

Rudiments of a Theory of Aether

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(Dated: March 20, 2010)

Abstract

This is the talk delivered via internet at the 16th Annual Conference held by the Natural Philosophy Alliance (NPA) in May, 2009, and presented under the title “Have You Done Experiments in Fluid Mechanics Lately?”. I now make it available to those interested in the aether because it contains in one document the most important ideas that together form, I think, the rudiments of a rational and consistent theory of the aether. At the top of each page are the slides shown at the conference followed below by the transcript of the verbal explanations. When the transcript was longer than the space under the slide, the slide was repeated on the next page and the transcript continued. The experiment referred to in the talk, showing the role played by the intervening medium (water) in the attractions and repulsions between two cylinders rotating in it can be viewed on YouTube as it has been recently uploaded on that site.

Keywords: aether, mass, inertia, electromagnetism

Have You Done Experiments in Fluid Mechanics Lately?

Ionel DINU

R. T. Glazebrook, F.R.S. (1896): “We are still waiting for a second Newton to give us a theory of the ether which shall include the facts of electricity and magnetism, luminous radiation, and it may be gravitation.”

Hello Dear Participants to this NPA Conference.

My talk is going to be about the aether and about fluid mechanics. After some years of research I found out that the aether is probably the most important missing concept in physics today and I came to believe that proper study of this fluid will give us the answers that we need in order to understand the physical world.

And here on this first page are some words that seem to agree with this.

...I found them in a book published in 1896 by Prof. Glazebrook, who was a fellow of the Royal Society and worked at Cavendish Laboratory.

These words represent the opinion held by many of the scientists of that time.

...and I will read them now:

“We are still waiting for a second Newton to give us a theory of the ether which shall include the facts of electricity and magnetism, luminous radiation, and it may be gravitation.”...

...so, as you can see, scientists used to have quite great expectations regarding the aether, and the most important of these expectations was that the aether would lead to an unitary theory of physics.

...Now, before entering in the main part of this talk, I would like to make a few comments about what you are going to hear in this presentation...

Preamble

This is a report on the progress being currently made by the author in the development of a theory of the aether.

Most of the ideas presented here have been discovered by other investigators, therefore credit should go to them.

...So, as a Preamble, I would like to say that

"This is a report on the progress being currently made by the author in the development of a theory of the aether"

...the talk will show the rudiments of a theory of the aether which I hope some day will become part of a complete theory of the aether.

My belief is that the theory of the aether to which we have to arrive must be very simple. Simplicity is the most important feature which you have to demand from a theory of the aether because this single theory aims at explaining the most fundamental observations that we make.

...so, what you will hear today are very simple things and you will understand them better if you are familiar with some phenomena that occur in fluids.

In the end of this talk I will show you a short video clip with a real experiment in fluid mechanics that shows how the action at a distance is in fact mediated by a fluid.

Secondly, I would like to emphasize that "Most of the ideas presented here have been discovered by other investigators, therefore credit should go to them."

In other words, this is not 'my theory' but it is the result of the work of a big number of physicists, a collective work that I have only put together and to which I have added my small original contribution.

...therefore, let us give some acknowledgements and credits ...

Credits [1/2]

The author acknowledges influences from, and wishes to extend his thanks to, the various authors who expressed their beliefs in the existence of the **aether**, who improved the general knowledge of **fluid mechanics** and even developed theories of fluid mechanics applicable to the aether : ... →

"The author acknowledges influences from, and wishes to extend his thanks to, the various authors who expressed their beliefs in the existence of the aether, who improved the general knowledge of fluid mechanics and even developed theories of fluid mechanics applicable to the aether :"

... and here are some authors whose works have had and still have a very heavy impact on the work that I am doing...

Credits [2/2]

→: Christiaan Huygens, Isaac Newton, Leonhard Euler, Thomas Young, Augustin Fresnel, Francois Arago, Michael Faraday, James Clerk Maxwell, George G. Stokes, James MacCullagh, William Thomson (Lord Kelvin), Dmitri Mendeleev, John A. Fleming, Albert A. Michaelson, Hendrik Lorentz, J. J. Thomson, Joseph Larmor, Heinrich Hertz, Ludwig Prandtl, O. G. Tietjens, Vilhelm F. K. Bjerknes, Horace Lamb, P. A. M. Dirac, S. Tolver Preston, Ignatius Singer, John Herapath, Oliver Lodge, John Tyndall

At the top of the list is...

"Christiaan Huygens" - who was the first to propose a theory of propagation of light based on the aether...then...

"Isaac Newton" - who in his study of the gravitational force was a proponent of the aether...

"Leonhard Euler" - an aetherist as well...

"Thomas Young" - who agreed with Huygens' theory of light as a compression wave in the aether and succeeded to show experimentally that light interferes - it is him who gave us the proof that light is a wave... a contribution of utmost importance..

"Augustin Fresnel, Francois Arago" - the two French physicists who have studied light extensively, both experimentally and theoretically, and were also proponents of the aether...

"Michael Faraday" - the great experimentalist in electricity and magnetism

"James Clerk Maxwell" - who built aether theories on Faraday's experimental findings

"George G. Stokes, James MacCullagh and William Thomson (Lord Kelvin)" - who all tried to develop theories of the aether, and they were not the only ones working on this...

Credits [2/2]

→.: Christiaan Huygens, Isaac Newton, Leonhard Euler, Thomas Young, Augustin Fresnel, Francois Arago, Michael Faraday, James Clerk Maxwell, George G. Stokes, James MacCullagh, William Thomson (Lord Kelvin), Dmitri Mendeleev, John A. Fleming, Albert A. Michaelson, Hendrik Lorentz, J. J. Thomson, Joseph Larmor, Heinrich Hertz, Ludwig Prandtl, O. G. Tietjens, Vilhelm F. K. Bjerknes, Horace Lamb, P. A. M. Dirac, S. Tolver Preston, Ignatius Singer, John Herapath, Oliver Lodge, John Tyndall

"Dmitri Mendeleev" - who argued for the existence of the aether from a chemical point of view...

"John A. Fleming" - an author who advocated with logical arguments the existence of the aether...

"Albert A. Michaelson" - who was again a proponent of the aether and aether waves and a skeptic of the electromagnetic nature of the light waves...

"Hendrik Lorentz, J. J. Thomson, Joseph Larmor, Heinrich Hertz" - whose works are very important and relevant to every field of research

"Ludwig Prandtl, O. G. Tietjens, Vilhelm F. K. Bjerknes, Horace Lamb" - these were fluid mechanicists...

"P. A. M. Dirac" - he, at some point, felt a need for the aether in his theories...

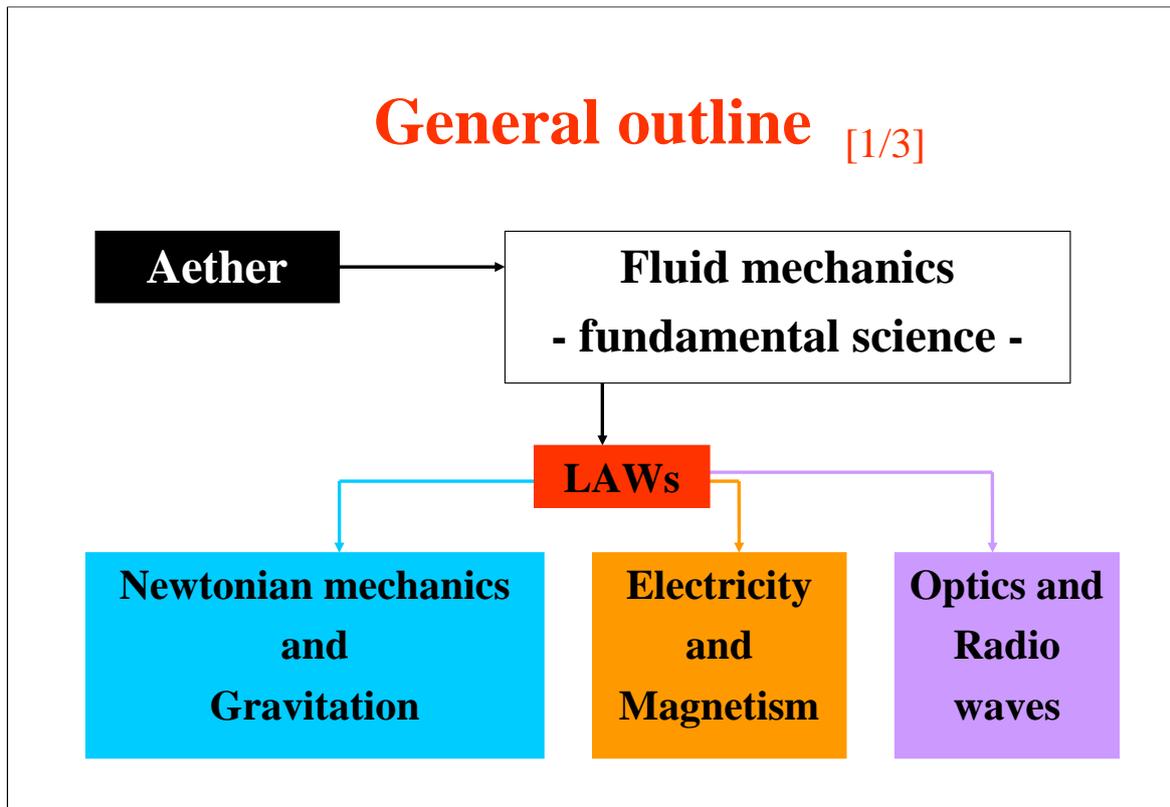
"Tolver Preston" - who proposed one of the most rational theories of the aether I have ever read and who inspired me in my work...

"Ignatius Singer, John Herapath, Oliver Lodge, John Tyndall" - authors who advocated the existence of the aether in their books...

... and many more ... but these mentioned here are really the most representative.

Now, let us enter the main part of this discussion...

General outline [1/3]



...Here on this page is a logical chart showing the fundamental role played by the aether...

...it says that the aether, which is a fluid and therefore obeys the laws of fluid mechanics, is able to explain the laws of physics as we know them.

...And, because the laws of fluid mechanics lead to the explanation of the other laws of physics, fluid mechanics should be considered a fundamental science, indeed, THE fundamental science of physics.

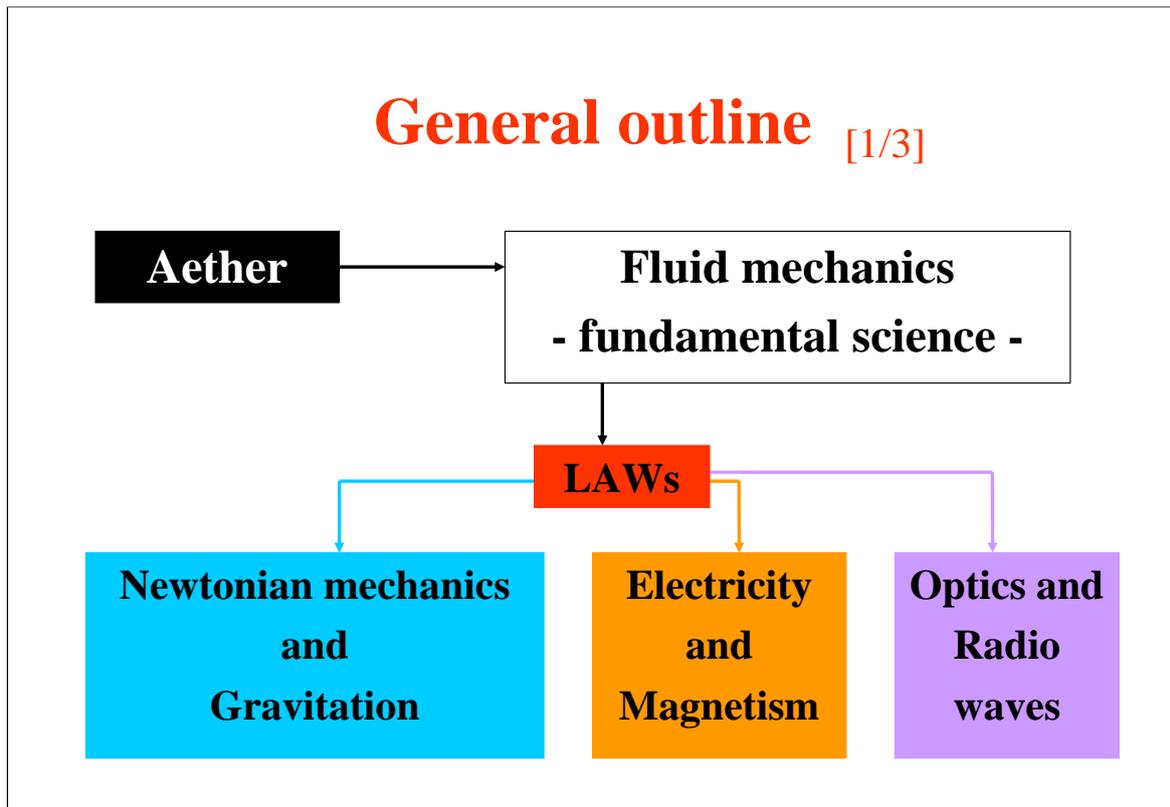
I am stressing this idea here because today it is believed that not fluid mechanics but other theories are fundamental to the understanding of the physical world: quantum mechanics, quantum electrodynamics, the string theory, and so on. But, as you know, after almost 100 years of trials, we cannot expect great insights from these theories any more.

