

ABOUT THE AUTHOR AND SOME BACKGROUND REGARDING THE DEVELOPMENT OF THE IDEAS IN PAPER I

For starters I am an admirer of Einstein and it is clear to me that he had an unusual grasp of physics. I had served as a nuclear weapons technician in the US Air Force and to me his $E = mc^2$ equation was more than an abstract theory. I was also aware of his work on the photoelectric effect, which won him the Noble prize, and his work that provided the mathematical underpinnings for Brownian motion. I knew that he was not only the father of special relativity (SR) and general relativity (GR), but was one of the fathers of quantum mechanics as well. When I could not track his ideas I assumed that it was because I just did not know enough, which was in large part the truth.

I spent a couple of decades teaching himself the math of GR. Though I do not claim to be proficient in math I can track the math associated with the key ideas of GR including the development of the Schwarzschild solution and the Ricci tensor. I possess an extensive physics library and have studied the books in it intensely.

I am an old retired ranger and naturalist of the National Park Service, who hopes that the math and ideas presented in my papers will speak for themselves. And I have proposed an experimental to test my ideas. Let them stand or fall based on the experiment.

In this paper I will trace some history behind the development of The Entrained Spatial Medium Gravitational Sink Model (ESMGS) and discuss some philosophical and theoretical principles that I feel are important to adhere to in the search for truth. In this paper I shall from time to time refer to insights which have occurred to me and will hopefully be seen as insights by the reader.

However, in the late 1960s I read an article in a popular science or nature magazine in which a diagram depicted the rubber sheet analogy of how curved space causes the fictional force of gravity. In the diagram a bowling ball representing the sun causes a depression in a rubber sheet and a marble representing a planet veers toward the bowling ball as it rolls past because of the curvature of the sheet. From this one supposedly can see that gravity is not a true force but a fictional force resulting from inertia acting upon the curvature of space.

I have no problem with fictional forces, being familiar with two of them: Centrifugal force, which should really be called the centrifugal effect; and the Coriolis Effect. But two things suddenly became clear to me.

First the analogy used circular logic, using gravity to explain gravity. It was gravity that caused the bowling ball to cause a dimple in the rubber sheet and it was gravity that that caused the marble to veer toward the bowling ball. It was obvious to me the analogy was a demonstration of gravity and had no valid explanatory power as it violated one of the principle rules of logic in that it used a term to explain a term. Turn the rubber sheet on its side and the analogy falls a part. Now all analogies break down at some point, but this one collapses before it gets started. *My and hopefully the reader's first insight.*

Second even if the analogy is restricted to just the concept that somehow space could steer objects, one needs to explain how the space gets curved in the first place. I began to suspect that the curvature of space might be an *artifact* of the Riemannian mathematics associated with GR. Maybe gravity could be treated as if space – or more correctly spacetime – was curved, but an underlying truth was being masked by this paradigm. *A second insight related to the first.*

Still I want to be crystal clear about one thing. My goal has never been to refute General Relativity, but to gain a deeper insight and make a possible modification to an aspect of it. I saw my self as working from within and saw my spatial medium as being “Einstein space” in many respects. It was obvious to me that the space of relativity had properties in that it could warp (a form of movement) and steer light and matter.

Sometime in the late 1980’s or early 90’s, I expressed my feelings about curvature being an artifact of math to a PhD in astrophysics, Bill Sumner, who showed me the following quote from p147 of Steven Weinberg’s text *Gravity and Cosmology*:

".....At one time it was even hoped that the rest of physics could be brought into a geometric formulation, but this hope has met with disappointment, and the geometric interpretation of the theory of gravity has dwindled to a mere analogy, which lingers in our language like 'metric', 'affine connection' and 'curvature', but is not otherwise very useful....."

In the above text Weinberg uses the Principle of Equivalence of Gravitation and Inertia rather than Einstein’s geometrical approach as the basis for his work. I do a similar thing in mine.

