

Hydrocosmica

or

Fool on the Hill, redux

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Abstract

A fundamental assumption, that basic electric charge is an inherent property of elementary particles, is overturned. Therefore, if basic charge does not come from within, it could only come from without. Hence we re-introduce the aether and show how it is responsible not only for electromagnetism, but also how its flowing nature is responsible for gravitational effects. Inertia, light propagation, and the large scale structure of the cosmos also fall out simply and naturally from this basic concept. A great deal of pruning is done to current theories.

How is it that the sky feeds the stars?
...Lucretius...

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The Starry Night
...Vincent van Gogh...

Prologue

A theory is the more impressive the greater the simplicity of its premises is, the more different kinds of things it relates, and the more extended is its area of applicability.

...Albert Einstein...

Let's try a simple yet profound thought experiment.

Basic electric charge—the positive charge on the proton and the negative charge on the electron—is assumed to be an inherent property of the particle; to come from *within*.

Let us imagine that this oh so very basic assumption, which could be argued smacks of perpetual motion, is incorrect. The very term “charged particle” implies that something *has been done* to *charge* the particle. An electric charge seems, like say, life, or fire, to be more of the nature of an *action* or a *process*—a continuous *happening*—than of a *thing*.

So let us, in our imagination, turn this situation inside-out and assume that if the cause of charge does not come from *within*, the only place left for it to come from is *without*.

Now let us take this new assumption—that charge requires a cause and that the cause comes from without—and, using deductive logic, see what kind of universe we can create.

This shouldn't be too hard because in most circumstances there will be only one viable option. Such as: how does energy go from being *without* to being *within*? What is the transport mechanism? The only way that seems to make any sense is for the energy to *flow* into particles. Thus, an aggregation of many particles, such as a planet, would induce a corresponding aggregation of this flowing medium.

But then what makes this hypothetical medium *flow*? Is it being *pulled* in by the particle? Is it being *pushed* into the particle by outside forces? Is it a complementary action, sort of a chicken/egg conundrum? Could it be that this aethereal medium is forced to flow because it is under pressure?

What sort of phenomenon could induce all of space (for indeed, this medium could be nothing other than space itself) to be under pressure? What could power this “aether-flux”? Heat? Yes, but what could cause this heat? It would have to be evenly distributed throughout all space. What sort of energy is evenly distributed throughout all of space? Radiant energy. The current view of radiant energy (photons or light quanta) is that it propagates *forever* with no attenuation of energy. This also smacks of perpetual motion, and leads straight into that minefield of differing opin-

Prologue

ions about the cause of spectroscopic redshift, receding galaxies, the expanding universe, the big bang, dark matter and dark energy.

However, if we assume that light continuously loses an infinitesimal amount of energy as it propagates, that *lost* energy could be accounted for in *heating* space, causing it to be pressurized, and forcing it to *flow*. This would, in a single stroke, immeasurably simplify our conception of the universe.

I hope the reader realizes the difficulty of presenting such a *spatial* idea in the linear form required by words and sentences. Let's recapitulate our thought experiment and see where we are in this through-the-looking-glass world we're imagining.

It seems as though what we have done is set up a self-perpetuating cycle of energy transfer and transformation. Energy—in its most elemental form (aether)—flows into elementary particles (protons and electrons) endowing them with mass (concentrated energy), and conferring upon them what we call “reality.”

Stars fuse protons together, liberating energy in the form of photons, which then radiate out into space, heating and pressurizing it, causing it to flow to where the demand is (matter). That's the big picture. It doesn't sound so far-out or crazy that we wouldn't want to tease out some of the details, such as:

Could we detect this aether-flux? Could the inflowing aethereal medium mimic gravity? Would the equations used to describe this flowing medium resemble those of hydrodynamics?

What about electromagnetism? Is the fluid of two types, one for each polarity? Could the forced separation of the normally neutral medium be the source of electric and magnetic fields?

What about inertia? If matter were conjoined to a field flowing in radially from all directions, what would happen to the flow pattern if the matter was accelerated?

Would we gain a different perspective on the large scale structure of the cosmos?

Please read on, but if you do, I suggest that the first time you read this you should just breeze through it from beginning to end, without getting hung up on this or that detail. This is a huge subject, and there are sure to be some mistakes and contradictions. So put your prejudices aside for an hour or two, read through it like it was a novel, and try to get a grasp of the big picture before starting in on the details.

I didn't even try to write this like it was for a scientific journal or something. In other words, it's not entirely boring. There's even some pretty pictures and a lame attempt at humor occasionally.

Gravity

Everything flows.

…Hericlitus…

What we need is imagination. We have to find a new view of the world.

…Richard Feynman…

Nothing can be created out of nothing.

…Lucretius…

Something flowing *into* the Earth. That may seem absurd at first blush, but again, it's just looking at something familiar from a different point of view. Hold your arm out from your body; you can't tell if it's being pulled down or pushed down. And no, that doesn't mean that gravity is repulsive instead of attractive. It is neither, and it is not mysterious. It's a simple matter of hydrodynamics.

All space, including the inside of stars and planets, of you and me, is filled with an aethereal medium possessing the following attributes: it is invisible, obviously; in action it behaves exactly like the hypothetical “perfect fluid” in an hydrodynamics textbook, namely, it is incompressible and non-viscous (frictionless). What it *is*, is a perfectly neutral blend of pure energy—positive and negative—at least when not in the presence of lone charged particles.

Light—and the rest of the electromagnetic spectrum, from gamma rays to radio waves, as well as neutrinos—has to pay a toll to propagate through the medium. Light waves push on the medium—the medium pushes back. This is the common action of oscillation—the trading of kinetic energy for potential energy for kinetic energy and so on. Think pendulum. But a pendulum, because of friction, needs a tiny little push each period or it stops. Exactly how this works with light we'll discuss in chapter three, but for now, consider that light continuously loses an infinitesimal amount of energy as it travels. This energy is transferred to, or absorbed by, the medium, all through space, all the time, in effect, *pressurizing*, or *heating*, space (aether*).

* We'll be using several different terms to describe the aether, but never ether. It's too easy to confuse with the chemical.

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Okay, so we have a whole universe full of pressurized energy. Obviously this sea of energy has to *go* somewhere or the pressure would just build and build. Luckily there is a demand, a destination—charged particles. Protons and electrons (a neutron is considered a proton-electron combination). They require a *constant* input of energy. By now the big picture should be coming into view. Radiant energy pressurizes space (aether); space *flows* into massive bodies (matter). Matter, in the form of stars, then create more radiant energy. It's naturally simple; a cosmic cycle of supply and demand. What we call dark energy, dark matter, and dark flow are all just misapprehensions of the cosmic flow of energy, as will be seen later.

So how do massive bodies *attract*? If you're a physicist or otherwise familiar with hydrodynamics you may already see what I'm getting at. Let's start with the Sun, since it's the "big dog," or gravitational *anchor* in our local part of the galaxy. The gravitational field of any body is the product of its density and size, or *mass*. Mass is equal to the number of charged particles—protons and electrons—in any form: molecules; atoms; ions; plasma; neutrons. They all require a constant input of energy. Think of the Sun as (most people have trouble with this) a three-dimensional *hole* in space, what the textbooks call a "sink,"* into which our aethereal fluid *flows* and disappears. "Annihilate" is the textbook term. Except it doesn't *disappear*—since it is already invisible, it *appears*—it transforms (energy has many guises) into the whirling, vibrating, *action* of submicroscopic phenomena, or matter ($e/c^2 = m$). It's like the Sun was being continuously, perpetually, *re-created*. You and me too. Put your arm back out there, and this time imagine the invisible energy streaming down *through* your arm, in effect continuously *re-creating* it.

