Scientists in 1800's Mis-handled Ether Pressure, so Einstein's mc^2 Super-welcomed

Carl Littmann
25 Washington Lane #313, Wyncote PA 19095 USA clittmann@verizon.net .
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Abstract
In his book, 'Opticks', 1700, Newton made a respectable estimate for both ether's pressure and density – the best up to about 1905, after which interest in ether sadly waned. Ether pressure is, in fact, the energy per volume in space, and thus is very fundamentally important. But this paper explains, sadly, how the scientists of the 1800's largely failed to address ether's pressure. I.e., not even appreciating ether's causing the high-pressures near the center of the earth and inside more massive bodies. So, Einstein's great (mc^2) was welcomed even more than otherwise. ((I also give my reasons for my own rough estimate of ether pressure of (10^{+34}) N/sq.m., (coincidentally, same as scientists use for inside neutron stars. [1]). And for my ether density estimate of (10^{-20}) Kg/cu.m., (consistent with the highest-to-lowest densities in Nature – roughly equaling the highest-to-lowest forces found in Nature).)) Some 1800's scientists made good estimate of ether's density. ((It is said of Einstein's gravitational theory that "two adjacent bodies bend space more than otherwise". But my view is that the available space for ether flow is naturally more constricted between two close bodies, so ether's flows must speed-up there to maintain flow continuity. And that causes the well-known 'Venturi flow effect' -- reduced pressure, a suction effect, 'attraction', i.e., known as 'gravity'.))

Introduction, Part 1
(Optional: Readers may, at any time, optionally scroll way down to heading, ''Historical Specific Estimates and Details" – for a summary of some famous scientists' specific estimates of ether's pressure and density.)

Very **Important**: In space, 'ether pressure' is, in fact, 'ether's energy per volume', of space. And so, in space, the units of pressure, (newtons per sq. meter), are the same as 'energy per volume', i.e. (newton) (~~meter~~) per ~~meter~~) (sq, meter). That is crucially important because, in fact, the "too low of pressure estimate (i.e., too low of 'energy per volume' estimate) in the universe," whether for ether, mass, or both – was the main 'goof-up' that ended the 'classical scientific age' of the 1800's. (Despite their other good work!)

So, that goof-up greatly helped launch the new age of 'modern physics', (the 1900's) – with its "vastly increased estimate of 'energy per volume' in the universe". (So, I have to say, "thanks to Einstein for his (mc^2) high energy proposal for mass -- that helped 'jump-start' the 1900's modern scientific age," after the 1800's scientists goofed-up with their too low of 'energy per volume' estimates. Similarly, thanks to the discoverers of 'radioactivity'.)

And so it seems, that, generally, the 'story' of humans advancing cognition and enlightenment is very closely tied to the flow of their discovering ever-greater 'magnitudes' associated with the

characteristics of the Universe – the 'large' being larger than they thought, and the 'small' being smaller than they thought!

For '**Newton's** estimate of ether's pressure, I get about **$4x10^{16}$** N/sq.m**.** [2] And for Newton's estimate of ether density, I get about **$1.75x10^{---6}$** Kg/cu.m. (Newton and many other scientists of that period did not express their estimates directly as a precise, simple number, but, instead, often 'by how many times greater or less' it was -- relative to a better-known other characteristic of Nature. I.e., for which numerical information was available. Thus, letting the readers, themselves, calculate-out the details and 'numerical result', if further interested. And, sometimes, the readers had to 'stretch a bit' to interpret the writer's comparisons and 'hope' their interpretation was right -- which is not ideal. But I'm confident about my correctness about what Newton believed, regarding the above.)

(Notably, Newton's ether pressure estimate, about $4x10^{16}$ N/sq.m., is quite high enough to provide the pressure believed to be near the center of our fusion-powered sun: $2.65\ x10^{16}$ N/sq.m). [3] And still more sufficient to provide the estimated pressure at the center of the earth, about $3.5x10^{11}$ N/sq.m.) (The ultimate tensile strength of Tungsten is roughly 10^9 N/sq.m., for relative comparisons.)