So I would like to repeat that this theory is able to prove that the properties of the aether and the laws of fluid mechanics that the aether obeys lead us to understanding some of the most important physical laws that we know and enable us to explain WHY do we find these laws in the way we find them and not otherwise...

In the same time, it shows the potential of giving rational and consistent explanations for all the phenomenology recorded by the physical science.

...to take a few examples...

General outline [1/3]



...in Newtonian mechanics we have to be able to explain why we observe that objects moving in vacuum at an increasing speed encounter a resistance - and this is Newton's second law - ... while when moving at a constant speed there is no resistance at all and objects go on moving forever - and this is the law of inertia or Newton's first law -...then...

...why is it that the gravitational force obeys the same law as the attraction and the repulsion in the electrical phenomena AND these laws are the same with the law of the change in the intensity of radiation emitted by a point-like source -all of them obey, as you know, the law of inverse square...then...

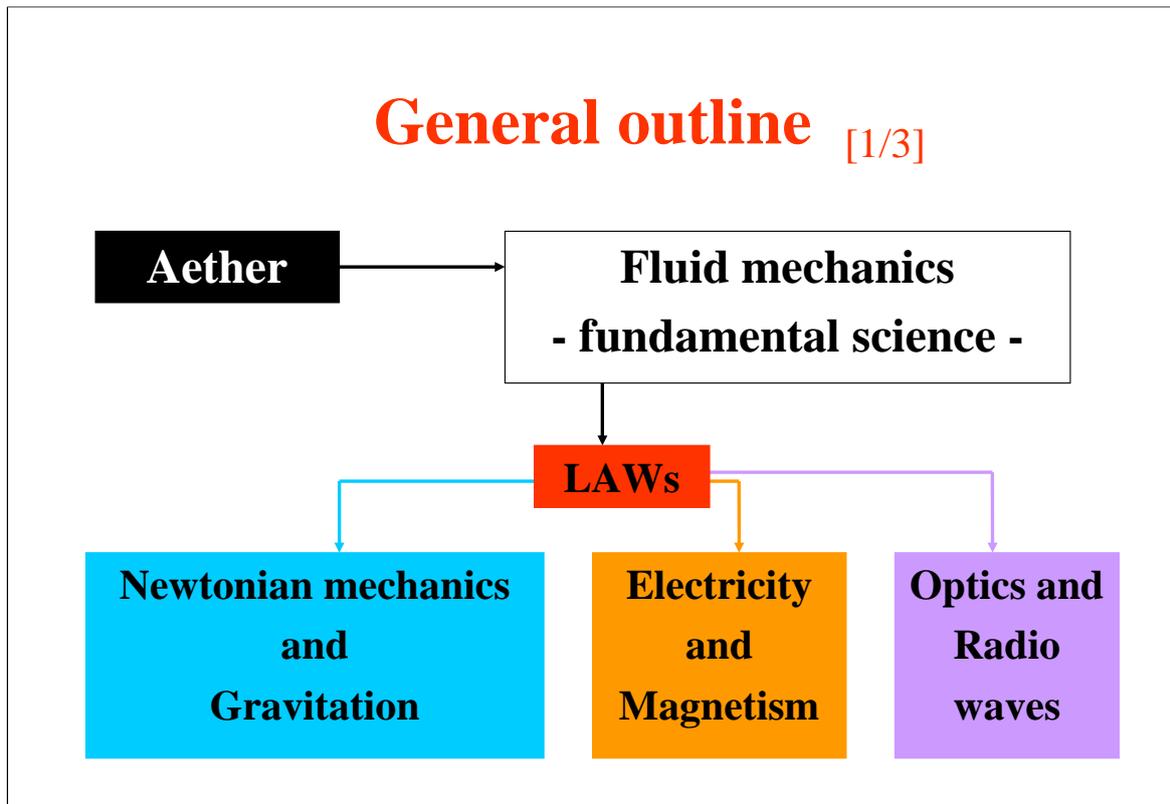
...why do we find attraction and repulsion in electrical phenomena

...why do we always obtain in magnetism two poles for the permanent magnets and never only one magnetic pole - you know that if you break a magnet into half, you do not get the north pole on one piece and the south pole on the other piece, but you end up with two pieces that have again two pairs of opposite poles...

...then, in optics, there are still quite a number of phenomena that need a proper explanation...

...why light refracts when passing from one transparent medium to another - why it does not just travel straight on without changing the direction in which it travels...

General outline [1/3]



...what is the physical nature of the so-called "polarized light", because it is still not clear how light propagates in vacuum...

...and so on...

So the aim of this theory is to show that all these phenomena are explainable by the simple fact that the aether obeys the laws of fluid mechanics, in other words because the aether is a fluid.

What I will actually show in this discussion will be how the aether explains the Newtonian mechanics - more exactly Newton's second law - and the phenomena of magnetism and electromagnetism...

...and this is because it is only these two chapters which I have succeeded to integrate in the theory.

...to the others I will only refer briefly because they are not completely finished ... probably you will hear about them in the coming years from me or from other persons -maybe you, why not- who share, or will come to share- the same views as those presented here.

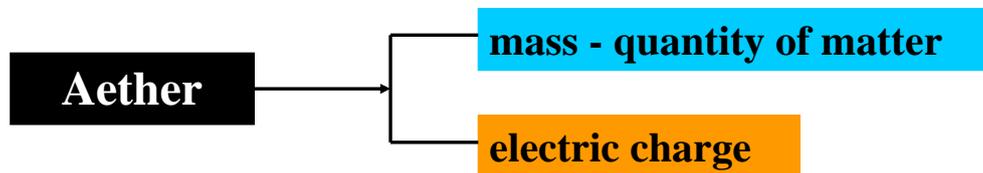
Now, there is one important reason for which I believe that the aether is a powerful concept... and this is its ability to explain the origin of so many phenomena. And, because of this, the aether fulfills one of the first rules of scientific investigation: it's the Occam's razor or Occam's canon...

...let's talk about this briefly in the next page...

General outline [2/3]

Occam's canon of economy of assumptions:
"Entia non sunt multiplicanda praeter
necessitatem"

Sir William Hamilton: "Neither more, nor more onerous,
causes are to be assumed, than are necessary to account
for the phenomena."



...Occam's canon of economy of assumptions is "Entia non sunt multiplicanda praeter necessitatem" - this is the Latin original statement which...

...Sir William Hamilton put into English as: "Neither more, nor more onerous, causes are to be assumed, than are necessary to account for the phenomena."

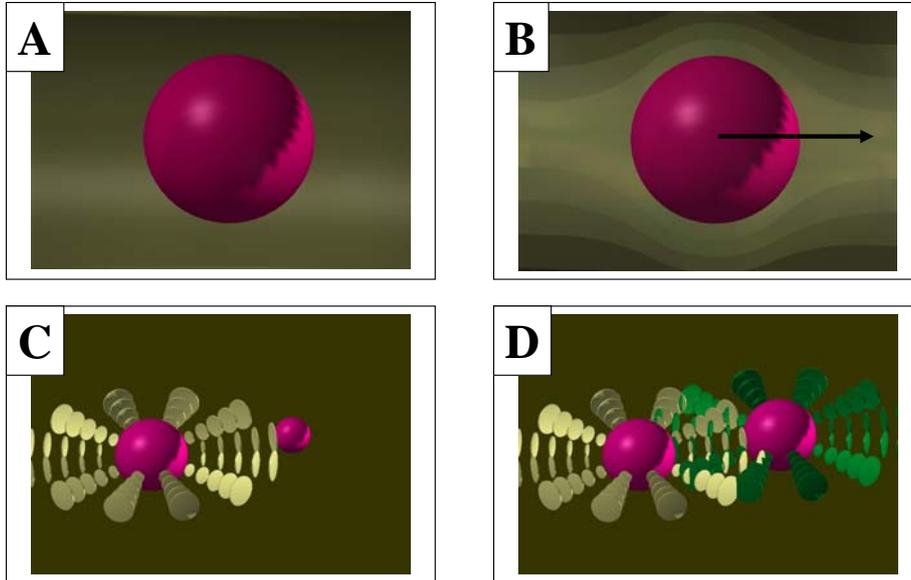
...so the reason for which I think that the aether is a very powerful concept is that it not only offers logical and sound explanations for phenomena that are now grouped in so many different branches of physics - mechanics, electricity, magnetism, optics - but it is also able to uncover the origin and the meaning of the physical quantities that are now believed to be independent of each other and taken as fundamental...

...and the most famous of these physical quantities are the mass and the electric charge... as shown here.

So the aether is able to explain where these physical quantities come from and you may ask...but how is the aether able to explain all these phenomena?

...and this I will try to outline in the next page...

General outline [3/3]



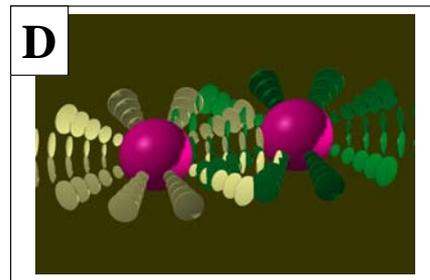
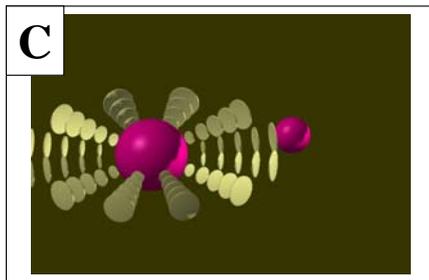
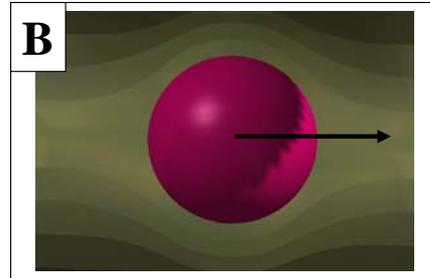
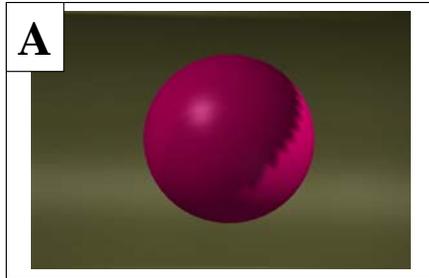
In picture A it is shown the smallest structure that forms matter - it is the atom. Of course, you can also consider a chemical bond that binds this atom to another atom, and so on, but we keep the things simple for the moment to grasp the idea of this theory. And this atom is completely immersed in the ocean of aether...