About this time I also became aware of the Casimir effect in an article which noted that no one seemed to know what to do with it. This was before dark matter and dark energy and the apparent acceleration of the expansion of the universe came to be in vogue. I remember excitedly asserting to my wife that I darn well knew what to do with it. The Casimir effect is the name applied to the process in which two thin metal plates suspended in a vacuum are drawn together beyond what would be expected from gravitational attraction alone. It was obvious to me that after scientists removed all the matter and energy they could detect from a vacuum something real remained. To my mind the Casimir effect screams out, that a reality still exists to which we are electromagnetically blind. This reality underpins the physics we can “see.” *A third insight.*

Along with the rest of the world I once accepted that the Michelson-Morley experiment (MMX), by failing to detect the drift of the earth through the ether, proved that the concept of an ether (aether) was false. But what the MMX really failed to detect was a difference in the speed of light in two beams one moving in line with and the other perpendicular to the motion of the earth deep in the earth’s gravitational field.

I was also aware that both Newton and GR predicted that light obeys gravity. Indeed, solar experiments confirming GR's prediction that gravity bent light by twice the amount predicted by Newtonian physics as calculated by Soldner was one of the reasons why GR was embraced by the physics community.

I was also aware that the gravitational field of the earth was entrained. That is it is a creation of the earth and travels with it. Thus the matter and fabric of the rest of the universe reacts not only to the physical presence of the universe, but to its gravitational field as well. Moreover, it is clear that the effects of the earth's field are much more powerful near the surface of the earth than at remote distances. Thus light at the surface of the earth and thus deep in the earth's gravitational field might not reflect what happens at the margins of the field.

Since the MMX was performed on the surface of the earth and thus deep in the earth's gravitational field, it struck me that the MMX should not be able to detect the drift of the earth through any ether that might exist, or would barely be able to do so at best. Indeed, a tiny drift was detected, but assumed to be due to experimental error. *A fourth insight.*

So at this point:

- (1) I accepted that a reality to which we are electromagnetically blind existed and that it underpinned the physics we could see;
- (2) I felt that the curvature paradigm was most likely an artifact that masked underlying physics;
- (3) I was freed from the constraints of the MMX, without necessarily rejecting the constant speed of light due to changes in clock rates and rod lengths;
- (4) I accepted that the Cosmological redshift indicated that the universe was changing size;
- (5) I understood the principles behind "raisin bread cosmology";
- (6) I understood how the process geologist call "continental drift" operated and saw a parallel between it and raisin bread cosmology;
- (7) I understood how sinks such as low pressure weather systems operated;
- (8) Whereas Einstein did not explain inertia, I had an intuition that I could do so;
- (9) While in QED Richard Feynman stated, "...Gravitation is, so far, not understandable in terms of other phenomena," I felt that I might be able to do so.

So around 1992 I decided to see if I could develop a model of gravity that would produce curvature as an artifact and which would be compatible with the math of GR in most

respects. Using these principles I constructed created what is now Table A in Paper I and produced a model and posted it on the web, although I had not yet developed the math to support it.

At the same time I began to teach myself the math of GR. I never became a fluent mathematician, but I got so I could follow the calculations having to do with the advancement of the perihelion of Mercury, the double bending of light by a gravitational field, the Schwarzschild line element and the development of the Ricci tensor.

I was delighted when it was called to my attention by Jim Ogle that Newton had posited in a 1675 letter to Oldenburg, the Secretary of the Royal Society, and later to Robert Boyle, that gravity was the result of a *condensation causing a flow of an ether with a corresponding thinning of the ether density associated with the increased velocity of flow*. He also asserted that such a process was consistent with all his other work and Kepler's Laws of Motion. Now this agreed precisely with a key portion of my model.

I was also encouraged when I read on p127 of Einstein's book *Relativity* that while the deflection of light by a gravitational field is $4GM/R_0c^2$, "It may be added that according to the theory, half of this deflection is produced by the Newtonian field of attraction of the sun, and the other half by the geometrical modification ("curvature") of space caused by the sun." I realize that his math incorporates these halves into a whole, but the halves can still be identified.

Note two things: (1.) He posited that *two* processes were responsible for the deflection of light by the sun's gravitational field, each deflecting light by $2GM/R_0c^2$. (2.) The quotation marks around "curvature". My guess is that Einstein was more open to a richer explanation regarding how mass curves space than many current physicists.