That may seem weird, or even spooky, but it's explainable, quite unlike the traditional mysterious force emanating from the center of the Earth and supposedly "pulling" on your arm like some sort of tractor beam (action-at-a-distance). At this point I should remind the reader, who may be wondering how the energy stream could flow *through* solid things, that things only *appear* to be solid. There is space between atoms, and the atom itself is over 99% empty space. If an atom were the size of Yankee Stadium, a baseball would represent the size of the nucleus. The electrons are irrelevant. And so the aethereal medium heads straight for the center of a star or planet, "servicing" all the charged particles along the way, till it peters out at the very center, where, of course, there is no gravitational force. The center is the anchor. The pressure of space is the same here as anywhere in the universe, but the velocity of the medium is zero. This is the origin of radius, and all math having to do with gravity begins here.

But back to the Sun and his gravitational field. In keeping with the doctrine of simplicity—of which nature must surely abide—we're only going to use two formulas to describe the basics, the substrate, of reality, and they are both simple. The first is the inverse square law, $1/r^2$, or, the gravitational force diminishes inversely with the square of the distance. This is the kernel of Newton's law of gravitation. Let's use the Earth as an example. The radius of the Earth is about 4,000 miles.† On the surface of the Earth, radius 1, the full force of gravity is felt. At radius 2, 4,000 miles above the Earth's surface and 8,000 miles from its center, the force of gravity is diminished to $1/2^2$, or $1/4$ of the force at the surface, radius 1. At radius 3, 12,000 miles from the

* Actually the Sun is both a sink and a source, since it radiates energy. It nets out as a source.

† Here we are using American (aka archaic) units to simplify the example. 4,000 miles is a nice round number. Mostly we'll be using MKS units (meter, kilogram, second).

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Earth's center, gravitational force is $1/3^2$, or $1/9$ that on the surface. And so on: $1/16$, $1/25$, $1/36$, $1/49$.

This law is ubiquitous in nature. Starlight falls off according to the inverse square, as does the light from a light bulb. The electric force surrounding a charged particle follows the inverse square law. Ditto magnetic force. It seems anything flowing into or out of a spherical body is constrained by nature to obey this universal principle. It's a simple function of geometry. It's baked into the cake.

The second formula is called the "equation of continuity." This is the fundamental equation of hydrodynamics (the science of fluid motion), $A \cdot V = \text{constant}$; where A stands for area, such as a cross-section of a pipe, tank, valve, etc, through which fluid flows. V stands for the velocity of the fluid. Say we have a pipe with fluid flowing through it under a constant pressure: the formula states that if the pipe gets narrower (smaller cross-sectional area), the fluid has to go faster (more velocity). If the pipe gets bigger, less velocity. A common example of this principle is putting your thumb over the end of a garden hose to make the water shoot out with more velocity.

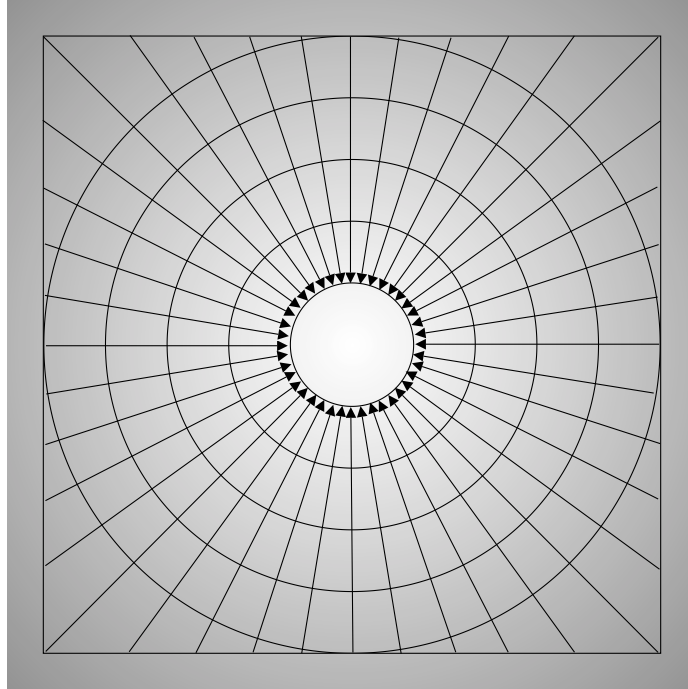
Let's review some other hydrodynamic basics before continuing. This is important, as the theory implies that the whole universe functions according to the laws of hydrodynamics. Imagine a huge aquarium with nothing in it but water and a 1 meter diameter sphere possessing a buoyancy that allows it to just hang somewhere around the middle of the tank. Pressure anywhere on the sphere is equal, and normal* to the surface. Actually, a cube, or any shape object will exhibit these characteristics. We're using a sphere because planets and stars are spherical, and because hydrodynamical equations work perfectly only for spheres. Now let's introduce an identical sphere, suspended in the water a few meters from the first one. Both spheres are made of a porous material, say, ceramic or something. Also they each have a thin, flexible tube leading from the center of each sphere to a pump outside the tank, which can suck water through the porous spheres, through the tubes and pump and back into the tank. The set-up thus represents two equal bodies floating in space. Except for the tubes of course.

We turn on the pump, and the spheres start sucking in water evenly all around them. Now, since the spheres are only a few meters apart, and water can only move so fast, they're going to be *competing* for the water in-between them, resulting in a situation analogous to a zone of *low pressure* between them, but which is actually a lower fluid *velocity* at the respective *between* surfaces. The upshot is that the *normal* pressure acting upon each sphere on the side opposite the low velocity region *pushes* the two spheres together, simulating gravitational "attraction."

Again, back to the Sun. Imagine, in space, concentric with the Sun, at radius 2, a spherical shell. This shell will represent the cross-sectional "area," not of a pipe of course, but through which, nevertheless, our aethereal medium will flow, inward toward the solar *drain*, or *sink*. Imagine also a spherical shell at radius 3, 4, and 5.

* In the jargon of science, normal means perpendicular or at right angles to.

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cross-section of Sun with four imaginary spherical shells

Like so. That should be enough. Now we put our two simple formulas to work. This is also important for our theory. We're about to prove that an incompressible, non-viscous fluid under constant pressure flows into a massive spherical body in exactly the *inverse* of the inverse square law, or, put another way, sort of a through-the-looking-glass view of gravity.

For simplicity we'll use, instead of the Sun, a unit sphere, with radius equal to 1. The formula for finding the area of the surface of a sphere is:

$$4\pi r^2 = \text{area} \quad \{1\}$$

Calculating for the five radii we get:

$$4\pi 1^2 = 12.56637m^2 \quad \{2\}$$

$$4\pi 2^2 = 50.26548m^2$$

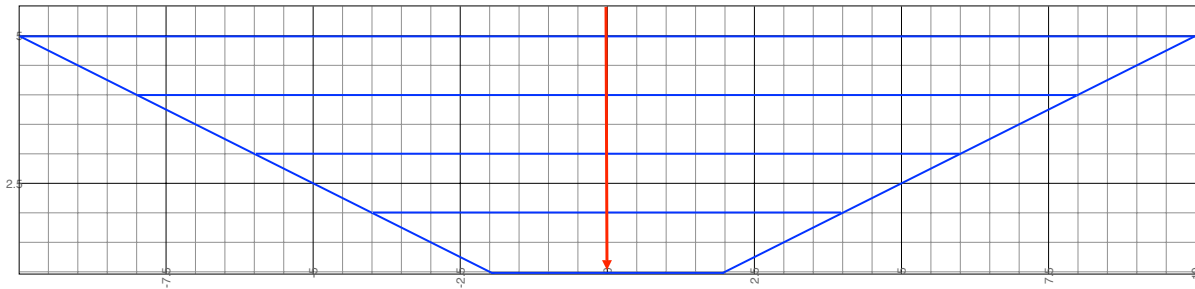
$$4\pi 3^2 = 113.09734m^2$$

$$4\pi 4^2 = 201.06193m^2$$

$$4\pi 5^2 = 314.15927m^2$$

Gravity

These are the areas, in square meters, of our five spheres, four imaginary and one (the surface) real, each separated by the distance of one radius, which in this case is simply 1. If you're having trouble imagining 3-dimensional flow into a sphere, another way to picture this is as a pipe, or better yet as a funnel, with each decreasing area representing a smaller diameter section of the pipe or funnel, with each section still separated by the distance of 1 radius. A cross-section of the funnel would be shaped like this:



$$4\pi r^2 = \text{area, sphere} \quad \pi r^2 = \text{area, circle}$$

$$\text{diameter, circle} = \text{diameter, sphere} \times 2$$

where each horizontal blue line represents the diameter of a circle with the same area as its spherical counterpart. The smallest one, at the very bottom, would be the surface of the body. The upper part would extend out toward infinity. This same shape would apply to the largest or smallest sphere. It's funny how a concept that seems so odd could resolve into such a simple geometric structure.

