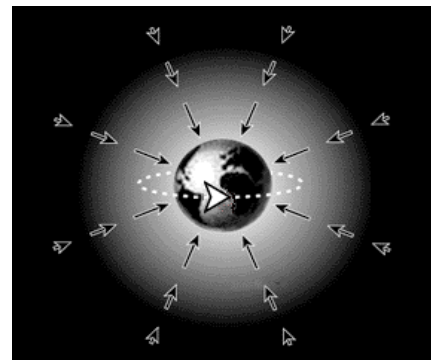


Fig. 8. The Earth Sucks

For describing Figure 8 instead of the authoritarian nomenclature of scientific pedagogy, let's attempt to bypass the sophisticated convolution of the conventual theory of gravitation, and introduce the picture in the language of unscientific simplicity:

Gravity is a 'cosmic suction force'.

For reference, look up any encyclopedia:

American Heritage Dictionary:

'suction' A force that causes a fluid or solid to be drawn into an interior space or adhere to a surface because of the difference between the external and the internal pressures.

...drawn toward the center? - Free Fall ?!

...adhere to the surface ? - Weight ?!

The Sun, Earth, Planets and all cosmic bodies are inhaling Aether....the cosmic fluid of Evolution!

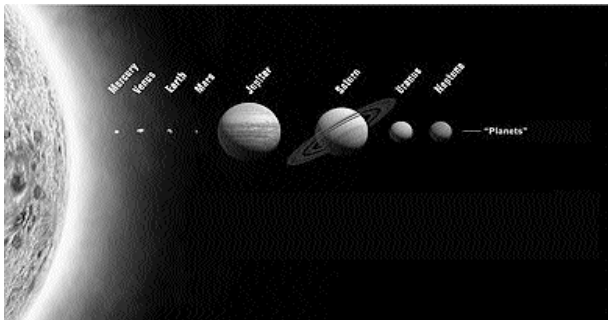


Fig. 9. Mass of all planets = 2% of the Sun's

Figure 9 shows that the total mass of the Solar system is only 0.01% more than that of the Sun without its planets. No wonder that the Sun's suction force, due to its evolutionary consumption of the cosmosphere is totally overpowers those of the planets.

But the negative force of 'suction', the cause of the equal rate acceleration of free fall is a different story. For a conceptual analogue, consider the Quantum Mechanical, Paul Dirac's negative 'electron sea' in metal, contrived in 1925, but when he needed a counter concept, he coined up an 'electron hole', in the sea, as an opposite energy. Similarly, Aethro-dynamics could call the Aether, a sea of randomly moving and colliding Aethrons, representing an isotropic cosmospereic pressure and explain the negative evolutionary suction force, due to the consumption of the Aether by cosmic bodies. Thus, the the individual disappearance of the Aethrons in the Sun or the earth could be 'Aethron holes' in the isotropic Aether sea producing the suction through the porous surface. This steady swallowing of the Aethrons could represents a constantly increasing negative

density field of Aethron holes, which could be taken as the 'lengthening of the collision free path' in the Aether surrounding the surface, equal to the 'negative suction force of gravity' and the equal rate 'gravitational acceleration field' for a free fall of all objects inversely proportional to the square of the distance from the sink.

Figure 10 is the scientific imagination of how our Milky-Way could look to another scientific being, observing from another earth of the cosmos. The observational data from this earth and the theoretical conclusions about the cosmos, led to this imagination, that our own Milky-Way is just another Spiral-Galaxy, like the majority of the other cosmic wonders, accreted from billions and billions of Solar Systems.

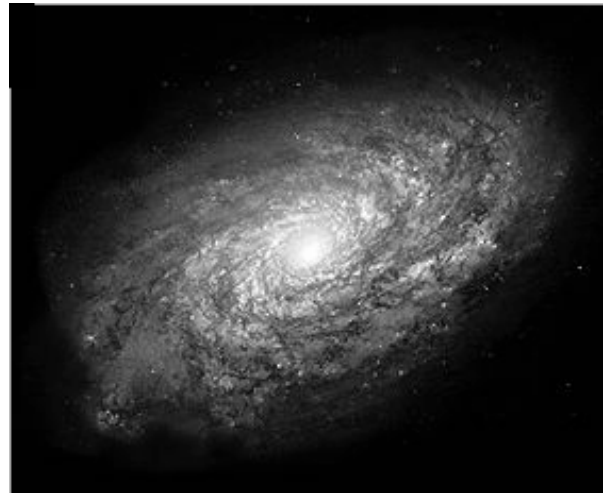


Fig. 10. The Milky Way

Hence, in 1619 Johannes Kepler empirically discovered the ultimate mathematics of the Aethro-dynamic Sink-vortex and their rotational gravitation throughout the whole universe, as  $P^2/R^3 = K$ . Centuries later myriad's of spiral galaxies were found, filling the cosmos.

Saying anything more on this subject would be superfluous. This treatise is merely a sketchy attempt to open up Aethro-dynamic designing for all Natural Phenomena...

## References

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- [ 2 ] Steven Rado, **Aethro-Kinematics** (Aetheron Press, 1994), 530pp.