(And notably, Newton's ether density estimate, about $1.75x10^{---6}$ Kg/cu.m., corresponds, roughly, to the very highly rarified atmosphere where a very fast traveling space reentry vehicle to earth -- encounters just enough atmosphere and friction to begins to glow. And on earth, that requires a very good (2 'stage', not 1 stage) rotary vane pump to achieve that vacuum. And that is deemed a 'high vacuum', not merely 'medium'))

Thus, I think Newton's estimates for ether pressure and density were great for his time, and even for quite some time thereafter!

Introduction, Part 2, Including my own Ether Pressure & Density Estimates

So before I further judge the merit of other scientists' estimations for ether, I need to present my own estimates of ether's pressure and density, for comparisons. And a few of my many considerations in making my estimates – which are as follows:

Let's start by considering the ultra-high pressures caused by, say, a proton spinning roughly at the 'speed of light', near the proton's 'equator', and perhaps vibrating at velocities near the speed of light in its other regions. That spin would create a 'centrifuge-like' force, roughly '(mc^2) / (radius) for the proton', which has a radius almost as small as $1x10^{---15}$ meters. And, therefore, considering the small 'surface face area' of the proton, much of the proton would generate a huge centrifuge-related spinning pressure, requiring at least that much ether counter-pressure to prevent the proton from 'flying apart', i.e., disintegrating.

So, in effect, that amount of needed counter pressure is roughly 'mc^2/volume of the proton'. So '*that*' roughly amounted to taking "Einstein's (mc^2) energy for a proton" and dividing that by the volume of the proton, which, remember, has a radius, 'R', almost as small as $1x10^{---15}$ m. So, by dividing that (mc^2) by a volume of $[(4/3)(pi)(R^3)]$, my rough estimate of ether's pressure comes out **10^{34}** Newtons/sq.m. (Or an 'energy/volume' of 10^{34} Joules/cu.m.) I.e., that is the counter-

pressure of the ether, and it must be at least that much -- to keep the proton from 'popping'. (I.e., even though Einstein ignored the ether!) (Co-incidentally, that also happens to be roughly the pressure deep inside a 'Neutron Star', according to astronomers.)

Next, for my estimation of Ether's density: There are several approaches or methods that we could try. But let us try the following, and start by noting this: In our universe, there should importantly arise *very high pressures* and forces due to very high-density fluid -- moving at some 'given velocity'. And very low pressures and forces due to low-density fluid moving at that same velocity! And this holds true for 'suction pressures' and forces produceable by 'Venturi fluid flow' in Nature, the 'Venturi Effect'. (I.e., So, 'high pressures often have high density' flow. And 'low pressures often have low density' flow.) The amount of pressure differential in the common Venturi and Bernoulli equations is directly and simply proportional to the densities of the flowing fluid!

So we will search Nature for examples of the highest forces, and what behavioral Class they're in. And similarly, search Nature for its lowest forces and their behavioral Class. And, importantly, we will look for, and note, whether the Classes seem to have a corresponding high and low density fluid flowing in them, a cause of those contrasting pressures. In pursuit of that, we importantly note that the highest density 'fluid' we know of in Nature -- is that of 'nuclear matter'. (And we know that value.) And the lowest density of 'fluid' is the 'ether density', (which we seek to know). But, importantly, we now know Nature's 'highest-to-lowest' pressure ratio value and a method' to calculate 'ether unknown density' !

So, we note that standard physics books give the ratio of "Nature's strongest forces to weakest forces" as about (10^{38} / 1.0). [4] Then, let us assume that the ultra-high 'attractive suction or pressure' of a nucleus is due to a 'Venturi flow suction effect' involving a nucleon's ultra-high 'nuclear fluid' density, $2.3x10^{17}$ Kg/cu.m., (and we will 'credit' high ether pressure for helping to fostering that.) (That "$2.3x10^{17}$ Kg/cu.m." is roughly considered the density of a nucleus.[5]) So, let us associate that $2.3x10^{17}$ Kg/cu.m high nuclear fluid density with Nature's strongest force. Then, next, and following convention, we can consider 'gravity' as Nature's weakest force, and to be likely 'causal-related' to a very low-density 'Venturi fluid flow' action', i.e., likely due to the relatively very low density of ether, and 'proportionally' so.