Now recall our simple equation: $A \cdot V = C$ (area \times velocity = constant). We know A , now we need V or C . Say we measure V on our unit sphere and it turns out to be 5000 m/s (meters per second). The actual number doesn't matter at this point, 5000 is just a nice round number. Next we multiply area times velocity:

{3}

<u>radius</u>	<u>area</u>	<u>x</u>	<u>velocity</u>	=	<u>constant</u>
1]	12.56637 m^2	x	$5,000 \text{ m/s}$	=	$62,831.85 \text{ m}^3/\text{s}$
2]	50.26548 m^2	x	$1,250 \text{ m/s}$	=	$62,831.85 \text{ m}^3/\text{s}$
3]	113.09734 m^2	x	555.6 m/s	=	$62,831.85 \text{ m}^3/\text{s}$
4]	201.06193 m^2	x	312.5 m/s	=	$62,831.85 \text{ m}^3/\text{s}$
5]	314.15927 m^2	x	200.0 m/s	=	$62,831.85 \text{ m}^3/\text{s}$

Velocity is obtained either by dividing the square of the relevant radius into the surface velocity, ($5,000 \div 4$; $5,000 \div 9$, etc.), or, once the constant is known, dividing the relevant area into that. If

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one uses a calculator and includes all the decimal places, the constant stays incredibly accurate. As you can see, the velocity diminishes according to the inverse square law when receding from the body. Conversely, we could say that the velocity *increases* when *approaching* the body in a manner the *inverse* of the inverse square law (square law?). That sounds confusing, but again, it's just looking at the same old thing from a different perspective. We're so used to thinking that anything to do with gravity originates *in* the Earth. Also, that constant represents a lot more than just a number. It's a measure of the *volumetric flow rate* of the medium—expressed as cubic meters per second in this example—flowing past *any* point in the body's gravitational field. More on this later.

At last we're back to where we wanted to be, and can now state, that what we presently call an increase or decrease in gravitational attraction, is in reality an increase or decrease in the velocity of the aethereal medium, flowing in accordance with the inverse square law and the equation of continuity. This is a significant fact. It means, among other things, that the universe could be imagined as a cosmic plumbing system, but with no pipes! A strange concept, truly, but there's the math to prove it.

All right then, now that we have a new picture of gravitation, we need some new words to describe it. Even though it sounds prosaic and mundane, it seems the best way to describe the former gravitational field is the term *drain field*. Ugh. This best fits the hydrodynamical nature of the phenomenon, although “sphere of influence” will also be used.

So, now let's insert the Earth into the Sun's *drain field* and see what happens. The Earth, of course, has its own sphere of influence, or drain field. It's the big dog, the gravitational anchor, in its own neighborhood, and has near total control of the Moon and all those artificial satellites. But the Earth's drain field is completely enclosed by the Sun's, and if it weren't moving, (orbiting), would get *pushed*—not pulled—straight into the Sun. Again, this is because the Earth and the Sun are both *competing* for the space (aether) in-between them, creating a zone of *apparent* low pressure there (actually less velocity). Hydrodynamic pressure then simply pushes the two bodies into this zone, with the less massive body doing most of the moving. The push doesn't actually occur at the surface of the body; it is diffused throughout the outer regions of the sphere of influence.

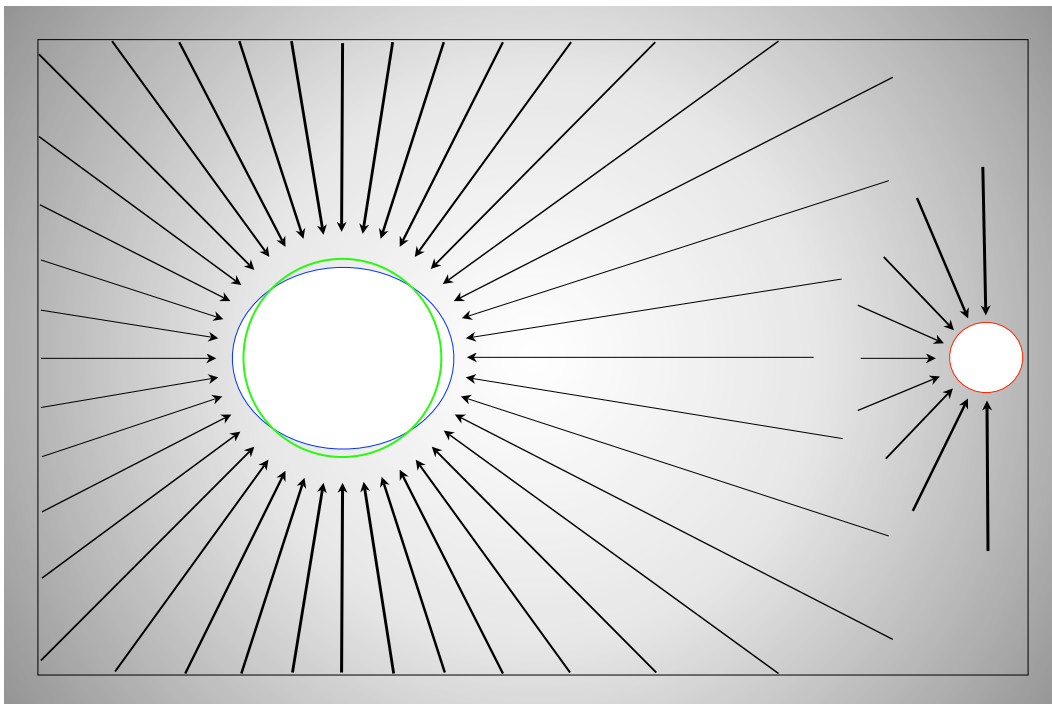
But of course the Earth is moving—orbiting—and so the Earth-Moon system and all the other planets are, in effect, “circling the drain.” Again, rather unpoetic, but eminently explicable in terms of causation due to contiguous actions. No mysterious action-at-a-distance. In fact, scientists fluent with hydrodynamics should have a field day with this new conception of the solar system, especially since these equations are made to work with a “perfect fluid,” heretofore hypothetical, and also with spherical bodies—sinks and sources. All the precepts of Newtonian gravity and general relativity should prove derivable by these means, including the precession of the perihelion of Mercury, the bending of starlight, and gravitational redshift.

We'll get into the cosmological implications in chapter four, but first there are a few more things to explore here in the solar system, such as the ocean tides. The most mysterious aspect of the tides is the equal and opposite tide on the side of the Earth not facing the Moon. It's not hard to imagine the oceans facing the Moon being *pulled* that way, but that opposite tide defies any common sense notions based on attraction. It seems like the Moon's gravity would be augment-

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ing that of the Earth, doing just the opposite of rising a tide. Centrifugal force is often thrown into the argument, only to confound the puzzle.