... and this is actually the only difference between matter and aether : that matter has a definite shape - a "hardness" of its own - while the aether is a fluid bathing this structure.

And there are two possible properties that can be defined relative to this structure: it is its shape -which here is pictured spherical for simplicity but it can have any other form more complicated than this- and the other property is the volume of the structure, its geometrical size and this is the volume that this structure displaces in the aether.

So, you can see how, by this simple reasoning, the first property -the shape- becomes a qualitative property of matter, and because of this it can account for the existence of different species of atoms: different shapes will correspond to different kinds of atoms. And the second property -the volume- is a quantitative property of matter -it is the size of the atom and this eventually leads to different dynamical behaviors of the atoms.

General outline [3/3]



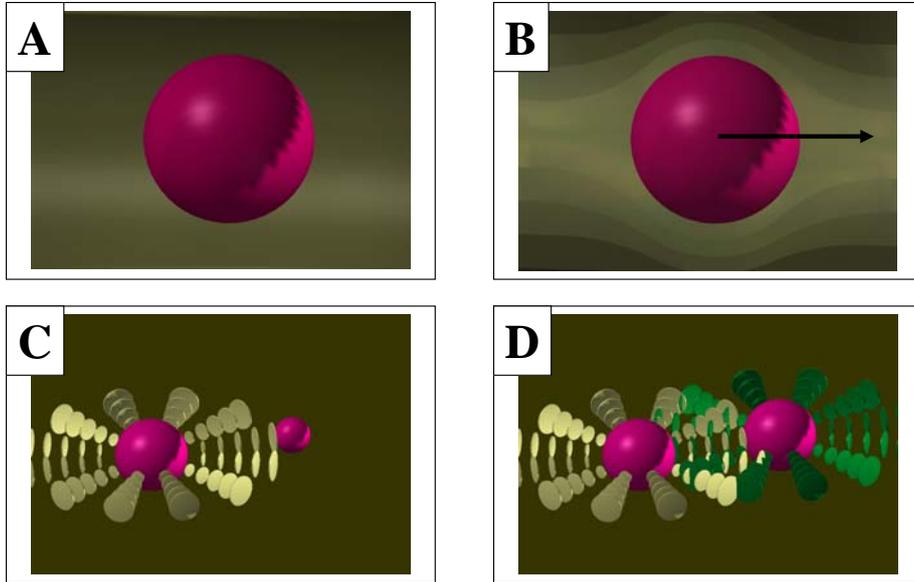
And there is another very important detail here. We do not introduce any "mass" whatsoever, we do not need anything like that and it makes no sense at all to introduce it because the quantity of matter in the atom pictured here is simply its volume and nothing more.

...We will see later that "mass" enters the theory as a physical quantity due to the presence of the aether and not as an intrinsic property of matter and this is so because both inertial and gravitational forces are due to the aether and not to the matter. And this is probably the most powerful finding of this theory. So we have that the only physical properties of matter are the shape and the volume...then...

In picture B it is shown the same atom as in A but in motion through the aether. The motion at constant speed takes place without friction between the aether and the atom and the same can be said for the case in which the aether flows and the atom is at rest... we will see later what observations lead us to this conclusion...

...and on the other hand, if the motion of the atom is taking place at an increasing speed, there will be a resistance from the aether even if the aether does not have any viscosity at all and, again, without being necessary to define any mass at all neither for the atom nor for the aether. I will return to this later because, as I have just said, the origin of inertia is one of the topics which the aether can explain very simply...then...

General outline [3/3]



...in pictures C and D it is shown how two atoms can interact with each other without touching each other... and the only conceivable way in which this can happen is when one or both atoms vibrate themselves and set the aether around them in vibration.

...in picture C it is shown that the aether waves produced by one atom through its vibration can attract another atom that does not vibrate or vibrates in a different mode ... which can be a different amplitude or a different frequency or both.

...and in picture D it is shown the repulsion observed in electrical phenomena. The repulsion happens because the two atoms vibrate identically or at least their vibrations have a high degree of similarity.

So these are the fundamental phenomena on which this theory is built. Some of these phenomena have been observed in hydrodynamics happening in real fluids. This is the case for pictures B and C. The phenomena shown in D need more experimental and theoretical work.

...and here we put an end to the general outline of the theory of the aether.

And next, I would like to say a few things about the aether, about some of its properties.

...and we can infer these properties of the aether by observing the motion of material objects moving through the aether. And the easiest way to do these observations is to go in the outer space... so let us go in the outer space...

Aether properties [1/6]



Photos by NASA

Observation 1: Material objects move through the aether at constant speed without any detectable resistance

...here we have two pictures taken by NASA of two vehicles moving through the outer space.

The black regions which we can see on these pictures is in fact the aether.

...and this is so because, if it were not for the aether, light wouldn't reach us. We wouldn't be able to even see these vehicles because the light they reflect wouldn't be able to reach us. Any region of space through which light can pass is filled with aether. This is our most fundamental assumption.

And these vehicles move through the aether and what has been observed is that these vehicles do not encounter any measurable resistance in their movement through the aether. In other words, the vehicles cut through the aether and move from point to point in an almost perfect frictionless manner.

From this we have our first observation, written here, that "Material objects move through the aether at constant speed without any detectable resistance"

...now, what I understand from this observation is something very straightforward. Let us see another set of pictures on the next page...

Aether properties [2/6]



Photo by NASA



Photo by National Geographic

...here is again a view of the outer space with an astronaut floating in the aether... and on the right here is a diver submerged in water.

...and... while looking at these pictures and wonder at their striking resemblance, I will tell you that, to me, the aether is very much like the water in which the diver is immersed.

But there is also a very important difference between the water and the aether.

...let us see what happens when you move through the water: even at constant speed, you feel a force of resistance from the water because, as you wade through the water, you have to break the molecules apart from each other to make room for your body; you have to break the weak bonds which bind the molecules of water to each other.

...In addition to this, there is also a force of friction between your body and the water through which you move, skin friction, because there are weak forces of attraction between the molecules of water and the molecules of your body.

Now, let us remember that the astronaut, on the left, is able to move freely, without any friction, through the aether.

Aether properties [2/6]



Photo by NASA



Photo by National Geographic

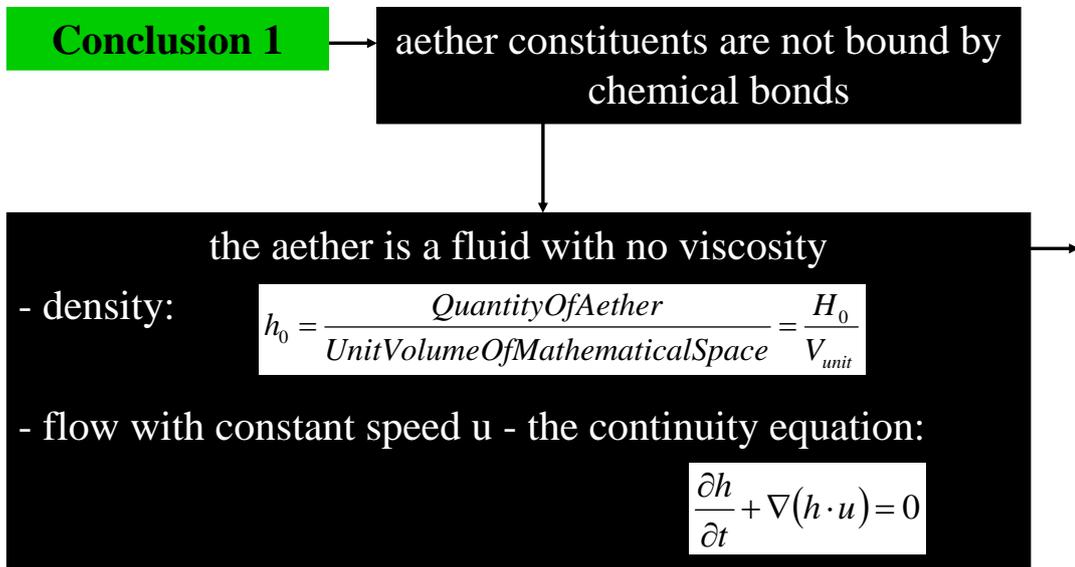
So the aether is a fluid through which the astronaut can move -or cut through- without any resistance from the aether whatsoever. You do not need to break apart the constituents of which the aether is made in order to make room for the body and this can only happen if there isn't any force of attraction at all between the constituents of the aether.

But it is not only that the constituents of the aether do not attract each other like the molecules of water do...

...since there is absolutely no friction at all between the astronaut and the aether, we find also that the constituents of the aether do not attract molecules of matter. Indeed, we can say that, in general, there is no attraction between matter and aether.

...so what we can conclude from these comments to the "Observation 1" is...

Aether properties [3/6]



...”Conclusion 1” that...the "aether constituents are not bound by chemical bonds".

And this can only mean that "the aether is a fluid", because its constituents do not attract each other at all, and this is true when the medium is a fluid and does not have a shape of its own, when it cannot maintain a shape because its constituents do not attract and stick to each other.

Moreover, the aether is not just any kind of fluid, but a fluid without viscosity, because the forces of attraction between its constituents are zero as the best of our observations show us.

...so we have that "the aether is a fluid with no viscosity"

...And, because the aether is a fluid, we can define a density as shown here in this equation "...". ...as the "quantity of aether" in unit volume of mathematical space.

... and, if the aether is a fluid, then it can move in space while its density h can change in time and location. This is the most general behavior which you can expect from a fluid and, if we consider that the quantity of aether is constant during its flow, we obtain the equation of continuity "...” which is here.

Now, the fact that the aether is a fluid without viscosity leads us to another conclusion about the aether, which is discussed in the next page...

Aether properties [4/6]

→ the aether can transmit only longitudinal waves of compression

$$\frac{\partial^2 p}{\partial t^2} = \left(\frac{dp}{dh}\right)_0 \cdot \nabla^2 p$$

Observation 2 : (Thomas Young) Phenomenon of interference of light

Conclusion 2 → the aether compression wave is light:

$$c = \sqrt{\left(\frac{dp}{dh}\right)_0}$$

...so, since the aether is a fluid without viscosity, it is clear that the aether cannot transmit transverse waves like solid matter does, but only longitudinal waves of compression. This is the case with any fluid, like water for example. Water can transmit sound waves as longitudinal waves of compression and no transverse waves at all.

So we have that "the aether can transmit only longitudinal waves of compression". The equation at which we arrive through calculations is that a variation in the pressure of the aether propagates according to this equation "... written here, which is the equation of a wave.

Then the question is what are these longitudinal waves of compression which the aether can transmit... and here comes "Observation 2", which is the experimental proof of Thomas Young who showed that light interferes. Since light is a wave and travels through the aether, then we can only have "Conclusion 2" that "the aether compression wave is light".

Aether properties [4/6]

→ the aether can transmit only longitudinal waves of compression

$$\frac{\partial^2 p}{\partial t^2} = \left(\frac{dp}{dh}\right)_0 \cdot \nabla^2 p$$

Observation 2 : (Thomas Young) Phenomenon of interference of light

Conclusion 2 → the aether compression wave is light:

$$c = \sqrt{\left(\frac{dp}{dh}\right)_0}$$

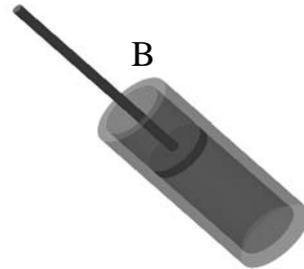
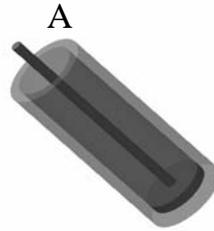
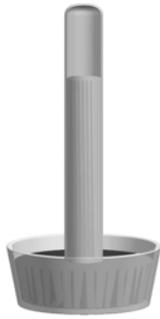
... and the speed of this wave is given by this expression which is the square root of the ratio of the increase in the aether pressure when its density increases.