In his book 1920 book *Space, Time & Gravitation*, which I did not read until 2009, Arthur Eddington, Einstein's great proponent, repeats the half and half assertion and further asserts that treating the gravitational field around a mass as a spatial density gradient was a valid way of viewing Einstein's curvature. He also asserts that this density gradient slows the velocity of light causing it slow towards the sun. The variation of light with position conforms with Einstein's 1916 assertion noted below. Frankly had I read Eddington early on, I probably would not have expended so much effort in my spare time studying GR, but I would have missed a possible key insight.

I was able to obtain copies of work by Johann Georg von Soldner. One was in German, which I had translated, and another was already translated. In 1801 using Newton's corpuscular theory of light, he calculated the deflection of light at half the value later predicted by GR. The mathematical processes which he used in 1801 were somewhat arcane, but from Einstein's comments, it is apparent that he too accepted this calculation. It is obvious that Soldner as had Newton before him anticipated gravitational lensing.

I also found the following written by Einstein:

(1) *The Principles of Relativity* by Dover Press contains a reprinted translation of a paper by Einstein (1907) in which he calculates the refraction of light in a gravitational field due to the effect of the differential velocities on the wave front of light and obtained the value $2GM/R_0c^2$ for the angle of deflection. I was able to use this calculation and to develop a similar simple calculation to replace Soldner's work as a part of my mathematical proof that the ESMGS model also provides for twice the bending of light.

(2) From p. 76 *Relativity* (1916): "A curvature of rays of light *can only take place when the velocity of propagation of light varies with position.*" (Italics added.) Einstein goes on to note that the constant velocity of light is restricted to special relativity i.e. absent a gravitational field.

I suspect that he was not aware of Newton's earlier proposals or he might have taken his theory in a slightly different direction, which might have made it easier for him to bridge to quantum mechanics. The Shapiro time delay supports this proposition. **I am proposing that this concept be re-examined and tested experimentally on the surface of the earth and in orbit with both light measurements being horizontal to the gravitational force.**

3). *The Principles of Relativity* p. 181: "An atom absorbs and emits light of a frequency which is *dependent on the potential of the gravitational field in which it is situated.*" (Italics added.) I believe many theorists believe that the same relationship holds for stages of the expansion of the universe.

(4) In his book *Relativity* (December, 1916) and in a 1920 lecture he asserts that there must be a medium or an ether which does not violate Special Relativity, in order for light and forces to propagate.

In my opinion with General Relativity Einstein in effect *renamed that medium, fabric, or ether "space"*. It also seems to me that the postulated Higg's field, discussed below, and dynamic vacuum of modern physics and similar concepts such as quintessence are also "ethers" under different names and that the Casimir effect and possibly dark matter and dark energy are reflective of a real spatial substratum with properties. *A fifth insight.*

At any rate, I was beginning to see a way that the ideas of Newton and Einstein could complement each other. This feeling was repeatedly confirmed as I became aware of the following.

Robert Kirkwood showed some fifty years ago that a flowing ether model yielded the *Schwarzschild line element* in Einstein's theory. Herbert Ives had done the same thing several years earlier. More recently, Tom Martin of the Gravity Research Institute, Boulder, Colorado has done so for a model based upon spatial flow of a physical substrate.

These three papers are important because it is generally accepted that *any theory which produces the Schwarzschild line element will produce the same results as General Relativity* for the key tests of General Relativity: Perihelion advance; Time delay in radar soundings; Geodesic effect; The gravitational redshift; and Bending of light.

I also became aware of two more important works.

Petr Beckmann in his book *Einstein Plus Two* provides calculations demonstrating an electromagnetic inertia above and beyond gravitational inertia based on an accelerating charge experiencing a portion of its own field. Amazingly, he failed to recognize the applicability of this concept to gravitational inertia, but I did as I was trying to say the same thing in a much more complicated way. I am in debt to Beckmann for *this sixth insight*.