Hydrodynamically, however, the pieces start to fit. It's like this—the Moon and the Earth, both being *sinks*, or *drains*, are competing for the space, the aethereal medium, directly between them. Remember also that all space is under pressure. Here we introduce perhaps the most important concept of the fluid universe—the setting up and changing of *flow patterns*. As the Moon orbits the Earth, it is constantly *taking* a portion of space that otherwise would be making a bee-line for the center of the Earth, creating a constant *shortage* in a line connecting both planetary centers. The aethereal medium seeks, always, an equilibrium, but can only change so fast. Space has to move in from the sides to counteract the shortage, changing the flow patterns. Also realize that everywhere in space not near the bodies, say, outside of radius 4 or 5, the medium is flowing relatively slow. The zone of shortage, for both Earth and Moon, can be imagined as a “low pressure,” but is actually low fluid “velocity,” relative to normal. What the medium does, besides moving in from the sides—to equalize the discrepancy—is *diverge* at the antipode (opposite side), and shift the flow pattern slightly, all round the globe, *converging* at the zone of shortage, or low velocity. In other words a *lateral velocity gradient* is established. The inflow pattern is still radial, but the local flow rates will differ. The volumetric flow rate through any imaginary spherical shell, however, does *not* change. Overages and shortages have to cancel out. This means that the equatorial zone between the antipodal zones of low velocity will have a higher *average* aethereal velocity. This is where the *low* tides are occurring.

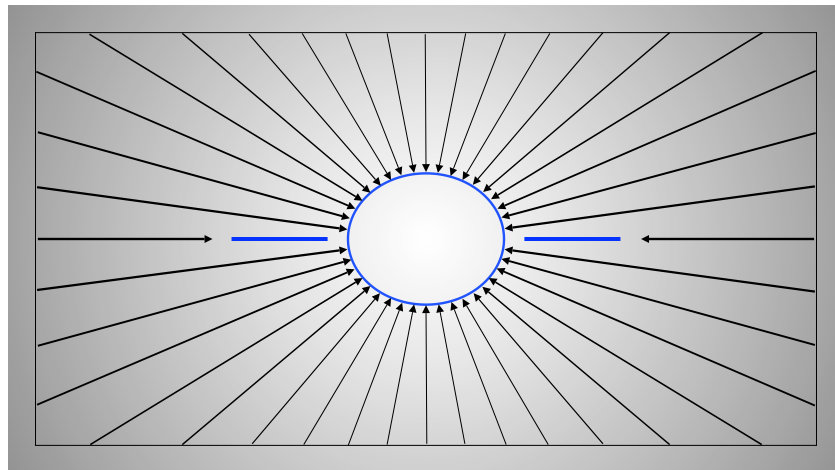


Earth-Moon system with exaggerated ocean tides (blue line)

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So the aether is doing all it can to equalize everything. It doesn't accomplish this feat entirely—it can't—but is able at least to equalize the antipodes. Thus a static pattern of flow is established, through which the Earth* blithely rotates. Now we have a shortage or reduced velocity on *both* sides of the planet.† The upshot is, then, the ocean tides, equal and opposite. Under the influence of less relative velocity, individual water molecules actually *weigh less*, temporarily, than normal. Lucky for the Earth that it is rotating. The poor Moon, showing always the same face to the Earth, has, over time, acquired a permanent bulge.

This antipodal equalizing effect has broader implications for the universe at large, but a fantastic local example is Saturn and its system of rings. Saturn is less dense than water. It is thought to have a solid core, but the rest of the planet is composed mostly of hydrogen and helium in a liquid and/or gaseous form. Because Saturn spins exceptionally fast—the rotation period is less than half an earth day—it bulges out at the equator, that is, it is oblate. All four gas giants are oblate and have rings, but Saturn, at 10%, is by far the most extreme example. Now, what all that extra mass at the equator does is cause a greater demand for energy (space) than at the polar regions, and space accommodates this demand by shifting the aethereal flow pattern. Here is our lateral velocity gradient at work again. The flow *diverges* gently, radially, away from an imaginary line drawn through the poles, and shifts, globally, evenly, toward the equatorial plane, where it encounters and *converges* with the energy flow displaced in like manner from the other hemisphere. This zone of convergence is, of course, where the rings are. The bulk of the shifting and flow pattern changing would take place out in space, at a fair distance from the planet, where the energy stream would be moving relatively slow. It would be all sorted out before it got near the surface and really started speeding up.



section view of Saturn with exaggerated lateral velocity gradient vectors

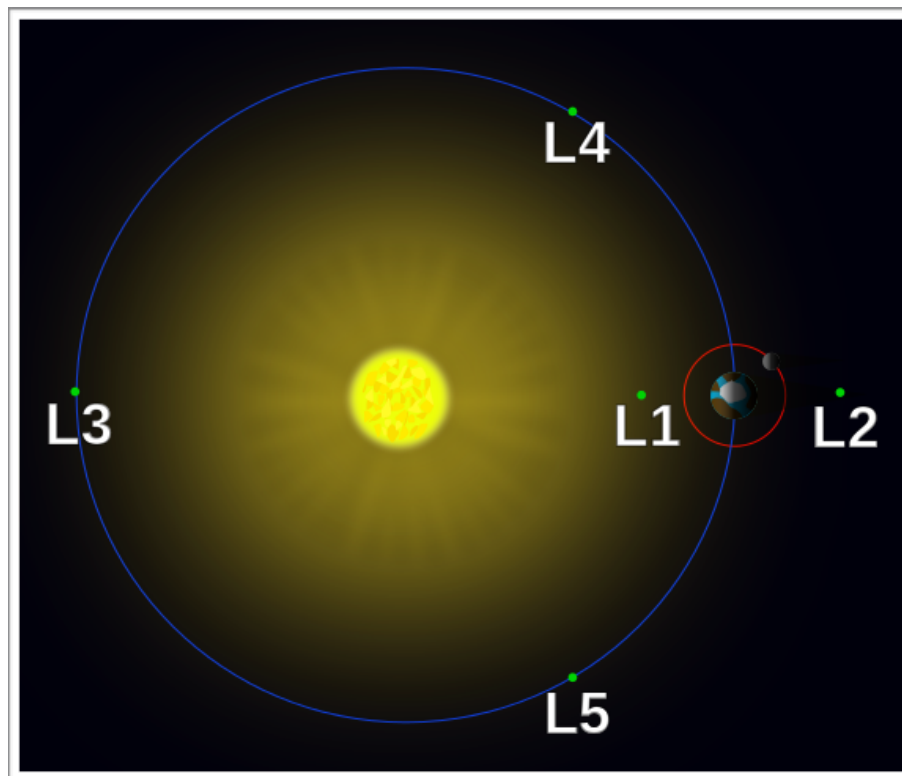
* A precision gravimeter situated at or near the equator would show a rough sine-wave pattern, with approximately two highs and two lows per day.

† This antipodal equalizing effect is a different phenomenon from that whereby the planets are pushed toward each other. The former is a local, interior action; the latter takes place in the outer regions of the sphere of influence.

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Saturn's rings are thought to be made up of remnants of a destroyed moon. Any small orbiting body would, given enough time, be constantly nudged toward the equatorial plane, there to encounter the equal and opposite flow displaced from the other pole, and become trapped. As the process continues, the ring itself would become a gravitational sink, accentuating the asymmetric flow pattern, and further stabilizing the ring system. Most of Saturn's moons are also in or near the ring plane, and the ones that aren't would probably get there eventually. It's hard to conceive of an attractive force, acting at a distance, that could have sculpted so exquisite a feature as these fragile rings.

Further examples of static, asymmetric flow patterns are the five Lagrangian points found in any two body system. There is a zone, on the Earth-Moon line, much closer to the Moon, where the respective drain fields are exactly equal, that is, the gravitational forces are equal. An object placed here would be hesitant as to which way to "fall," Earth or Moon. It's like a watershed, or, more in keeping with the flowing nature of space, an eddy in a stream. This is where the medium is flowing in from the sides—to alleviate discrepancies—and is itself momentarily at a loss as to which way to *flow*, and so there is a finite region where there actually is no flow relative to the bodies—a stagnation point. This zone, or point, is named L-1. L-2 and L-3 are at L-1's antipodes, and are less well defined.