... and as long as this ratio is constant, the speed of light is constant. But, we do not have a definite proof of this constancy and this is why more research is needed on this topic.

...finally, a very important property of the aether can be seen from the experiment of Torricelli...

...let us see it in the next page...

Aether properties [5/6]



Observation 3 : Obtaining vacuum with Torricelli experiment and with a piston-cylinder system

Conclusion 3

→ the aether permeates the material bodies and moves easily through their volume

...so, in Torricelli's experiment, we find that we can obtain vacuum above the surface of mercury here. Upon placing the mercury filled tube in another vessel of mercury, we see how the mercury in the tube falls down to a certain level, leaving in the space above its surface free aether.

... or we can obtain the same thing with a steel piston and a steel cylinder as shown here. You push out all the air from the cylinder (A) say, through a small opening made at the bottom of the cylinder, then close that opening and when pulling the piston outwards (B) the volume of space remaining in the cylinder here does not contain any gas. And if you try this in the outer space the piston will go in and out freely.

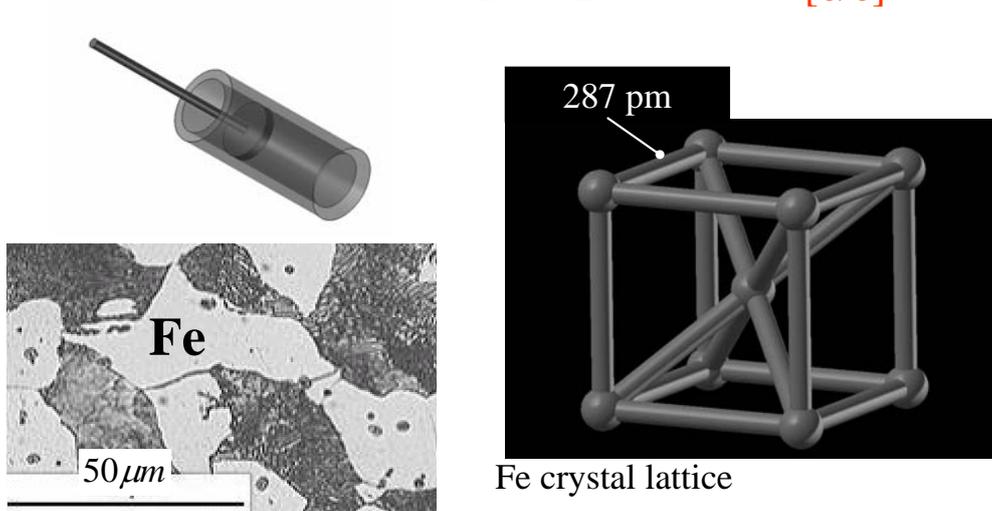
This comes to show that when the piston is moving in and out of the cylinder it actually moves through the aether, because the aether remains behind the piston to fill the space inside the cylinder.

...and from this we have that matter -the matter from which the piston is made- has pores inside, spaces, so that it can move freely through the aether.

...so this is "Observation 3" and from this we have "Conclusion 3" that "the aether permeates the material bodies and moves easily through their volume"

...and I want to give you a better picture of what I mean in the next page...

Aether properties [6/6]



Aether : a liquid which permeates material bodies

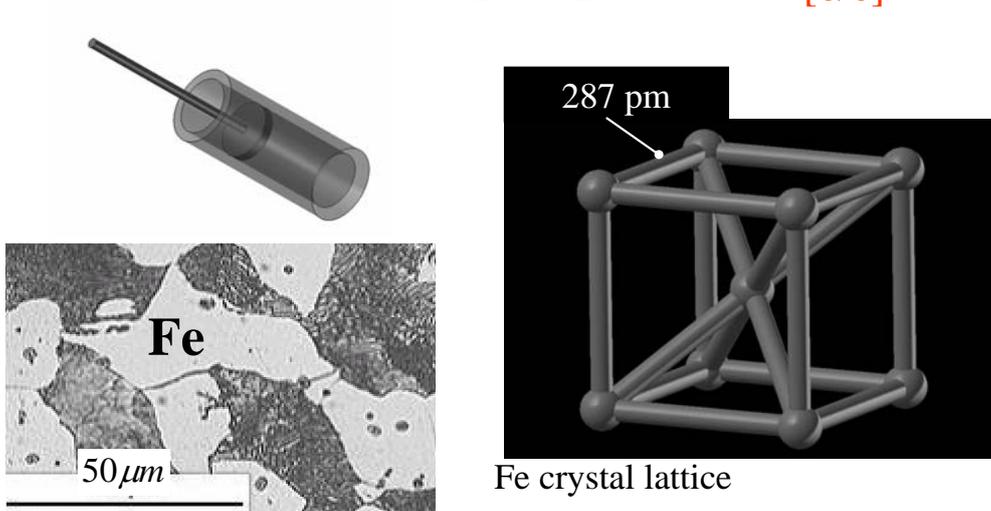
...here it is shown the cylinder and the piston that can move in and out of the cylinder. From this, again we understand that the piston must be moving through the aether because the aether exists in the space inside the cylinder, behind the piston.

...and to form an idea about how penetrating the aether is, and how finely structured it is as a fluid, you can see here a microscope picture of the steel of which the piston is made. The distances here are of the order of microns - the thousandth part of a millimeter... and we still cannot see any pores. All we can discern are some small variations in the composition of the steel - the white regions are grains of iron, while the dark regions are mixtures of iron and other compounds...

...but in the picture here on the right it is shown the crystal structure of iron, and you can see that the distances between the atoms are of the order of picometers - the billionth part of a millimeter... and it is down to this scale where the aether penetrates the matter...

...so the aether is of such a fine structure as to completely bath material structures which are billionth parts of a millimeter in size...

Aether properties [6/6]



Aether : a liquid which permeates material bodies

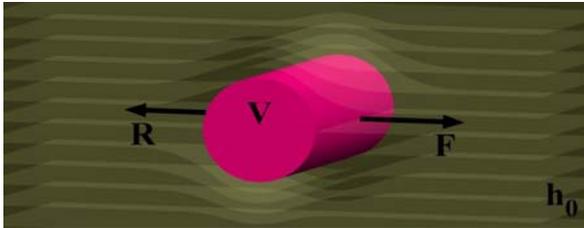
...and from this fact, that the aether turns out to be a medium of such a fine constitution, to me, the aether should be considered rather a liquid than a gas... and this is why you will hear me from now on saying that the aether is a liquid.

...of course, we do not know now if there are spaces between the constituents of the aether... this remains to be investigated, but I will take the liberty to speak of the aether as a liquid until we have a definite proof that it is otherwise...

Ok, so here I would like to end the discussion about the properties of the aether which can be inferred from simple observations made on the behavior of material objects moving through it...

...and next I will show how these properties explain Newton's second law...

Aether explains inertia [1/3]



Aether hydrodynamic
resistance

$$R = h_0 \cdot V \cdot \frac{\partial u}{\partial t}$$

A cylinder of volume V accelerated through an ideal liquid like the aether encounters from the liquid a resistance proportional to its volume V and the acceleration.

Newton's
2nd law

$$F_i = m \cdot \frac{dv}{dt}$$

Inertia is a hydrodynamical effect in the aether

...the proof is entirely based on an important observation made for the first time in fluid mechanics.

...so, if you take a cylinder of volume V as pictured here, and try to accelerate it through a liquid which has no viscosity, the liquid will oppose the increase in the speed of the cylinder with a force that is proportional to the volume V of the cylinder and the rate at which its speed increases, which is its acceleration. This observation is written here in the blue box.

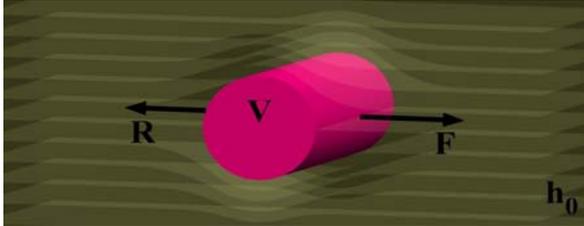
And here is the equation that gives the force of resistance R felt when the cylinder accelerates through the liquid.

...I want to stress again that this is a real effect seen in hydrodynamics... objects that accelerate in liquids -and not only in liquids but also in gases- encounter a resistance from the liquid and this force of resistance obeys this equation.

...this may sound counterintuitive, but this happens even if the liquid has no viscosity at all, even if the liquid is ideal. You can try this when you go to the pool... take a light object that can remain immersed in water and try to accelerate it through the water... it will seem like it has a very great mass, a very great "inertia"... it is because of this effect.

So, basically, the force of resistance which opposes the force F acting on the cylinder is proportional to the volume V of the cylinder and to the rate of change of its speed. So you can see that the intrinsic property which belongs to the moving object and gives the measure of its resistance is its volume V .

Aether explains inertia [1/3]



Aether hydrodynamic
resistance

$$R = h_0 \cdot V \cdot \frac{\partial u}{\partial t}$$

A cylinder of volume V accelerated through an ideal liquid like the aether encounters from the liquid a resistance proportional to its volume V and the acceleration.

Newton's
2nd law

$$F_i = m \cdot \frac{dv}{dt}$$

Inertia is a hydrodynamical effect in the aether

...and now look at Newton's second law that I have put here for comparison.

Newton said that the force accelerating an object is balanced by a resistive force - he also perceived it as a resistive force and he called it "inertial" because he could not see where this effect of resistance could come from and attributed it to an inherent property of matter- ...

... and this force of resistance F_i he saw that is proportional to the acceleration of the object and with a constant which he said it is the quantity of matter in the object - but he could not define clearly what he meant by this term "quantity of matter".

... latter, this term "quantity of matter" began to be called "mass"... and this is why we use the letter "m" for the constant of proportionality in Newton's equation.

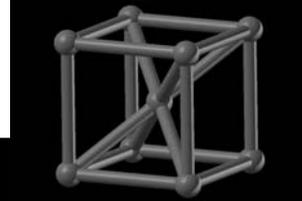
As you can see, there is a striking resemblance between the two equations and this key finding comes to show what Newton's "quantity of matter" really is: it is the volume displaced in the aether by the object in accelerated motion.

So, basically, inertia is a hydrodynamical effect in the aether and the quantity of matter in a material object is just the volume V displaced in the aether by the object. Also notice that we make no use of any "mass" here, the aether density h_0 entering the equation for the hydrodynamical resistance R has been defined previously without any reference to any inertial property of the aether.

...next page shows a summary of the conclusions up to here...

Aether explains inertia [2/3]

Conclusion



- the quantity of matter in a macroscopic body = the volume of occupied by the atoms and the chemical bonds

- density of matter ρ in a macroscopic body :

$$\rho = \frac{V_{Matter}}{V_{MacroscopicObject}}$$

...so we have this conclusion that what we call "the quantity of matter" in an object is in fact "the volume of matter in that object", in other words, the total volume that the atoms and their chemical bonds displace in the aether.

...from this we have that the density of matter in a macroscopic object is given by the ratio of the total volume of matter contained in that object and the volume of the macroscopic object. Therefore, the density of matter in an object is just a number and does not have units.

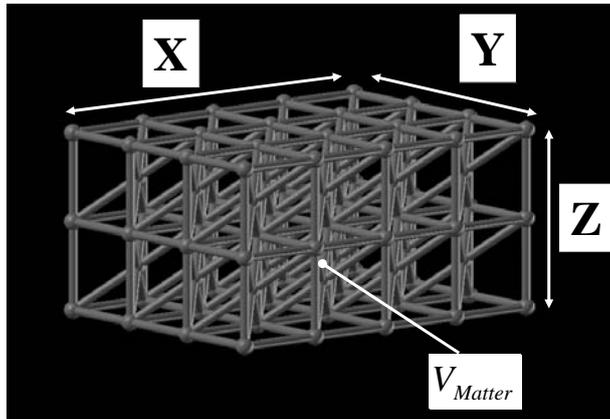
... one consequence of this result is that there is really no need to express the density in units of kg/ m³ ...

... and, we see that what is called a fundamental unit today -the kilogram- does not have any basis for being considered so.