A July 2000 Scientific American article by Chris Llewellyn Smith notes the failure of quantum mechanics to provide a mechanism to generate the observed masses of particles, but he observes that physicists believe that the Higg's field plays a role. "*The stronger a particle interacts with the field the more massive it is.*" His series of graphics and associated text resemble the mechanism for mass described in the ESMGS model.

Maxwell posited the need for an ether to provide a medium, which he called the electromagnetic field, through which electromagnetism could propagate. It seems reasonable if a medium is necessary for light propagation that any *thinning* of the medium would slow the propagation of light. *Thus light should bend toward the thinner spatial medium* (Contrary to the behavior of light in air and similar to that of sound in water or air). A *seventh insight*

This insight was important as it led to a synthesis between the gravitational field as envisioned by Newton and Einstein's proposition that the speed of light varied with position in a gravitational field. Newton – or at least Soldner - had overlooked that Newton's thinning of the inflowing ether would create a density gradient which could later provide a basis for Einstein's variation in the speed of light with position and Einstein was most likely unaware of Newton's ideas. I was able to show mathematically that in combination *these two ideas led to a successful calculation of the double bending of light by a gravitational field*.

Raisin Bread Cosmology has the expansion of space cause the Hubble redshift and passively carry galaxies apart. In Friedmann universes the permittivity of the vacuum also varies with expansion. It occurred to me that a variation of in the density of the fabric of space and *the speed of light* are also implied. Further, I realized that the variation in the speed of light due to expansion is tied to the same processes as is the variation of the speed of light with position in a gravitational field. *An eighth insight, which has profound implications for the flatness and horizon problems. This is why I*

consider the test of Einstein's early proposition that light varies with position in a gravitational field so important.

Along the way as I was doing the calculations I realized that the velocity redshift and the gravitational redshift are tied to the same underlying processes based on a concept that I call timeliness. Indeed I regard the gravitational redshift as a special instance of the velocity redshift. A *ninth insight*.

The timeliness analysis and mathematics drove me to the surprising and more speculative conclusion that rod lengths may lengthen with increased velocity. It turns out that Paul Marmet in his book *Einstein's Theory of Relativity Versus Classical Mechanics* had come to the same conclusion by an entirely different line of reasoning. It was in print before I had my insight and it almost certainly planted a seed in my subconscious.

A tenth insight was why they do so. We both assert that the cause could be tied to Bohr radius type processes, even though I recognized that it is most likely absorption and emission by particles such as electrons that underlay the processes. However, Marmet gets there by applying a correction to the Planck parameter en route, while I initially just attributed it to timeliness issues having to do with the relative relationship between the forward velocity of the atom to electron orbital processes, to which he did not respond warmly.

As I developed my math further I tied the increased Bohr radius to changes in the *effective* permittivity of the vacuum associated with the changed velocity of the atom. This reasoning is consistent not only with the timeliness issue, but with the proposition that processes associated with an accelerating an atom, gravity and the expansion of the universe can all be tied to common underlying causes. For example, changes in the speed of light with expansion can be tied to changes in the permittivity of Friedmann universes.

I had already come to the conclusion that the universe is a self contained whole which serves as its own ultimate reference frame. In many respects General Relativity seems to subscribe to this same view. But I am in debt to Paul Marmet for distinguishing between clock rates and time per se. To me Father Time can be equated with the states of expansion of the universe.

Now it is time for me to return to the very beginning of my efforts and speak a little of the work of two other fellows, Steven Rado and Henry Lindner, who discovered my initial postings on this home page and batted around a number of ideas with me during my early days. Like me they are not physicists by training and so our early discussions were not overly sophisticated. But they forced me to challenge some of my early ideas for which I am deeply appreciative.