Then, let us recall that "(10^{38} to 1.0) ratio" (the strongest to weakest force in Nature). And use it to roughly estimate the ratio of "the scientifically accepted high 'nuclear fluid density' to the relatively low 'ether fluid density', the low density that we seek to know." Then our estimate for ether **density** comes out to about **10^{---21}** Kg/cu.m, a very important estimate!

So that is my rationale, methodology, and calculations. But for practical purposes, and etc., I will round-off that rough value for ether's density to **10^{---20}** Kg/cu.m., and I will use that as my rough estimate. And that estimate, somewhat 'reassuredly', also comes out a few magnitudes more rarefied (thinner) than that of the very good vacuums that scientists make in labs using very good equipment and subtle techniques. And quite low enough to cause 'virtually negligible long-term drag' -- even supposing that ether is not quite 'inviscid'. But I think, that like the 'Bohr orbiting electron orbit in his hydrogen atom' model, that ether is 'inviscid' -- like a 'super-

fluid'. (I.e., at least for all mass that retains at least a slight '*wave character*', or special *compatible oscillation* during its traveling.)

((Optional, in my model of motion -- mass and light have '*those properties*' so they can travel, without friction, through "an ethereal 'sea' of 'eddy-currents'," in space, and those eddy's have an average amount spin or 'angular momentum' that is roughly equal to that of "a 'Planck constant' amount". That is – 'Planck constant' may be expressed in 'units' (or 'dimensions') of 'angular momentum' - a specific small (discrete or 'quantum') amount. Say, in units of '[(Kg)(meters) (meters/second)]'. (Again, this whole paragraph is 'Optional' and may be skipped).))

More Thoughts and Details

Very Important: Again, a key theme in this paper is – that the 'proposition of **ultra-high** energy per volume, or pressure,' in the universe, (whether associated with gross mass, ether, or both) – was the key proposition that launched the age of 'modern physics' and ended the 'classical age' of the 1800's, with its insufficient pressures. And that the very abrupt transition was much more abrupt than otherwise, because the 19th century scientists, very disappointedly (and somewhat mysteriously) -- utterly failed to realize the very great magnitude of pressure (energy per volume) associated with ether or mass. (And failed to make the seemingly obvious, holistic, and 'pro-unifying' connections – such as relating that high 'energy/volume' with the super-pressures near the center of massive bodies – with their great gravity, i.e., such as we associate with the sun and even its planets.)

Optional: In my opinion, 'modern' physics did not commence with Planck's great work, nor his 'Planck constant. Nor with the "Planck constant worth of related angular momentum" associated with particle spin or orbital paths of particles, nor even 'ether-spin'. I think, that all those discoveries were good, but quite consistent with the great "model of the Universe as a 'Vortex Sponge'," the major model existing well-before the end of the 1800's. And that regardless of whether that applies to 'gross mass', ether, or both; those concepts were advocated and considerably developed -- even in the period from the 1600's through 1800's. But commendably, a lot of the great work of the early 1900's scientists -- provided better definition, greater clarity, and understanding of the vast work done before the 1900's.

Around 1900, many new discoveries began to be made, including some details of 'radioactivity', and the great forces and pressures it implied. And thus, that was a further motivator for change, a very strong 'springboard' for escalating progress!

But, of course, scientists of the 1800's knew none of those later discoveries to be made later in the 1900's, so they lacked that information to go on. Similarly, they had no information that the small nuclei were spinning at about the speed of light, and thus causing ultra-high centrifuge-related pressure – and that that would need a super-high ethereal counter-pressure (also about 10^{34}Newtons/sq.m), to keep them from 'flying apart'. That information would not become known until well into the 1900's.