Sun-Earth Lagrangian points (not to scale)

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The intriguing ones are L-4 and L-5. These zones are located on the ecliptic,* like the others, and orbit in lockstep with the orbiting body, but one leads the orbiting body and the other follows. In the case of Jupiter, L-4 and L-5 are huge, and have, over time, acquired a population of large asteroids—the so-called Greeks and Trojans—bobbing along in orbit around the Sun, trapped in their stagnation point rather like leaves caught in an eddy. This would be where Jupiter’s advancing and retreating sphere of influence matches, or equals, that of the Sun, creating something like a bow wave eddy out in front and a wake eddy in the rear. Again, it’s all about flow and flow patterns.

Let’s recapitulate: the gravitational “force” between two bodies only *appears* to be attractive, whereas the bodies are actually *pushed* toward one another because of the diminution of the energy sea between them. This will apply equally to planets, stars, galaxies, and neutral atoms. Lone charged particles are another matter, as we’ll see in the next chapter, where we unite gravity and electromagnetism.

this is from Newton’s *Opticks*

“query 21] Is not this medium much rarer within the dense bodies of the Sun, stars, planets, and comets, than in the empty celestial spaces between them? And in passing from them to great distances, doth it not grow denser and denser perpetually, and thereby cause the gravity of those great bodies *toward one another*, and of their parts toward the bodies; every body endeavoring to go from the denser parts of the medium toward the rarer? For if this medium be rarer within the Sun’s body than at its surface, and rarer there than at the hundredth part of an inch from its body, and rarer there than at the orb of Saturn, I see no reason why the increase of density should stop anywhere, and not rather be continued through all the distances from the Sun to Saturn, and beyond. And though this increase in density may at great distances be exceeding slow, yet if the elastic force of this medium be exceeding great, it may suffice to impel bodies from the denser parts of the medium to the rarer, with all that power which we call gravity.” (italics added)

Look how close Newton was to the truth about gravity. Where he says “more dense,” as in way out in space, I say “less velocity.” Where he says “less dense,” as in near massive bodies, I say “more velocity.” Where we also differ is in the medium’s elasticity. If it is incompressible, it is not elastic, at least not in the normal sense. If only he had known more about charged particles and electromagnetism, he would have figured all this out.

So, here we have Newton, in his later years, doing exactly what he said he would not do, namely, hypothesizing about the aether. Ernst Mach even politely castigated the long dead Sir Isaac for

* The ecliptic is the plane of the solar system where all the planets are.

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this turnabout, but at least the subject was still open for debate. Newton considered the notion of action-at-a-distance as absurd, and so was merely posing the question for future generations to contemplate, and contemplate they did, at least until about 100 years ago, when Einstein banished the aether from serious scientific consideration.

Let's take a quick look back at some of the ancient notions about the aether. 2500 years ago in Greece, the seat of western philosophical and scientific thought, there were but five elements: earth, air, water, fire, and a fifth element, belonging to the realm of the starry heavens, called *quintessence*—pure and essential—existing above and outside of the vulgarities of life on Earth. Aether was equated with perfection, with perfect sphericity of form and motion. Such were the views of Aristotle and his ilk. Lucretius and the other atomists argued for a more useful, practical version of the aether—which he termed “void,” to go along with his “first beginnings”—his atoms and molecules. But the church only allowed the world one prime-mover, and so an earthly aether was swept aside and the 2000 year reign of Aristotle's physics was assured. Other cultures equated quintessence with the mystical “One,” or God. Unknowable. All pervasive. The Tao.

The dark ages finally ended, and the aether resurrected, with the invention of the telescope and the tireless work of four men: Copernicus, Kepler, Galileo, and Newton. Resurrected, yes; accepted by all, no. Now begins a 400 year struggle—ending a century ago—between the need for an aethereal medium to explain light propagation, and the competing hypothesis of action-at-a-distance.

Enter Albert Michelson, the “Prince of Light.” Michelson, like most physicists of his time, firmly believed in the aether. How else could one explain the obvious wave nature of light, effects like interference and diffraction? *Something* had to be waving. Newton, however, with his theory of gravitation and corpuscular theory of light had, unfortunately, supplied evidence for the other camp. Also disputed was the relationship of the aether to celestial bodies. Was the aether just sitting *out there*, like Newton's absolute space, with the planets moving through it, or was a portion of it dragged along with the earth? Experiments were done by Fizeou and others, but with no definite conclusions.

Michelson believed he could measure the Earth's motion relative to the aether if he had a sensitive enough instrument, so he built the world's most precise measuring device of the time, his famous interferometer. This optical instrument sends light down perpendicular pathways and recombines the reflected rays into an interference pattern, from which can be deduced whether one ray traveled further than the other. It was a huge thing, built on a slab a granite floating in a pool of mercury so that it could be rotated smoothly in any direction. The experiment, conducted in 1887, failed (supposedly) to detect any earthly motion relative to the aether.

Even though many or most scientists continued to believe in an aether, the null result was a blow to aether theories in general. It's almost tragicomic to picture Michelson there, squinting through the eyepiece of his exquisite device as it slowly rotates, looking for the very thing that was *flowing down, through his body*, on its way to the center of the Earth. If only he could have pointed one of the arms up or down he might have gotten a different result.

It has been argued whether or not Einstein knew of Michelson's result when in 1905 he published his *special* theory of relativity. The upshot of the special theory is that the only thing constant and absolute in the universe is the speed of light; all else is relative to an observer's frame

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of reference. You've all seen those diagrams, explaining relativity, of boxes, or train cars, or platforms, moving *laterally* relative to one another at constant speed (inertial frames). And of course, with these restrictions—no gravity and no acceleration—all the math works out fine. But he didn't *have* to banish the aether, just because his *special* theory didn't need it. He could have left it as an open question. Poincaré, Heaviside and others continued to believe in the need for an aethereal medium through which light waves propagate, but they were old, and when they and their generation died off, the aether died with them.

This was a turning point in science of epic proportions, and has led to a century in which not only has physics made no progress, but has actually regressed, 1913 being about the high water mark. It was as if the floor had been pulled from under the feet of the whole physics community. Action-at-a-distance had won the day. Causality was provisional, and the path now beckoned into the realm of phairy tale physics. Maxwell would have been appalled. The main theme of Maxwell's comprehensive *Treatise on Electricity and Magnetism* was to show the necessity of a continuous medium through which forces act. He was an unapologetic advocate. He had a dog in the fight. But he was dead; dead at the age of 48 while editing the second edition of his great work. So, while physicists were happily romping in their new wonderland, creating expanding universes, big bangs, quantum jumps, and huge machines to breed more unicorns for the particle zoo, poor Einstein spent the latter part of his life trying to unite gravity and electromagnetism, a quest doomed from the outset without the aether. If physics in general has suffered from Einstein's banishment of the aether, Einstein himself has suffered more than any individual.

And now for a mathematical interlude—please hang in there—there's nothing arcane.

Earlier we saw how an incompressible, non-viscous aethereal medium flowing under constant pressure into a massive spherical body follows the inverse square law and the equation of continuity. For that example we just used arbitrary, general numbers. We'll now use actual figures to show how the gravitational effects *caused* by the flowing aether match those of the action-at-a-distance forces conventionally used, that is, the force of gravity between two massive bodies in newtons ($m \text{ kg/s}^2$), and the acceleration of an object due to gravity (m/s^2). This method more accurately reflects the hydrodynamic nature of the phenomenon we call gravity. All units are MKS (meter, kilogram, second).

Escape velocity is that required for a projectile launched ballistically from the surface of a body to completely escape the clutches of gravity, and is obtained using this equation:

$$\sqrt{\frac{2GM}{R}} = V_{\text{escape}} \quad \{4\}$$

Using the Earth as an example, $M = \text{mass} = 5.97 \times 10^{24} \text{ kg}$, $R = \text{radius} = 6\,378\,140 \text{ meters}$, $G = \text{the gravitational constant, } 6.67 \times 10^{-11} \text{ m}^3/\text{kg s}^2$, and yields a velocity, V_{escape} , of 11,180 m/s (meters per second).