Henry Lindner asserts that both my model and GR are really ether models, which is what lead me to assert that GR renames the ether space. His model is an ether sink model, which is close to my early model in a number of respects. As I have done, he equates his ether with "space" in the sense that Einstein uses the term. However, his ether does not

posses "momentum", a concept which is crucial to the spatial medium in my model. His ether is cellular in nature, reminding me somewhat of quantum loops. His ideas regarding how black holes operate are similar to mine. His home page is A THEORY OF THE ETHERIAL SPACE OF NEWTON AND EINSTEIN
<http://ourworld.compuserve.com/homepages/hlindner1/>

Steven Rado has a home page and a book *Aethro Kenematics*. In both he uses the terminology sink vortex. I agree with the sink part of his concept, but most definitely not the vortex aspect as he applies it to gravity. He built his model on the assumption that an ideal gas is a good analogy for an ether. In this respect his theory has something in common with Tachyon theory or the C gravitons of van Flandern and some string theories. His model overlaps the early version of my model in a number of respects and his use of vortices seems to be more readily applicable to electromagnetism. He does not accept a number of concepts which I feel are reasonable, including the validity of the Hubble redshift, the big bang, and Alain Aspect's ideas. Surprisingly he does not like Bohm's ideas, though he himself presents ideas which are very close to Bohm's. But he has some interesting insights which are consistent with the work of several modern physicists. I especially like his analysis of the minimum dimensions of space, and of the uncertainty principal. His home page is <http://www.westworld.com/~rado/>

One problem with the ideal gas type models is that they require a "locked room" in order to function. Without it the universe would expand forever and eventually dissipate to a state where all energy is smoothly distributed. Of course, this is what some theorists think might be happening. An ideal gas model could also work if the observable universe was part of a self contained megaverse, with sun spots serving as an analogy.

But it seems to me that at some scale the universe or any megaverse needs to have a fabric or field with restoring power to hold it together. Lindner's cells, quantum loops and some string theories seem to provide this.

One reason I look for a restoring force is that I see the universe - or megaverse - as an eternal, but finite self contained entity "sitting in a void". This is in spite of my acceptance of an apparently expanding universe.

I do not spell out the nature of that spatial fabric other than to equate it with Einstein's "space" and Newton's ether. The reason is that I suspect that "space" is more complex than conventional wisdom assumes. It could encompass any or all of the following: Rado's ideal gas, Linder's cells, quantum loops, strings, or something not thought of to date. I also think that the apparent need for some theorists to resort to extra dimensions in their effort to unify gravity and the quantum forces suggests that the spatial medium may consist of more than one fabric, field, substance, or operating principle.

I especially want to acknowledge the encouragement I received from Dr. Bill Sumner during my early days. He encouraged me to learn the math, even though I told him I was too old. He stated even if in the end I was not correct, that I was on the playing field and that it would be a mistake for me not to pursue my ideas.

I should note that he has published a paper in the *Astrophysical Journal*, vol 429, no 2, part 1 1994 July 10 *On the Variation of Vacuum Permittivity in Freidmann Universes* in which he argues that expansion of the universe causes a change of the ability of atoms to emit and absorb photons which is twice the amount as the change in wavelength for a photon existing in space. In effect he argues that the ruler changes twice as fast as the item being measured with the result that expansion should cause a Hubble blueshift to be measured. Thus, if he is correct, a Hubble redshift implies that contraction is presently occurring. The physics community has not rushed to accept this line of reasoning, though his math seems good.

I have to admit a collapsing universe would be consistent with a recycling one. Also an increasing rate of collapse with time is more easily comprehended than an increasing rate of expansion. If true, the universe would have to be older than present estimates and have been much larger at one time than it is now. Given that there is an error on the order of 10^{55} in values associated with present vacuum energy calculations, this paper may be worth a second look.

In the book *Surely your Joking, Mr. Feynman* he speaks of large crowds turning out at his guest lectures just to hear a Noble prize winner. The problem was that most did not have the background to understand what he was talking about. On one occasion when asked to give a lecture to a physics club, he arranged to have posters made with what he called the “dull name” of Professor Henry Warren from the University of Washington announced as the lecturer. Now even though my name is Henry Warren I don't regard myself as dull. Not only that I am handsome.

Just to prove that point I am going bare my soul and reveal a nightmare – I mean a dream – in which I had a conversation with Einstein. Handsome is of course me.

Handsome: Wake up old fellow.

Einstein: You spooked me!

Handsome: I have a bone to pick with you regarding your bowling ball-rubber sheet gravitational analogy.