To the credit of many **17** century scientists, most of them regarding gravity as an ethereal 'Pushing' action, and not what I think so many thoughtful people rightly objected to -- as an

'Occult' (magical) 'Pulling' action. ((For example, if, like in a case of the 'Venturi flow effect', when there seems to be an absolute suction or 'pulling effect' -- I think that what is really happening is this: A 'gross mass' is being pushed from a 'higher pressure region to a lower pressure region'. And that often, the 'higher-energy 'player', that is doing the greater 'pushing', has such low 'mass density', that, like ether and gravity' -- that 'the pusher' is not, itself, visible. And that, therefore, the resulting observable event -- only seems 'mysterious', i.e., like 'occult attractive gravity' – seemingly without an obvious cause.

Important: I think that among the few leading, 'intractable' physical mysteries of the universe, from the time of the ancient Greeks to about 1905, was this: "What is the ethereal density and ethereal pressure in the universe." (And thus, my paper focuses on that key issue, especially the attempts to estimate it (i.e., ethereal density and energy) from roughly '1700 to 1900', roughly 200 years.)

Historical Specific Estimates and Details (and Grouped into Classes)

Below I have tried to divide scientists' attempts 'to address ether pressure and density' into a few major classes, so that the reader can hopefully see an 'over-all' picture of the related work, and 'sort through it' efficiently, depending on the particular information they seek.

Class 1. (Somewhat vague Ether Pressure and Density Estimates)
Most scientists of the 1800's and earlier – spoke of ether's high pressure (or tension) and ether's low density – but most did not give quantitative estimates for ether's pressure or density.

Class 2. (Estimates for **Ether Pressure**, mainly)
A few scientists gave a specific estimate for ether's pressure, (and even a few relatively good estimates) – but often did NOT give an estimate of ether's density, or if they did, it was usually a poor density estimate.

Some examples: Osborne Reynolds made a fairly good estimate for ether Pressure in 1902, about 1.2×10^{13} N/sq.m.[5], quite adequate to provide the pressure near earth's center, about 3.5×10^{11} N/sq.m., but not so for the sun. (And he made a ridiculously high estimation of ether's density, about 10,000 times that of water).

Sir Oliver Lodge made a rather good estimate of ether's Pressure in 1907, about 10^25 N/sq.meter; but that estimate was made after Einstein's famous 1905 paper proposing (mc^2), for the very high energies of gross mass, and interest in 'ether' was fading. So, I think Lodge had "come to the table, 'relatively, too late', so-to-speak". I.e., in effect, after Einstein's already ultra-high energy per volume conjecture. (And Lodge, somewhat like Reynolds, also made a ridiculously high estimate for ether density, much denser than water.)

Samuel Tolver Preston, in his 1875 book, The Physics of Aether', estimated Ether's Pressure to be about 7.7×10^{9} N/sq.m. But even though that seems like a 'big' number, I regard it, still -- as a poor estimate for ethereal pressure even for that time; i.e., it is even less than the already mentioned estimate for pressure near earth's center, 3.5×10^{11} N/sq.m. And thus, I think, his ether pressure estimate could not even cause the high-pressures near earth's center.

Yet, sadly, all that seem s all too typical of ethereal pressure estimates by most of the interested scientists in the 1800's period, a major theme of my paper. (Preston's estimate for ether's density, however, was about $2x10^{--7}$ Kg/cu.m, which I think was fairly good for his time.)

Class 3. (Estimates for **Ether Density**, mainly)
A few scientists. gave an estimate for ether's density, (and even a few relatively good estimates). But generally, they did not give an estimate of ether's pressure, or if they did, it was usually poor.

For example, Lord Kelvin (William Thomson, 1854) estimated the density of ether to be at least greater (at least thicker) than $1x10^{--19}$ Kg/cu.m. (And Maxwell thought that Lord Kelvin had made a reasonable attempt.) Although I think it was a very good estimate for the times, and perhaps even now; I think his thick 'minimum' would have probably been better said and deemed, by Lord Kelvin, to be a 'maximum' ether density estimate, instead of minimum. I.e., That is, I think ether's thinness is roughly $1x10^{--20}$ Kg/cu.m., 'thinner than Lord Kelvin's estimate. And thus, I think that Lord Kelvin should have called his ether density 'just a rough estimate', without his term, 'minimum', or maximum or other. Unfortunately, Lord Kelvin made no specific estimate of ether's pressure!