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Terminal velocity is that attained by an object of any mass or shape falling to the surface from an infinite distance (neglecting atmospheric resistance), and is given by the formula:

{5}

$$\sqrt{2gR} = V_{terminal}$$

Again using the Earth, g = acceleration due to gravity, 9.8 m/s^2 , and yields a velocity of $11,180 \text{ m/s}$, exactly the same as escape velocity. According to the theory of the flowing universe, this is the velocity of the medium at, and normal to, the surface of the body, be it star, planet, event horizon, or neutral atom. In other words, I'm saying that there is actually *something* there—flowing—as opposed to a mysterious force acting at a distance. A body falling from an infinite distance (from a practical standpoint this is probably an idealization) would have been accelerated at the same rate as the medium, and would not have been *forced* to do so. It would merely be “going with the flow,” or following the path of least resistance, or obeying the principle of least energy. In terms of General Relativity it would be following a “geodesic.” To the object it would be no different than floating out in deep space.

There's another way to show this, using an equation that involves density and size (surface area), that gives a clearer picture of the demand and supply relationship. It's more 3-dimensional. It describes a sphere, or ball, of a certain size and a certain density, and gives the same velocity as the two equations above:

{6}

$$\sqrt{k\rho A} = \sqrt{\left(\frac{2}{3}G\right)\left(\frac{mass}{\frac{4}{3}\pi r^3}\right)(4\pi r^2)} = V_{surface}$$

I like to refer to this as the fundamental equation of gravity. All we need from here on is surface velocity and radius. We don't need G , and we don't need mass anymore once we have density. And a check on the units:

{6-b}

$$\sqrt{\frac{m^3}{kg \cdot s^2} \frac{kg}{m^3} \frac{m^2}{1}} = \frac{m}{s}$$

Since we'll be using the term $(2/3G)$ a lot and because it's so important, I've assigned a symbol, k , to represent it. As G itself is simply $2/3$ of a very small fraction of a unit, 10^{-11} (two-thirds of one ten-trillionth), or 6.67×10^{-11} , $2/3$ of G is therefore $2/3 \times 2/3$, or $(2/3)^2$, or $4/9$, with a value of 4.45×10^{-11} . In the same manner, $(2G)$ is just $2 \times 2/3$, or $4/3$ of 10^{-11} , and has a value of 1.334×10^{-10} . Gravity seems to express itself most naturally through an interplay of basic, simple ratios. The ratios are natural, the units, of course, are not.

So, here are 3 different versions of the constant, G . Let's see how else they are related. But first, there is an important ratio that needs to be defined. Let's call it the *aethereal flow ratio*. For the Earth:

{7}

$$\frac{V_s}{g} = \frac{11180}{9.8} = 1141_{earth}$$

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That is, the velocity of the medium divided by the acceleration of the medium at that point. This is the same as what's happening in the funnel from earlier in the chapter. This ratio is unique to each body, and is dependent on density and radius, or size, as in equation {6}. Like volumetric flow rate, this value does not change with distance from the body. It only changes when another gravitational field is encountered. So we have the density—*inside* the radius—representing demand, and we have the aethereal flow ratio—*outside* the radius—representing supply. Multiplying the density by the square of the flow ratio, we come up with *the* universal constant of gravity: {8}

$$\text{density} \times \text{flow ratio, Earth} = (5497)(1141^2) = 7.156 \times 10^9$$

Let's do Mercury:

$$(5433)(1148^2) = 7.160 \times 10^9$$

Jupiter:

$$(1240)(2403^2) = 7.160 \times 10^9$$

Mars:

$$(3909)(1353^2) = 7.156 \times 10^9$$

The Sun:

$$(1408)(2254^2) = 7.153 \times 10^9$$

And so on. It doesn't come out perfectly because planetary statistics are basically rounded off estimates. You can't "weigh" a planet directly. Mass is inferred from orbital mechanics. G is supposedly a laboratory measured constant, but is it really? First let's give our universal constant a symbol, say C . Now let's recast equation {6}: {13}

$$\sqrt{(\pi C)^{-1} \left(\frac{\text{mass}}{\frac{4}{3}\pi r^3} \right) (4\pi r^2)} = V_{\text{surface}}$$

Isn't that beautiful? A π in every term. This equation is a veritable cornucopia of information compared to the sterility of equation {4}. Where that equation contains only numbers, this one shows *things* and *relationships*. The relationship between π and the gravitational constant, C ; the relationship between mass and volume, revealing the density; the radius, twice; and finally an area to multiply by V_{surface} that gives the volumetric flow rate. Roundness and sphericity abound, just like in nature. And if we want the denominator of our flow ratio, or g , it's here too: {14}

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$$\frac{(\pi C)^{-1} \left(\frac{\text{mass}}{\frac{4}{3}\pi r^3} \right) (4\pi r^2)}{2r} = \frac{k\rho A}{2r} = \frac{V_s^2}{2r} = g$$

such that, for the Earth:

$$\frac{\sqrt{k\rho A}}{\frac{k\rho A}{2r}} = \frac{11180m/s}{9.8m/s^2} = 1141 \tag{15}$$

So just how does G relate to C ?

$$\frac{1}{(\frac{2}{3}\pi)C} = \frac{1}{(\frac{2}{3}\pi)(7157017739)} = 6.67 \times 10^{-11} = G \tag{16}$$

How about $2G$:

$$\frac{1}{(\frac{1}{3}\pi)C} = \frac{1}{(\frac{1}{3}\pi)(7157017739)} = 1.334 \times 10^{-10} = 2G \tag{17}$$

And how about $2/3 G$, the one we're calling k :

$$\frac{1}{(\frac{3}{3}\pi)C} = \frac{1}{\pi(7157017739)} = 4.45 \times 10^{-11} = k \tag{18}$$

Isn't that interesting? They're all related to C via π , and this last one appears to be the most fundamental. Let's see what else C is related to, but now let's round everything off by the same ratio as that of the true speed of light, 299792458, is to 300000000. This will allow us to more easily see the relationships of the various ratios. First we'll see where the true C comes from:

$$\frac{c}{\frac{1}{75}\pi} = \frac{299792458}{0.04188790205} = 7157017739 = C \tag{19}$$

And now the one we'll be using for awhile, the rounded version—these two aren't real equations because the units don't work, so we'll just call them relationships.

$$\frac{c}{\frac{1}{75}\pi} = \frac{300000000}{0.04188790205} = 7161972439 = C \tag{20}$$

Notice the $4/3 \pi$ in the denominator. C and π seem to have some kind of complimentary relationship. I'm assuming that C is irrational, but multiply any multiple of π by this number (the rounded version) and it *appears* to rationalize it. It's especially fond of multiples of 4π . What it actually does is introduce a long string of zeroes to the left of the decimal point, and usually a few to

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the right as well. As an example let's use the inverse of k (rounded version). The length of the string of zeroes to the right of the decimal point will depend on the calculator being used.

$$\pi C = 2.25 \times 10^{10} = 22500000000.00 = k^{-1} \quad \{21\}$$

and which, in keeping with the notion of ratios we could write:

$$\frac{9}{4} \times 10^{10} \quad \{21-b\}$$

The inverse of G is:

$$\frac{2}{3} \pi C = 1.5 \times 10^{10} = 15000000000.00 = G^{-1} \quad \{22\}$$

and:

$$\frac{3}{2} \times 10^{10} \quad \{22-b\}$$

The inverse of $2G$ is:

$$\frac{1}{3} \pi C = .75 \times 10^{10} = 7500000000.00 = (2G)^{-1} \quad \{23\}$$

and:

$$\frac{3}{4} \times 10^{10} \quad \{23-b\}$$

It would appear that the k^{-1} version is the primitive one, and that both G versions are derived from it. And again, it is 3-dimensional whereas G is not, and cannot be. There is no place in the G formulation for volume, hence no place for density. It works fine in a one body problem, because a slice or section of one body, taken anywhere through the center, is the same because of the radial nature of gravity. Remember that the equations:

$$\sqrt{\frac{2GM}{R}} = V_{escape} = m/s \quad \text{and} \quad \frac{GM}{R^2} = g = m/s^2 \quad \{24\}$$

are about velocity and rate of change of velocity respectively. There is no force term, no kilograms. They work fine, but go to the two-body configuration and problems begin to surface, in particular, there is no surface. All the mass is treated as if it were located at a *point* in the center of each body, and the “force” is computed by measuring the *line* between them. Points and lines—that’s not even 2-dimensional—it’s 1-dimensional. There is no way to even tell when and where two bodies would actually collide, as there are no surfaces. With no surface there can be

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no density, and density is extremely important when computing gravitational influences, as will be seen.