...let us discuss this concept of density in more detail in the next page...

Aether explains inertia [3/3]

density of matter ρ in a macroscopic body



$$V_{\text{MacroscopicObject}} = X \cdot Y \cdot Z$$

$$\rho = \frac{V_{\text{Matter}}}{V_{\text{MacroscopicObject}}}$$

"The Origin of Gravitation", *General Science Journal*, Jan. 19, 2007.

...so to find the density of matter in a macroscopic object we measure its external dimensions as shown here and then we calculate the volume of the object. We call it here "V macroscopic object". So we multiply its dimensions along X, Y and Z directions and this gives us the volume of this block.

...but this is not the volume of the matter in this object, it is only its external volume... we know that the block has spaces inside between its atoms and between these cylinders which are the chemical bonds. So the volume of matter and matter only that this object contains is really the total volume of its atoms and of the cylinders which are the chemical bonds giving the body its hardness. And this volume is less than the volume of the block which we obtain by measuring its macroscopic dimensions.

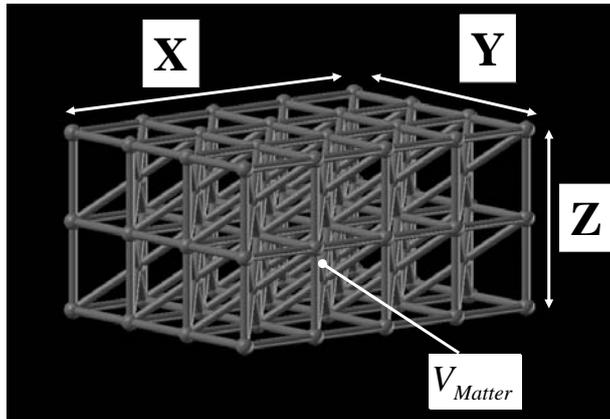
...so you see that there is a very big difference between the two volumes. And if you take the ratio of these two volumes you obtain the density of matter in this object.

...so the significance of density of matter in an object is that it really represents the compactness of an object. Objects which have less space between their atoms, which are more crowded, will be more dense because they have less aether between their atoms, while objects with big spaces inside their volume have small density and these spaces are filled with aether.

...this leads, again, to the conclusion that there is no need to express the density in kg/ m³; the density is just a number and there is no reason to employ the unit kilogram.

Aether explains inertia [3/3]

density of matter ρ in a macroscopic body



$$V_{MacroscopicObject} = X \cdot Y \cdot Z$$

$$\rho = \frac{V_{Matter}}{V_{MacroscopicObject}}$$

"The Origin of Gravitation", *General Science Journal*, Jan. 19, 2007.

There is another interesting point to mention here. I have worked at a theory of gravitation, basically at an explanation of the force of weight and what I found was that the force of weight is really a force of buoyancy in the aether.

...and this is consistent with what we have seen here that the quantity of matter is really the volume of matter contained in an object

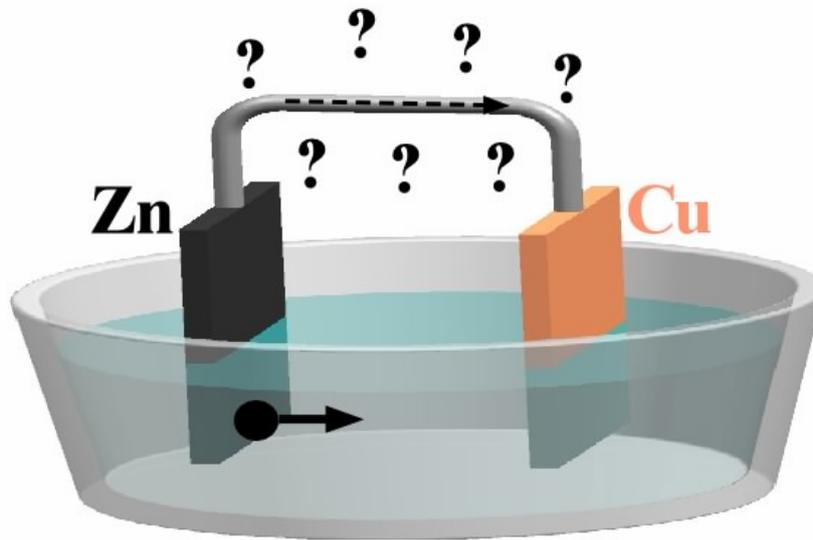
...And this is because when such a structure as the block here exists in a region in which there is a gradient of aether pressure, the force of buoyancy felt by this block in the aether is proportional to the volume displaced by the matter of this block in the aether - which again is the quantity of matter. And we obtain the so called equivalence between the quantity of matter measured inertially by acceleration through the aether and the quantity of matter measured gravitationally.

...And this solves the long-standing problem that exists in physics today of explaining why we find the same value for the inertial and the gravitational mass, in other words, why these two masses are equivalent. This theory shows that this happens simply because the volume of the matter in the respective object does not change.

For those who are interested to check this striking consistency I have put here the paper which treats this subject. The paper, with slight modifications, has also appeared in print: "On the Origin of Gravitation", *Galilean Electrodynamics*, Volume 21, No. 3, pp. 53-58.

And this is all I have prepared to discuss related to Newtonian mechanics and now I will move on to talk about magnetism...

Aether explains magnetism [1/10]



...so in this and in the next 9 pages and I will show you how I think that the aether explains the magnetic phenomena. This is again my small contribution to this theory.

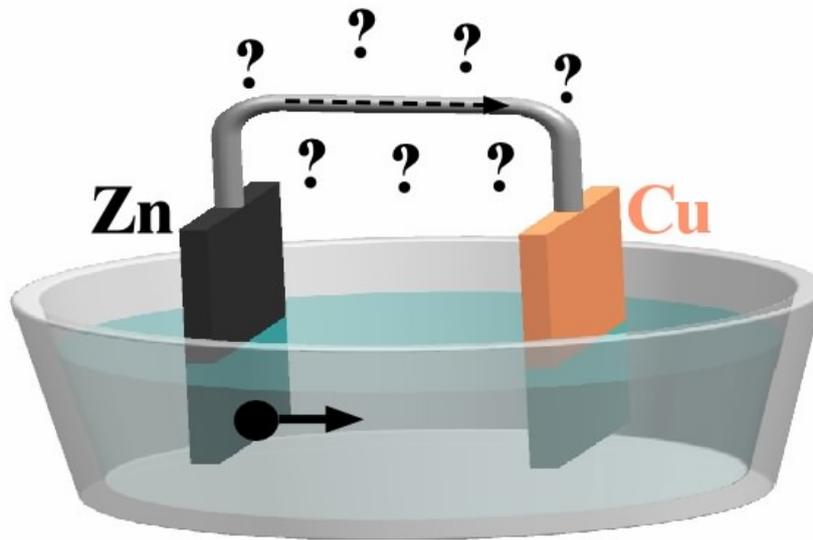
...here is a picture of what takes place at the most basic level:

...we consider two different substances placed in reaction with an acid. The zinc dissolves in the acid and combines with it, while the copper remains unattacked by the acid.

Now, through the wire that connects the zinc and the copper here, there is something which is transmitted from zinc to copper. I repeat this because it is important: there is something which travels through the wire from zinc to copper only, and there is nothing going from copper to zinc.

...this “something” that travels through the wire, which wire, again, let us not forget, is permeated by the aether down to its atomic level, creates in the space surrounding the wire a certain state which we now call magnetic field because it interacts with magnetic substances. The problem is that we really do not know what is this magnetic field, what is its nature.

Aether explains magnetism [1/10]



...As you know, this interaction between the wire and the magnetic substances takes place even if we put the wire in vacuum...

...so it is not the air, but the aether which must be playing the main role in this phenomena. In fact, we find that in vacuum these interactions are more intense and that the air rather impedes the interaction.

I think that understanding what happens around a wire that carries an electric current must start from the fact that there is something that travels along the wire and from the fact that the wire is surrounded and permeated by the liquid aether.

So we have something that travels basically through the liquid aether and along the wire.

...Therefore, we may ask, what happens, generally, when something moves through a liquid?

...we will try to discover this in the next page...

Aether explains magnetism [2/10]



Photo by NASA

...Here is a picture made available by NASA, in which we see the activity of a harbor.

We can observe up here and down here on the picture two ships moving on the water and leaving some trails in the form of the letter V. These small waves are also known as wakes and are a common occurrence when objects move through liquids.

...in the next page there are some more pictures of wakes, let us see them...

Aether explains magnetism

[3/10]

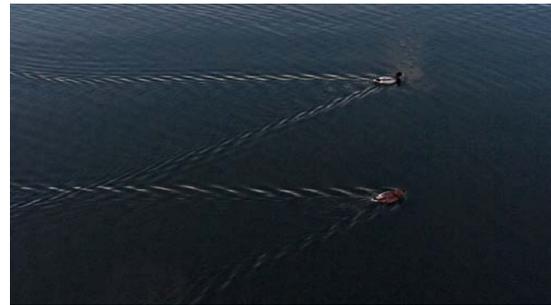


Photo by Phil Robertson
www.wakemakerducks.com



Photo by Brian Oh

Photo by Free Nature Pictures
www.freenaturepictures.com



...observe how these ducks leave a single trail on the water, a single wake, that, if you take a close look at the pictures here on the left, all arise from the breast of the duck which pushes the water. The pushed water then travels on its own as a wave away from the duck and creates this V shaped pattern on the water.

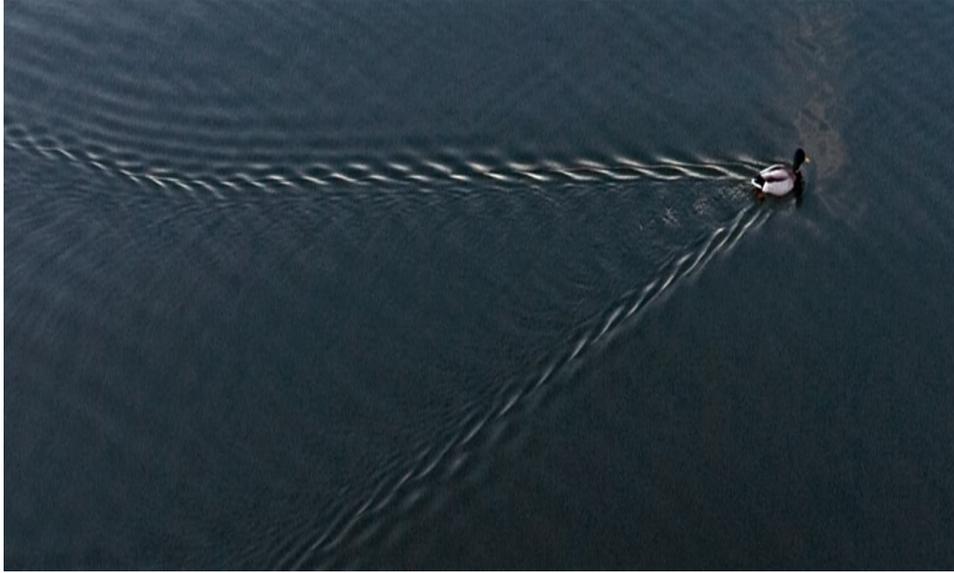
...here on the right the picture is taken from a high point and is more striking. Each duck that swims on the surface of the water produces a wake on the water.

...Now...

... what we are seeing in these pictures are objects moving on the surface of the liquid, but I think that even objects submerged completely in water can produce such wakes, and these wakes are made of compressed liquid.

...In the next page I will take this picture on the right here and keep only one duck to focus on its motion...