Nikola Tesla, made a fine estimate, in my opinion, an ether density in 1929, but that was well after Einstein's 1905 paper and thus scientists' interest in ether, or ether's characteristics, had waned rather greatly, i.e., most scientists by then likely doubted ether relevancy or even its existence. But there was still an interest in ether by many scientists, until the atomic bomb was exploded, after which the general view of Einstein's work and theories escalated to even greater heights.

Anyway, and more specifically, in 1929 Tesla estimated an ether's density that comes to $1.9x10^{---24}$ Kg/cu.m, (about $1/10^{th}$ of that which he thought he had observed). That seems to me to be a good estimate for that time, and I think worthy enough for any time -- although my own density estimate, ($1x10^{--20}$ Kg/cu.m.), is somewhat thicker than that. Yet, my estimate is somewhat thinner than the still thicker value which Lord Kelvin considered to be the limit as to how thin ether's density is. And, actually, my own ether density estimate is a little closer to Lord Kelvin's maximum thickness estimate, than to Tesla's 'thin' estimate. But I think that all three of us did a pretty good job of estimating ether's density.

Unfortunately, Tesla made no specific ether pressure estimate, although like so many other scientists, he said ether[s pressure must be very high.

((As previously mentioned, Preston, Lodge, and Reynolds made too high of estimates for ether density. But among those density estimates, Preston's was at least, reasonable enough for his time – in my opinion.))

Class 4. A few scientists gave an estimate for **both** ether's **pressure and density** – but only a few 'pairs' of such estimates were a relatively good pair.

Reynolds, Lodge, and Preston made estimates for both ether's pressure and density, as previously discussed, under the heading "**Class 2**", above. But their density estimates were usually

ridiculously too high, except for Preston's case where the density was okay for the time – but Preston's pressure estimate was ridiculously too low.

So remarkably, as emphasized in my paper's Abstract -- the 'great' Isaac Newton made remarkably good estimates for both ether pressure and density, for his very early time, about 1700. And I think his estimate held appropriately enough, until the interest in ether, and its pressure and density, began to wane appreciably -- soon after Einstein's publications in 1905.

So, now I return to information around my 5th paragraph under my 'Introduction Part 1, of this paper. I got for Newton's ether estimates -- a density of about 1.75×10^{-6} Kg/cu.m., and a pressure of about $4 \times 10^{+16}$ N/sq.m. (In that Introduction Part 1, I explained why I admire his estimates – they seemed relatable to some special realities even today, some still relevant 'memorable markers'!)

(Optional: I consider Newton to likely be the greatest 'Physicist' to this day. I do not object to those who consider Einstein to be the greatest Theoretical Physicist. But Newton was also a great inventor, mathematics pioneer, experimentalist, and even speculator, much of which is evident in his work, 'Opticks'. Many consider his Opticks to be an even greater achievement than his foundational work, 'Principia'.)

Summary of Article

Basically, my 'Abstract', that I began my article with -- can also serves as an adequate 'Summary' of my article, (as often my practice.)

Historically, over time -- humans have generally discovered greater and greater magnitudes associated with the Universe's characteristics. And I believe the pressure of ether is (10^{34}) N/sq.m, which is naturally also ether's energy per volume, (10^{34}) J/cu.m. And that that also serves as an example of the progression of increasing magnitudes. I.e., far higher than the magnitudes earlier imagined.