With the two-body system, *GMM*, kilograms are back in the equation, and so we have to *invent* a force to account for gravitational “attraction.” This so-called force, expressed in newtons, is an abstraction, a mathematical bridge built to cross the “void.” This is what Einstein tried to remedy with general relativity.

Let’s do a little thought experiment. Say we’re aliens from another galaxy and we work for an interplanetary mining outfit. Our job is to go to unknown planets or moons and determine their mass and/or density to see if they might be suitable candidates for extracting minerals. Our species does not use the constant *G*. We know what space actually is, and that it *flows* according to natural laws. We don’t want to waste time orbiting the planet. We set right down on the surface and go to work.

We were able to measure the planet’s diameter from space so we know the radius. Now we set up a gravimeter and measure the acceleration due to gravity at the surface (we’ll use Earth figures ‘cause they’re so familiar) which is 9.8 m/s². Next we use this formula:

$$\frac{V_s^2}{2R} = g = m / s^2 \quad \{25\}$$

rearranged like this:

$$\sqrt{(9.8)(2R)} = 11180 m / s = V_{surface} \quad \{26\}$$

to obtain what Earthlings call escape velocity but which we know is the velocity of the aethereal medium at the surface. This will then give us the *flow ratio*—that of velocity to acceleration—of 1141. Then all we have to do is square that and divide it into our constant, *C*:

$$\frac{C}{1141^2} = \rho = \frac{7.157 \times 10^9}{1301881} = 5497 kg / m^3 \quad \{27\}$$

and then:

$$\left(\frac{4}{3}\pi r^3\right)\rho = mass = (1.087 \times 10^{21})(5497) = 5.974 \times 10^{24} kg \quad \{28\}$$

and then off we go to our next assignment. No *G* necessary.

Equation {13} gives us the flesh and bones of what we call gravity. Let’s use our new constant *C* and have a look at just the bones, the skeletal structure of the phenomenon:

{29}

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$$\rho \left(\frac{\sqrt{\frac{4\rho}{C}}}{\frac{2\rho}{C}} \right)^2 = C$$

To put flesh on all we need do is specify a radius, then we have a surface to enclose the density and hence we have a massive three dimensional object. Radius also fleshes out the flow ratio of the velocity and acceleration of the medium for that particular body.

{30}

$$\sqrt{\frac{4\rho}{C}}(R) = 11180 \text{ m/s} = V_{\text{surface}} \quad \text{and} \quad \frac{2\rho}{C}(R) = 9.8 \text{ m/s}^2 = g$$

Say now we want to find the acceleration due to gravity somewhere above the surface, out in space. We can just take the surface value and divide by the inverse square. For example, to find the value at radius 2, simply divide 9.8 by 2^2 , or 4, giving 2.45 m/s^2 . There is another method, however, of obtaining acceleration due to gravity, anywhere in the field, of which equation {25} is just a special example of, that reveals an interesting correlation with atomic electron shell structure:

{31}

$$\frac{V_s^2}{(r^2)(2R)} = g = \text{m/s}^2$$

where R = the radius of the body—the unit radius—and r = the number of unit radii. Watch what happens with the first four radii:

{32}

$$\frac{V_s^2}{(1^2)(2R)} = \frac{V_s^2}{2R} = g = \text{m/s}^2$$

{33}

$$\frac{V_s^2}{(2^2)(2R)} = \frac{V_s^2}{8R} = g = \text{m/s}^2$$

{34}

$$\frac{V_s^2}{(3^2)(2R)} = \frac{V_s^2}{18R} = g = \text{m/s}^2$$

{35}

$$\frac{V_s^2}{(4^2)(2R)} = \frac{V_s^2}{32R} = g = \text{m/s}^2$$

2—8—18—32—Look familiar? That's how many electrons there are in the first four shells of an atom. After shell number four things get less clear-cut in the real world of atoms. This is proba-

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bly a coincidence, but it might also be a hint at some universal truth concerning the aether-flux and spherical bodies in the atomic realm (out of my league).

And as a corollary to equation {31}, this equation, a modification of the basic escape velocity equation, {4}, will give us the velocity, at any point above the surface, of an object launched *ballistically* and radially from the surface at escape velocity (another idealization). Thus it tells us the velocity of the inflowing medium at that point (definitely *not* an idealization):

$$\sqrt{\frac{2GM}{(r^4)(R)}} = V_{field} \quad \{36\}$$

Note that this has nothing to do with rocketry or orbits, this is strictly radial ballistics, and the kinetic energy of our projectile would be falling off as $1/r^4$. Using the Earth as an example, here's what we get for the first four radii. R is the actual radius in meters, r is the integer value of successive radii:

$$\sqrt{\frac{2GM}{(1^4)(R)}} = \sqrt{\frac{2GM}{R}} = 11180m/s \quad \{37\}$$

$$\sqrt{\frac{2GM}{(2^4)(R)}} = \sqrt{\frac{2GM}{16R}} = 2795m/s \quad \{38\}$$

$$\sqrt{\frac{2GM}{(3^4)(R)}} = \sqrt{\frac{2GM}{81R}} = 1242m/s \quad \{39\}$$

$$\sqrt{\frac{2GM}{(4^4)(R)}} = \sqrt{\frac{2GM}{256R}} = 699m/s \quad \{40\}$$

These are the exact values that are required for the medium to comply with the continuity equation, and is really just a long-winded way of writing:

$$\frac{V_s}{r^2} = V_{field} \quad \{41\}$$

which is what we did back on page nine. Others who believe in a flowing medium think the velocity falls off as the square root of r , or as r cubed, or something else. Simple geometry says otherwise. Going outward from the surface, the inverse square law rules, and the ratio of velocity to acceleration remains constant, as in, for the Earth, $11180/9.8 = 1141$; $2795/2.45 = 1141$; $1242/1.09 = 1141$ and so on. If the velocity fell off with any other value the medium would have

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to be compressible or have some other weird features, and the universe would not work. Direct communication would break down. *All particles everywhere* feel the *same* pressure at *all* times.

An incompressible aether also allows for the instantaneous transmission of certain effects. The so-called speed of gravity has been argued about for centuries, based on the concept of gravity coming *out* of a body and *attracting*. An incompressible medium flowing *in* to a body turns this notion on its head. If the Sun were to somehow disappear, there would be an *immediate* hydraulic lock where it used to be, the medium would stop flowing, and *all* the planets would *immediately* head off on a tangent. An inflowing medium also makes the quest to detect “gravitational waves” a complete waste of resources. Even large-scale disruptions such as exploding stars would be damped in short order by the inflowing medium.