Einstein: Man are you warped!

Handsome: Be nice! But if we're going to engage in name calling, I'm gone call your analogy "The Space Blanket Model", because I think it's kinda far out.

Einstein: Go crawl in a black hole.

Handsome: Not until I've made my point.

Einstein: Speaking of points, you're the closest thing to a singularity I've seen in a long time.

Handsome: Gothcha, but your analogy is based on circular logic in that it uses gravity to explain gravity. It is gravity that dimples the space blanket in the first place.

Einstein: You've missed my point, namely, that like the blanket, warped space steers other balls that are passively obeying the law of inertia as they approach the bowling ball. In other words, just like the Coriolis force and the centrifugal force, gravity is only an apparent force - an expression of inertia.

Handsome: I'll come back to apparent forces later, but I humbly point out that if you remove gravitation, the space blanket is not going to steer anything. It is the pull of gravity - not inertia that causes the other balls to veer. If you took your model into gravity free outer space there would be no dimpling of the blanket and no veering of other balls. Your model is **not** an analogy of how gravitation works, it is a **demonstration** of gravity in action. Why not dump a ton of bricks on a bug on a rainy day and watch water drain into the depression and drown the poor ol' trapped bug and claim that as an insight for how gravity works. Of course, that plainly shows that gravity works by breaking, crushing or drowning things.

Einstein: Come on get real! The model is not supposed to be an explanation of gravity. Its purpose is to help students visualize how gravitation is really an indirect force caused by the warping of space. I could devise a model that uses electromagnetic attraction or magnets to dimple the blanket in free space and get the same result.

Handsome: But that's the point. The bottom line here is that **it takes a real force** to dimple the blanket. Besides, no one can imagine three dimensional warped space and I suspect that the problem lies not with people's imaginations, but your analogy.

Einstein: Go away and let me rest in peace!

Handsome: I beg your pardon, but I think you have begged an important issue. I insist that gravity has both active and passive components. In the space blanket model the active component is the dimpling of the blanket and the passive component is the inertial veering of the other balls toward the bowling ball. You never explain the active component: how or why mass warps space.

Einstein: I beg you to leave.

Handsome: Since you brought it up, let's get back to apparent forces for a moment. The formula for centrifugal force is $F = mv^2/r$ and that for the Coriolis force is $F = 2mvw$. Both of these are useful "as if" formulas, but neither describes reality. My point is that math is a language and like any language it is useful, especially for describing operational relationships between stuff. But like with any language, if you push things too far, you can get disconnected from reality. In other words, just describing a pink elephant doesn't obligate nature to provide one. It is my belief that some of your math describes pink elephants, but you're looking kinda tired so I won't belabor the point now.

Einstein: Man, I'm dead. Are you through?

Handsome: In a minute. I just wanted you to know that *the space blanket analogy is a false comforter* and that the Entrained Spatial Medium Gravitational Sink Model does a better job of explaining gravity and inertia. So according to Ockham's razor it ought to replace portions of General Relativity. Besides I know that you put "curvature" in quotes on at least one occasion and that you felt that the deflection of light was due to two processes. Did you know that Newton felt that gravity involved two processes? I suspect that Newton, you and I are not too far apart.

Einstein: Ockham smok'em!

The development of the ESMGS model has evolved over a number of years. Along the way I have looked for and absorbed insights wherever I could find them, always ready to modify or drop the model completely. I have studied main stream physics extensively, but I found that they were frequently doctrinal, sometimes superstitious, and that trying to pin some of them down was like "nailing jello to the wall." Sometimes I also accepted ideas from those who were not in the main stream.

I have no illusions that someone like me without a PhD in Physics can get his ideas tested based on their own merits. However I am hoping that given the difficulty reconciling gravity and quantum mechanics, **someone will see the merit of testing whether the early idea that Einstein had regarding the speed of light varying with position or his later judgment is correct.**

In the meantime I'll behave like the old retired chief naturalist that I am and get back to the birds and bees.

Henry Warren 928 Benjamin St., Port Angeles, WA 98362 Ph 360-457-7610

E mail hcwarren@olypen.com