Aether explains magnetism [4/10]

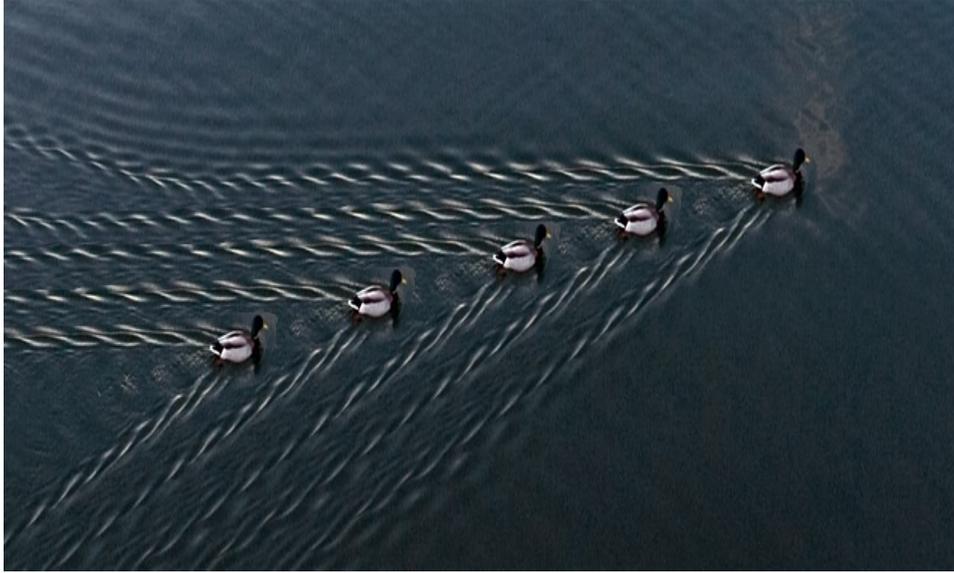


...so I will use this picture from which I have removed one duck.

... and, starting from this picture, I will add a few more identical ducks like this and put them one behind the other to form a row of ducks moving in line.

...in the next page it is shown what we obtain if we do this...

Aether explains magnetism [5/10]

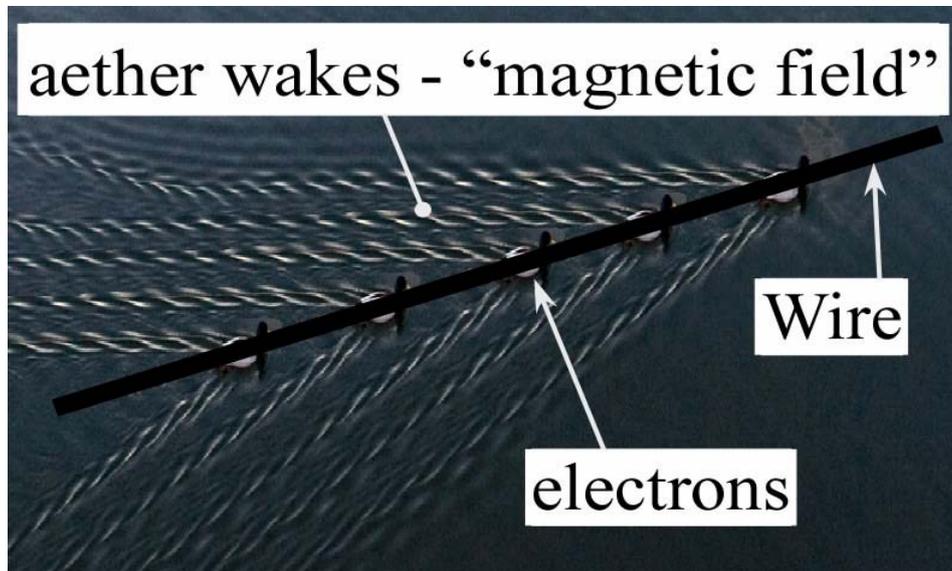


...so I have added four identical ducks and formed a row of ducks swimming on the water one behind the other.

...the ducks are basically objects moving through the liquid water and this helps us imagine what is the magnetic field produced by charges that are moving through the liquid aether along a wire...

...in the next page...

Aether explains magnetism [6/10]



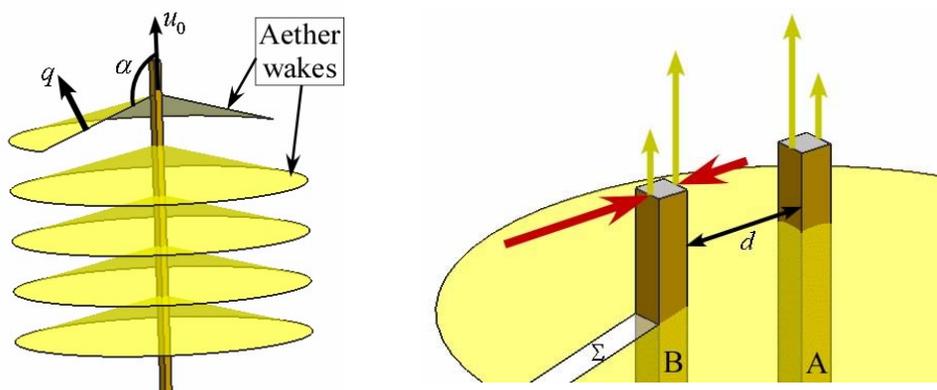
...we have the same picture in which I consider that the electrons create wakes in the aether in the same way ducks or any other objects moving in a liquid create wakes. The ducks here are then the electrons, the wire is just a guide for the electrons, and the wakes are what we call "magnetic field"...

...so, from this picture, I arrive at an understanding of the physical nature of the magnetic field. According to this theory, what we call "magnetic field" is in fact the system of aether wakes produced by the charges moving along the conducting wire... this is what I would call my small original contribution to the development of this theory of the aether.

...in the next page we will leave the analogy with the ducks and I will turn to the electrons that travel along the wire through the aether...

Aether explains magnetism [7/10]

The aether wakes theory : electric charges moving along a conductor generate aether wakes



"Bernoulli Equation for the Aether and Ampere's Effect", *Electric Spacecraft Journal*, Issue 43 (2007), p. 7-10.

...so the aether wakes theory states that the "electric charges moving along a conductor generate aether wakes"

...here in this picture on the left is the tridimensional representation of the wakes generated by the charges moving along the wire. The cones in yellow colour are the tridimensional aether wakes, which are waves of compression, and are produced by the moving charges due to the fact that they travel through the aether and along the conducting wire as a guide.

... q is the speed of these wakes through the aether and u_0 is the speed of the charges along the wire.

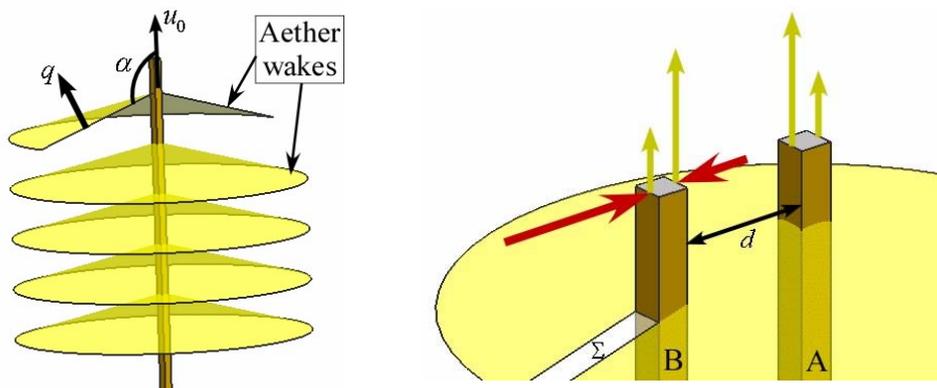
I have studied the theoretical side of these phenomena to some extent...and you may be surprised if I tell you that the study of the wakes in a fluid is not so well developed as one would expect. But, as far as I could work on this, I could find what happens if two wires carrying electric currents are placed parallel to each other at a distance d .

...and this is shown in the picture here on the right for the case in which the wires carry electric currents in the same direction. Basically, the wake generated by the charges flowing in one wire is screened to some extent by the matter of the second wire and by the current flowing in the second wire.

...The surface σ here shows the fact that the aether wake produced by wire A has been cut off by the matter of the wire B and by the current flowing through the wire B. Due to this fact, the aether speed at the surface of the wire B is different at the opposite sides and this results in a net aether pressure shown in red which tends to approach wire B towards wire A. Calculations show that this force becomes repulsive if the electric currents in the wires flow in opposite directions.

Aether explains magnetism [7/10]

The aether wakes theory : electric charges moving along a conductor generate aether wakes



"Bernoulli Equation for the Aether and Ampere's Effect", *Electric Spacecraft Journal*, Issue 43 (2007), p. 7-10.

Even this simple fact, that you can explain attraction between currents in the same directions and repulsion between currents in opposite directions is in itself showing that the theory is on the right track. But the results are even more striking because as we do the calculations it turns out that the force in each case decreases as the inverse of the distance between the wires, and this is exactly what is observed in experiments. As we all know, this dependence of the force with the inverse of the distance between the wires was found by Ampere and ever since then this law is called Ampere's law. So this theory explains Ampere's law...

...the calculations also show the existence of another term in the expression of the force between the conductors that might lead to some new insights into what happens in this phenomenon. Due to the need of brevity I cannot show here the calculations but I put here, for those who want to take a look, the paper in which I have explained everything in more detail.

Another thing that results from this theory of aether wakes produced by charges moving along a conductor is a picture of what happens when the charges do not move along all the length of the conductor but have an oscillatory motion to and fro around a point of the conductor.

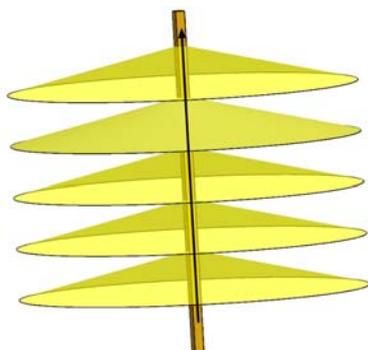
...and this is discussed briefly in the next page...

Aether explains magnetism

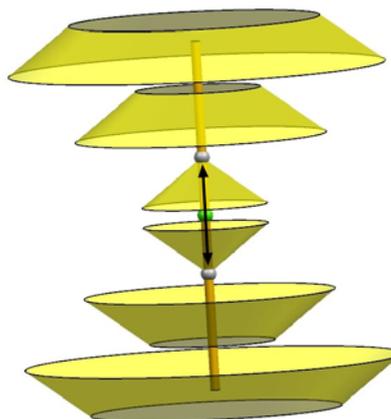
[8/10]

The nature of radio waves

**Five charges moving
along conductor**



One oscillating charge



...here on the left we have again some charges moving along the conductor and producing aether wakes as we have seen.

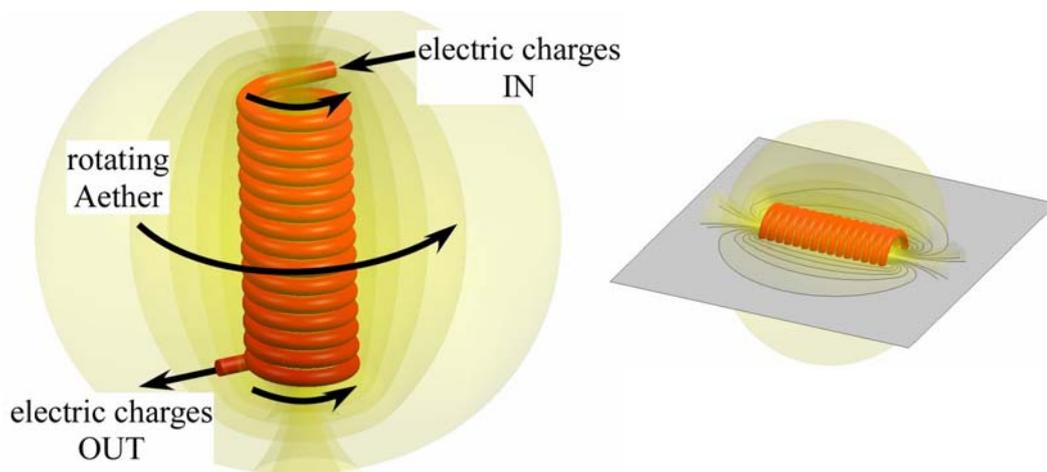
Now,... if a charge will oscillate, as in the figure on the right, it will produce aether wakes as shown. The wakes are following one after the other and the frequency of the succession of wakes is equal to the frequency of the oscillating charge. The wakes are moving away from the conductor forming waves and this gives a fairly good description of what it is experimentally observed: that a rectilinear wire carrying an oscillating current acts like an antenna and emits radio waves.