When I contemplate that staggeringly high ether pressure all over the universe, I cannot avoid the humble feeling that my brain and body compositions are, in a sense, just 'minor players' or 'resultants', merely and mostly made possible by that high pressure. I.e., perhaps humans are "just a 'shell' with webs, chambers, mazes." But which, perhaps, provide a localized means for that 'super-powerful ether', and its whirling nature and other traits -- to 'weave-out' and display some of ether pressure's remarkable potentials and capabilities in. Thus, I believe, (as many readers likely have for some time), -- that most human evolution, life, feelings, and actions – are enabled by just slight variations or perturbations in this drastically high ethereal pressure (or energy/volume). And one can wonder, 'could it be that occasionally there arises an unusual high-pressure perturbation which still maintains a right amount of interaction with that (10^{34}) N/sq.m general ether pressure to give us 'the feeling & realization of consciousness'?

((It even seems possible that "light's speed may not be 'the fastest progression of action' in our universe" – that there may be a virtually hidden 'precursor-like' underlying structure for that progression. ((After all, I regard ether's pressure-to-its-density (ratio) to be roughly (10^{34}) N/sq.m / (10^{-20}) Kg/cu.m).)) And that the 'progression of action' in that underlying structure is

likely at a super-speed, (10^{27}) m per sec. So fast as to carry an aspect of its progression across the entire 'known' universe in about 1 second! I.e., that is – across the entire size of the universe based on what is thought to be visible with the best telescopes).))

Although my article is mainly about ether pressure, I also sometimes discuss in it -- ether density and related matters. And I stress Newton's thinking on all that, which was remarkable for his time, and perhaps some of it – for all ages.

("Newton may not have been 'a nice guy to know'. [6] But, I think, for his time, 'he did know a lot and that was nice'." I.e., including about the ether!) But, sadly, as my article stresses, I think that the later scientists of the 1800's mis-handled 'ether pressure', and thus caused the great Einstein's ($E=mc^2$) to be even more super-welcomed and more shocking than otherwise.

In my opinion, there exists in 'modern times', a great misunderstanding about 'light' and the Michelson-Morley 1887 experiment -- and its supposed 'proof' of ether's 'non-existence'. But that 'knotty problem' is too complex for me to 'untie', in this article. So I'll just say that, of course, Michelson and Morley believed in 'ether' until their deaths, in the 1930's and 1920's, respectively – quite through the 'prime-time' of Einstein and many others. And I think, (as Newton and many others thought then, and still many people believe), that the proposition 'that space is virtually empty', (or a 'glib equivalent' of that) would be a sad 'throw-back' to a an 'occult' (magical) view of the universe, somewhat 'akin' to a view that 'nothing causes something'.

Footnotes and References

[1]…Wikipedia, topic: 'Neutron Star'. (Note, regardless of my notes or references, readers, of course, should feel free to independently do their own further research or double-checking into anything I've written or concluded.)

[2]… Newton's Opticks 'Query 21'. (I'm reasonably confident that I've interpreted well enough for this paper -- some 'not-so-easy-to-interpret' writings by scientists of 'long' ago – into roughly accurate-enough 'terms', and modern 'units'. And I've used the 'm.k.s' units, etc., in this paper, 'm' for meter, 'Kg' for kilogram, 's' for second. (In that Query 21, Newton also gives his ether density comparisons, which I further interpret to give an estimate of his ether density estimate.) Often scientists, like Newton and others in those days, would not give a specific numerical value for their conclusion -- regarding 'magnitude', etc. But, instead, they made a relative comparison based on somewhat similar or analogous physical behavior for which numerical information was known, and etc. But I think, throughout my paper, that I've interpreted their writing well enough for this paper, although some people may have their own views, instead.

[3]…Wikipedia, topic: 'Solar Core' (for Pressure near the center of the Sun).
And Wikipedia, topic: 'Earth's inner core' (for Pressure near the center of the Earth).

[4] Semat, H., Introduction to Atomic and Nuclear Physics, Chapter 15, Fundamental Particles, (15-22), pg.536 , Holt, Rinehart and Winston, New York, 4th edit., 1962.

[5] Pressure and density estimates of all lesser-known Physicists than Newton, (which I tried to 'interpret from their works', calculate out' and express in 'modern terms' and units) – were also based on each of their major works, and readily 'surfable on the Internet'.

[6] Hawking, S., A Brief History of Time, Chapter 10 with its biological profiling of Newton, (Bantam Books, 1988)