I did not finish studying the subject of radio waves and antennas but, as a preliminary result, I think that it is safe to say that the so called electro-magnetic waves are in fact aether wakes following one after the other in a succession of compressions. So it is not that electric and magnetic fields detach themselves from the wire and travel through space as “electro-magnetic waves” as it is believed today; what travels away from the wire are waves of aether and the only connection with the electric phenomena is that these waves of aether are generated electrically as wakes in the aether. This view was actually supported by J. A. Fleming and is in a very good compatibility with the picture in which light was considered a compression wave in the aether.

Returning to charges that flow along a wire and generate aether wakes, we can see that this theory gives an insight into the nature of the magnetic field produced by a coil. Imagine that this wire here on the left is turned around to a coil. Then the aether wakes will turn into a rotating vortex of aether.

...this is shown in the next page...

Aether explains magnetism [9/10]



"What's Behind Faraday's Magnetic Lines of Force", *Electric Spacecraft Journal*, Issue 41 (2006), p. 24-30.

...here on the left you can see such a coil and the charges entering the coil from the upper end. The charges flow along the turns of the coil and create aether wakes that will rotate around the coil and surround the coil completely.

So, from this we can see that the magnetic field of a coil is in fact a vortex of aether rotating around the coil.

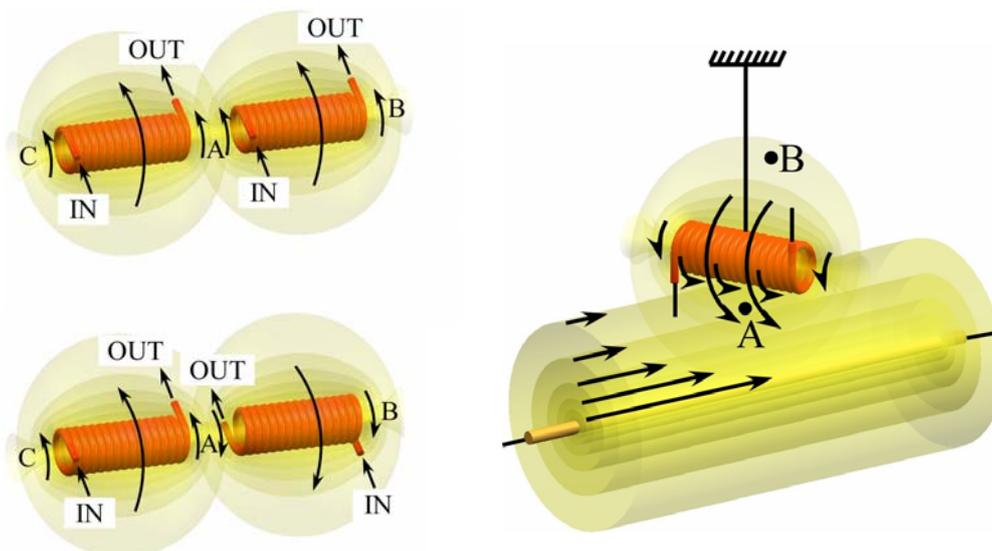
In the picture on the right it is shown how this rotating vortex of aether produces the magnetic lines of force which we can see with the help of iron filings. This theory explains the production of these lines by the impact between the aether rotating around the coil and the iron filings.

I would dare say that perhaps the most important conclusion of this theory is that the magnetic poles of a coil are in fact the top and the bottom of a rotating vortex of aether. Please note that this view is different, even if slightly, from that held by J. C. Maxwell, who believed that the lines of force are fixed in space and that there are aether vortices around every such line of force.

So, if we look at the picture on the left, we can consider that the upper end of the coil is one magnetic pole -the top of the vortex- and the lower end of the coil is another magnetic pole -the bottom of the vortex. Although these poles belong to the same vortex of aether, they are not identical and behave in an opposite way.

...we will discuss this in more detail in the following page...

Aether explains magnetism [10/10]



"What's Behind Faraday's Magnetic Lines of Force", *Electric Spacecraft Journal*, Issue 41 (2006), p. 24-30.

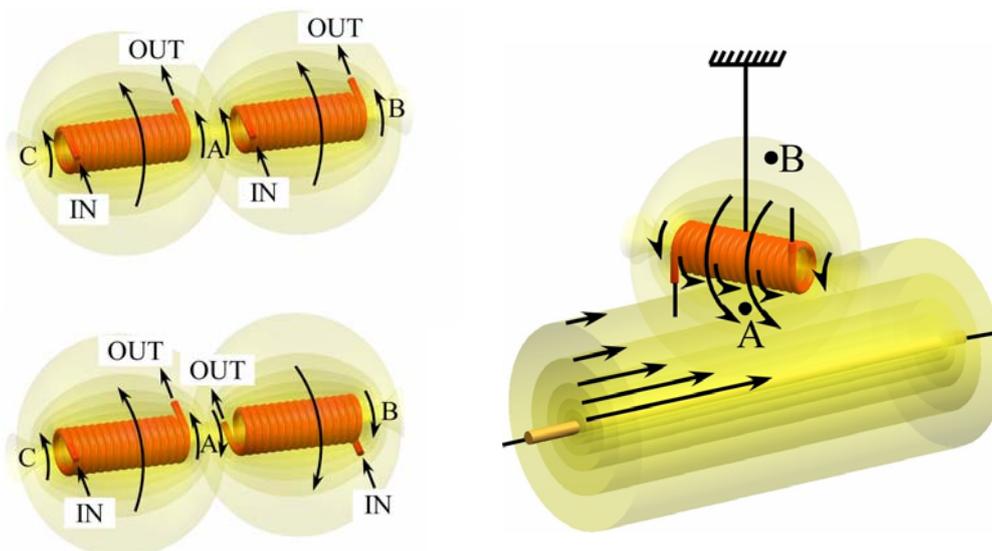
...Consider for example two coils with the poles facing each other as in this picture here on the left up. The charges flow in the coils in identical direction, therefore there is an aether vortex rotating around the coils in the same direction.

Look at what happens in the space A between the poles facing each other: the bottom of the vortex of the coil on the left faces the top of the vortex of the coil on the right; in this region A between the poles the aether rotates in the same direction, therefore the speed of the flowing aether is greater here, between the poles, than at the other ends of the coils B and C. If you apply Bernoulli equation to these flows you will find that there is a decrease of aether static pressure in the region between the poles due to the fact that the speed of aether flow there is higher. So you have attraction between the coils. This conclusion is consistent with observations because we know that what is actually observed when two coils are arranged like this is a force of attraction between the coils.

So, in electromagnetism the explanation that is offered for the fact that the coils attract is just that the two coils have two opposite poles facing each other. Compared to this, the theory presented here gives an insight into what is really going on between the poles that gives rise to an attractive force.

The theory is consistent and gives good results for the other situations. For example, in the lower picture the coils are placed with the same poles facing each other. As you can see, the bottom of the vortex rotating around the coil at the left faces the bottom of the vortex rotating around the coil at the right. In the space A between the poles, the aether rotates in opposite directions and its flow speed decreases because of collisions between the two aether flows. If you apply again Bernoulli equation, you obtain that the static aether pressure in the space between the poles is higher than at the other ends of the coils B and C. Therefore you obtain repulsion, a fact which is actually observed if you place two current-carrying coils as shown here.

Aether explains magnetism [10/10]



"What's Behind Faraday's Magnetic Lines of Force", *Electric Spacecraft Journal*, Issue 41 (2006), p. 24-30.

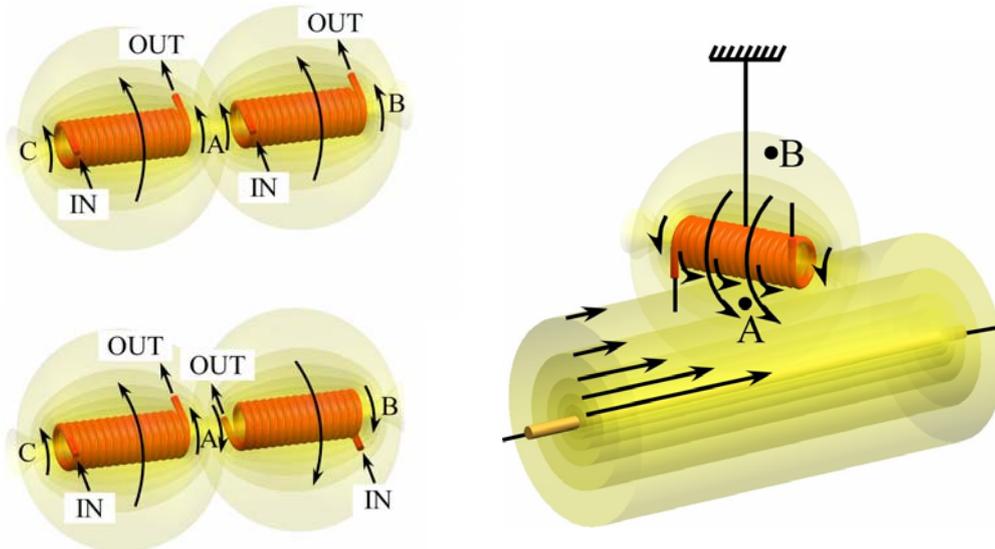
And this is really the most important consequence of the theory presented here: that the magnetic field surrounding a coil or the magnetic field of a permanent magnet -because they behave identically- is in fact a vortex of rotating aether...
 ... this in its turn offers an explanation for why we can never obtain magnetic monopoles, the north and the south poles of a magnet isolated from each other. Since the magnetic field is actually a rotating vortex, even if you break a magnet into two pieces, the resulting pieces will each of them have attached to them a rotating vortex that obviously has a top and a bottom, therefore each piece of the magnet will have again two opposite poles.

Another instance in which this theory is found correct is in the explanation of the Oersted effect. This effect was the first to be discovered in electromagnetism and shows the action of a current on a magnetic needle. On the picture at the right you can see a wire carrying an electric current and a current-carrying coil.

...and the reason for which the coil finds equilibrium in a perpendicular direction to the wire is simply due to the fact that the aether which flows along the wire collides with the aether which rotates around the coil and equilibrium is found only when their lines of flow are in the same direction. Therefore, if the coil is let free to rotate in the neighborhood of a wire it will find equilibrium at a right angle to the wire. If the current in the wire, or that in the coil reverses, then the coil will rotate and find equilibrium at right angle with the wire but in opposite direction.

... compare this explanation with that offered by the currently accepted theories and see the difference...

Aether explains magnetism [10/10]



"What's Behind Faraday's Magnetic Lines of Force", *Electric Spacecraft Journal*, Issue 41 (2006), p. 24-30.

... so here is where I would like to finish the discussion about the theory. In what follows I would like to present to you an experiment that I performed recently and which comes to support what has been said here.

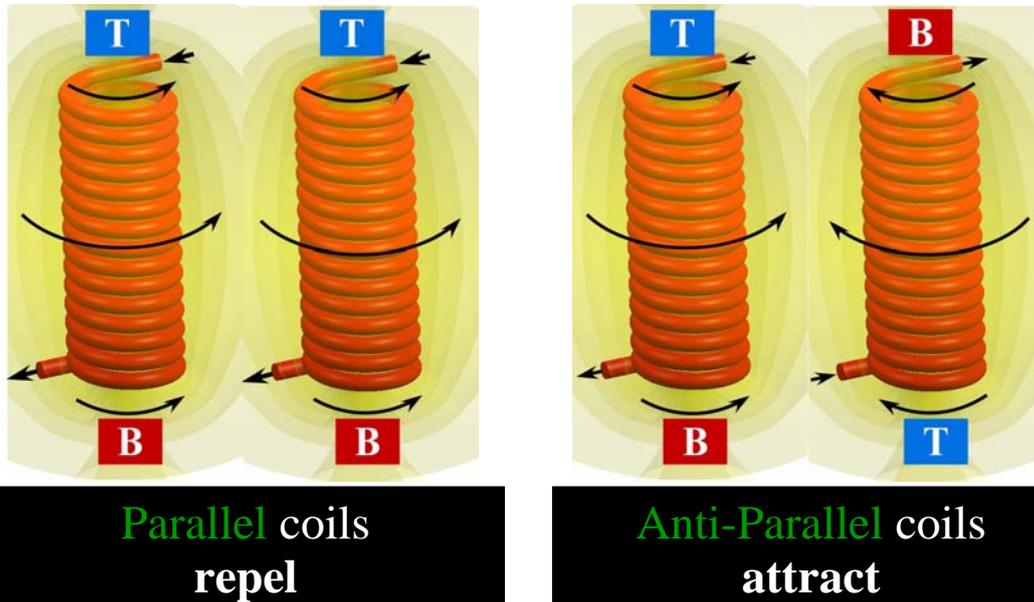
We have seen that this theory leads to the conclusion that the magnetic field of a coil is a vortex of rotating aether and that the magnetic poles a coil has when carrying an electric current are in fact the top and the bottom of a vortex of rotating aether. Therefore, basically, we have that when two coils carry electric currents it is the aether vortices surrounding them that interact with each other and result in attractions and repulsions.

In my experiment I wanted to replicate this phenomenon in water, by using water instead of the liquid aether. I wanted initially to test if the tops and the bottoms of water vortices attract or repel according to what has been shown here but the experimental set-up was too difficult to build.

...but I still could check something and this was what happens when the water vortices are parallel to each other, that is, when the coils are not with the poles facing each other but are parallel with each other.

...this is shown in the next page...

Experiment [1/5]



...here on the left we have two parallel coils in which the current flows identically, therefore their similar poles are close to each other; because of this, the coils repel each other.

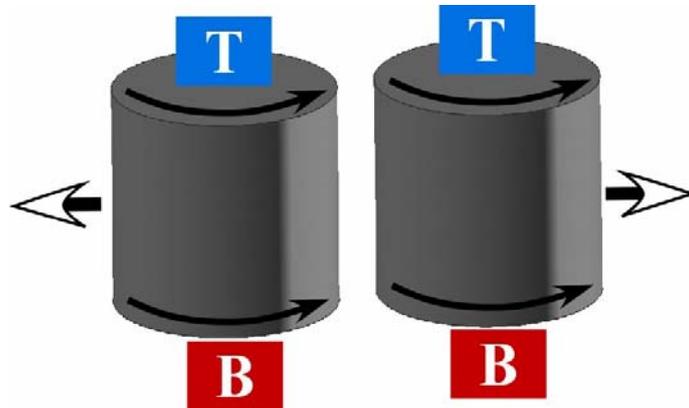
Seen from a fluid mechanical point of view, this situation leads also to repulsion between the coils because in the region between the coils the aether flows in opposite directions, therefore collides, decreases its flow speed and its static pressure increases.

On the right picture there are also two parallel coils but in which the electric currents flow in opposite directions. The coils have the opposite poles next to each other and experimentally it is observed that the coils attract each other.

Again, the fluid mechanical point of view confirms this because in the region between the coils the aether flows in the same direction, therefore the aether flow speed there increases and the pressure decreases, leading to a force of attraction between the coils.

...in the experiment that I performed I have tried to check if the fluid mechanical point of view is correct and whether we can observe these forces of attraction and repulsion between vortices in a liquid. Let us see on the next page some details about the experiment...

Experiment [2/5]



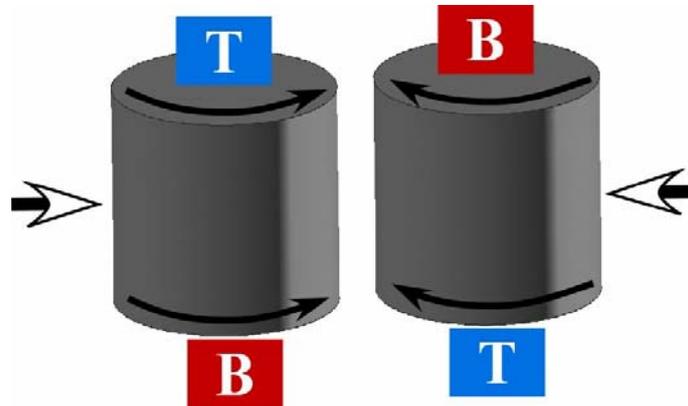
Parallel cylinders rotating in the same directions in a fluid should **repel** each other

...in the experiment I took two identical cylinders that, by rotating in water in the same direction, would produce water vortices rotating in the same direction as the cylinders. These rotating cylinders would replicate what coils carrying electric currents would generate in the aether.

...Here both cylinders create vortices that have the tops next to each other and the bottoms next to each other. In this case, the experiment should show that the cylinders repel each other...

...there was another case, in which the cylinders rotated in opposite directions, shown in the next page...

Experiment [3/5]

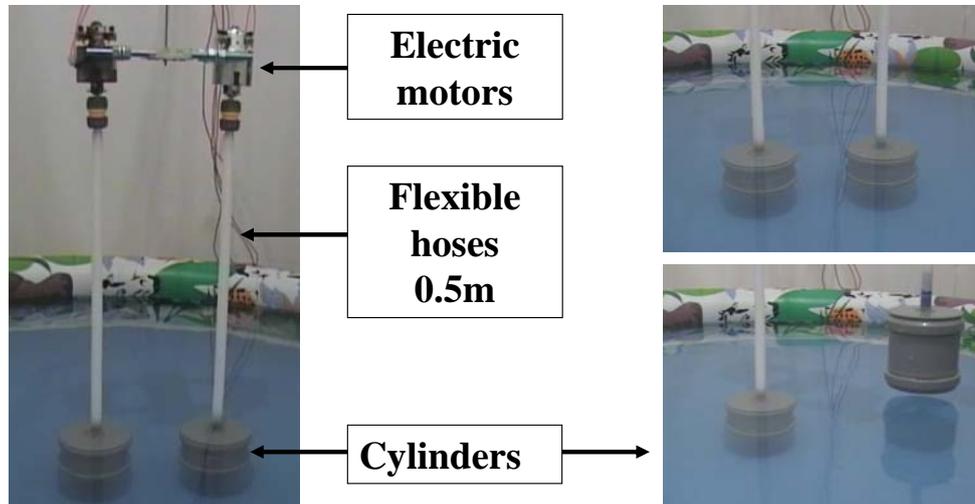


Parallel cylinders rotating in **opposite** directions in a fluid should **attract** each other

...when the cylinders rotate in opposite directions the water vortices would rotate oppositely. The top of the left water vortex will be close to the bottom of the right water vortex and the opposite is true for the other ends. In this case the experiment should show that the cylinders attract each other...

...the experimental setup is shown here on the next page...

Experiment [4/5]



The author wishes to thank physicist Leon FRATILA for help and assistance in doing the experiments.

...so, I have used two identical electric motors that transmitted their rotation by two flexible hoses to two cylinders made of plastic and immersed in water. The direction of rotation was reversed by reversing the polarity at the terminals of the motors.

...the whole experiment is recorded in a four minute video clip. Let's watch it together...

Experiment [5/5]

Video

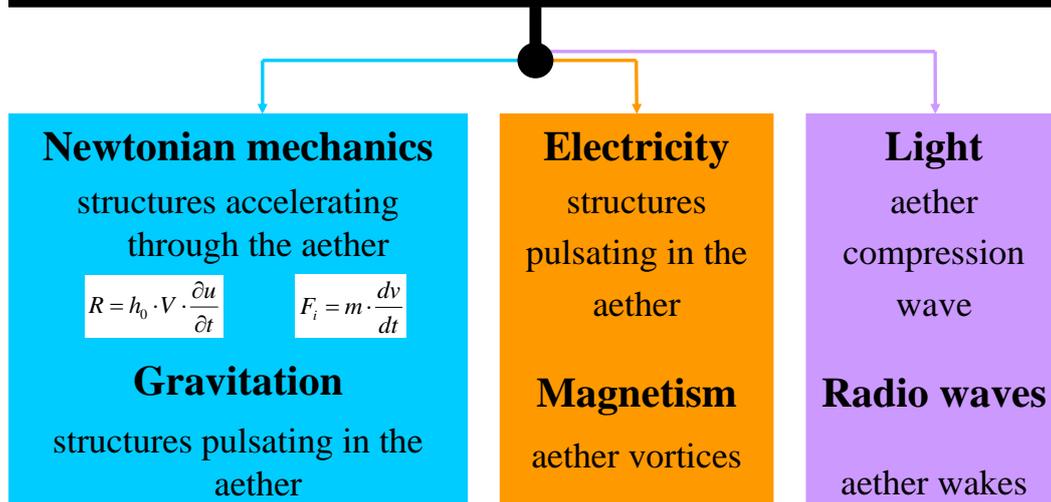
[The video is available on YouTube. The title of the video is “Ionel DINU - Experiments with Cylinders Rotating in Water”]

...so the experiment confirms the theory in that we could see how the cylinders attract or repel according to their direction of rotation. The experiment is also striking because we could see action at a distance mediated by the liquid, we saw forces of attraction and repulsion arising between objects due to the intervening medium.

...next I would like to move to the final remarks of this talk...

Final remarks [1/2]

the Aether is a liquid with no viscosity



...so we have that the aether is a liquid with no viscosity...

...and that these simple properties lead to the explanation of inertia as a hydrodynamical effect in the aether; we have that atoms accelerating through the aether are all that we need to explain Newtonian mechanics ...

...then we have that atoms that vibrate in the aether send out compression waves and another atom present in such a field will experience attraction... Phenomena similar to these, in which forces of attraction arise when objects are situated in an acoustic field, are being investigated by some research groups; they call these forces Bjerknes forces...

...then the same happens in electricity, where atoms which vibrate can attract or repel each other - another thing worth being investigated in more detail both experimentally and theoretically...

...in magnetism... we have seen that the magnetic field of a coil is in fact a vortex of aether and that this explains the attractions and repulsions between poles very well...

...and we have seen that light is a compression wave in the aether and that this is consistent with the representation given by this theory to the radiation emitted by charges oscillating along a wire, the radio waves, which are in fact a system of aether wakes.

...and finally, a few predictions and implications of this theory...

Final remarks [2/2]

Predictions and Implications

Gravitation - no gravitation between two bodies at $T=0K$
there is no interaction between macroscopic objects consisting of atoms that do not vibrate ($T=0K$)

Mass - is not a fundamental physical quantity
quantity of matter = the total volume displaced by matter in aether

Atomic theory - shapes of atoms
atomic spectra are the frequencies of the normal modes of mechanical vibration of the structures which represent atoms

...one is related to gravitation and the prediction is that "there is no gravitation between two bodies at $T=0K$ ". In other words "there is no interaction between macroscopic objects consisting of atoms that do not vibrate". The gravitational field of a star depends on the temperature of the star. Even planets, moons, etc., must be at a certain temperature in order to have a gravitational field of their own.

...then about mass...we have seen that "mass is not a fundamental physical quantity" and I think that the unit of kilogram will eventually be dropped or, at least, not considered "fundamental" any more. The appropriate definition for the "quantity of matter" in an object is "the total volume V displaced by matter in aether" and this has the unit of m^3 .

...finally, in the atomic theory, the theory points to the conclusion that the atomic spectra emitted by the atoms are related to the special shape of the atom - remember that the shape was the qualitative property of atoms which makes the difference between the different species of atoms. This implies that the "atomic spectra are the frequencies of the normal modes of mechanical vibration of the structures which represent atoms" and this is another direction on which I direct my research.

...This is all, thanks very much for your attention.