* * *

Terrestrial gravitational force or g , equations {24} or {25}, is eminently practical and allows us to calculate myriad things; from how hard you’ll hit the ground after falling off the roof, to just how a baseball must be hit to clear the home-run fence. Now we move into the enigmatic realm of G ; the arena of celestial mechanics and orbital mechanics; the province of NASA. The traditional formula for obtaining the force between two massive bodies is (using Earth and Moon):

{42}

$$\frac{GM_e M_m}{d^2} = F_G = N$$

where mass of the Earth = 5.97×10^{24} kg, mass of the Moon = 7.35×10^{22} kg, d = distance between the two planetary centers, 384 000 000 meters, N = newton = m kg/s^2 , and which gives, for the Earth-Moon system: 1.98×10^{20} N . The newton force concept can be hard to grasp. Remember, this is a mathematical description of an abstract force acting at a distance. The best description of this force that I’ve come across is: “the force that provides a one kilogram mass with an acceleration of one meter per second per second.” That still seems somewhat vague, especially when one considers that this is supposed to be a *pulling* force. Just how does it get a *grip* on the Moon?

Now let’s consider the flowing medium as described earlier in this chapter, that is, fluxing through concentric (imaginary) spherical shells as it accelerates under pressure into a massive spherical body in accord with the inverse square law and the equation of continuity, *area times velocity equals a constant*. This constant represents the *volumetric flow rate* (symbolized by Q) of the medium for that particular body, and this rate *does not change*, regardless of distance from the body. Only the *velocity* of the medium changes. In fact this quantity, Q , could be considered as sort of an *extension* of the body—out into space—providing a *mechanism* for what we’ve been calling a “sphere of influence,” or “drain field,” or “gravitational field,” something that another body, if close enough, could, in a sense, *feel*. This *feeling* would of course be mutual, and the closer the bodies are to one another, the stronger this *feeling* would be, due to the proportionately increasing velocity of the medium.

Of course what this increasing *feeling* actually represents is the increasing *competition* between the bodies for the aethereal medium between them, and the force as described by equation {42} would actually be a *positive* force, divided by two, acting at the antipodes as opposed to some sort of attractive, or *negative* force acting *between* the bodies like some sort of tractor beam. Be-

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tween the bodies there is nothing except increasing competition resulting in a reduction of flow velocity. One could also argue that there is no force being deployed—that the bodies are just doing what comes natural—obeying the principle of least action, or least energy.

So, if these two concepts are actually describing the same phenomenon—that which we call gravity—they must be somehow related mathematically, and they are:

$$\frac{GM_e M_m}{d^2} = F_G = N = \frac{Q_e Q_m (\sqrt{\rho_e \rho_m} / 75.4)}{d^2} \quad \{43\}$$

where ρ stands for the density of the body. Staying with the Earth-Moon system:

$$\frac{Q_e Q_m (\sqrt{\rho_e \rho_m} / 75.4)}{d^2} = \frac{(5.71 \times 10^{18})(9.01 \times 10^{16})(56.84)}{(3.84 \times 10^8)^2} = 1.98 \times 10^{20} N \quad \{44\}$$

Here's what's going on with this new concept: the product of the two volumetric flow rates (QQ) is always less than GMM . Continuing with the Earth-Moon system as an example:

$$\frac{GM_e M_m}{Q_e Q_m} = \frac{2.928 \times 10^{37}}{5.149 \times 10^{35}} = 56.86 \quad \{45\}$$

56.86 for the Earth-Moon. For the Sun-Earth: 36.90. For the Sun-Mercury: 36.66 (Earth and Mercury have nearly identical densities). For the Sun-Saturn: 12.38. For the Earth-Earth: 72.90 (the Earth is the most dense planet in the solar system). For Saturn-Saturn: 8.22 (Saturn is the least dense planet). A different quotient for every two-body system. And so it all boils down to density. Two bodies of equal mass but unequal densities (unequal radii) have unequal volumetric flow rates, with the denser bodies having a lower flow rate and hence a larger quotient between GMM and QQ . It seems as though a smaller, denser body is somehow more *efficient* at the process of transferring the energy of the aethereal medium to the elementary particles (protons, electrons, and neutrons) contained within the body.

And a dimensional analysis of this new equation shows that kg/m^3 , or density, is just what is required to obtain the requisite force term m kg/s^2 , the newton:

$$\frac{m^3}{s} \frac{m^3}{s} \frac{1}{m^2} \frac{kg}{m^3} = \frac{m \cdot kg}{s^2} = N \quad \{46\}$$

There's another conversion factor for dealing with one body systems. GM is what is known as the “standard gravitational parameter,” and is generally considered more accurate than G or M in isolation. It has units of m^3/s^2 . For the Earth the value is 3.98×10^{14} . The volumetric flow rate, or Q , for the Earth is 5.71×10^{18} . It has units of m^3/s . To convert between them we once again make use of the ratio of aethereal velocity to aethereal acceleration, this time multiplied by 4π :

$$\{47\}$$

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$$\frac{Q}{4\pi\left(\frac{V_s}{g}\right)} = GM = \frac{5.71 \times 10^{18}}{4\pi(1141)} = 3.98 \times 10^{14}$$

and likewise:

$$GM(4\pi)(1141) = Q \tag{48}$$

and the units:

$$\frac{V_s}{g} = s \quad Q = \frac{m^3}{s} \quad \frac{m^3}{s} \frac{1}{s} = \frac{m^3}{s^2} = GM \tag{49}$$

which is the standard gravitational parameter. Consider what these units represent. Do they represent an abstract, tractor-beam-like “force,” or do they represent a fluid-like, 3-dimensional medium being accelerated?

Before we go further I want the reader to know that I am *not* saying that anything is *wrong* with the constant G or with any calculation made using G . It obviously works perfectly fine; we send spacecraft anywhere we want in the solar system with great accuracy. But there is more than one way to skin a cat. The new methods introduced here—which *explain* gravity—are simply a different mathematical approach based on a *physical mechanism*, that of an aethereal medium flowing into massive bodies. It seems G might be more of a down-and-dirty, lower order approximation, at least in multiple-body systems.

Let’s explore this further, and maybe discover where the 75.4 term comes from, by analyzing what are currently known as “black holes.” Much has been theorized about these strange objects, but all that can actually be *known* about them—since they can’t be seen—is their mass, radius, spin, charge, and temperature. All else is speculation. The next equation gives the radius of the event horizon, the mysterious spherical veil that’s hiding what’s inside:

$$\frac{2GM}{c^2} = r_{\text{schwarzschild}} \tag{50}$$

Dark stars were first theorized by the Englishman John Michell in 1783 using Newton’s century old law of gravity. Unlike a black hole—which is based on the equations of general relativity and consists of an event horizon and a central “singularity”—a dark star has an actual surface and consists of matter (probably neutrons) of such a high density and hence gravity so strong that light (at least in the optical band and above) cannot escape. In the theory being here proposed, that of the flowing aether, dark stars occupy a very special place. The surface of a dark star is the only place in the universe that the aethereal medium is flowing into a massive body at the speed of light. This makes the dark star a very simple thing to understand and to calculate with. The above equation {50} contains a wealth of information.

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For starters—and this fact cannot be overemphasized—the ratio of mass to radius of a dark star is fixed. Fixed at 6.74×10^{26} to 1, as in:

$$\frac{c^2}{2G} = \frac{8.988 \times 10^{16}}{1.334 \times 10^{-10}} = 6.74 \times 10^{26} \quad \text{or} \quad \frac{c^2}{(\frac{1}{3}\pi C)^{-1}} = 6.74 \times 10^{26} \quad \{51\}$$

Fixed ratios like this don't come along in nature very often. Anything about a dark star can be calculated knowing this ratio, the speed of light, and either the mass—or the radius. In the examples to follow we will be using a dark star with a radius of 1—a unit radius—which means that our mass will be equal to 6.74×10^{26} kg, which we will represent by the letter M . It's doubtful whether an entity like this could exist in the real world, but a unit radius makes the math easier to see. Let's plug these figures into equation {50} to obtain the identity:

$$\frac{2(6.67 \times 10^{-11})(6.74 \times 10^{26})}{c^2} = 1 = \text{radius} \quad \{52\}$$

This is where nature uses the speed of light radiating *out*, and the equivalent speed of aether flowing *in*, to set the baseline—to establish a universal parameter relating the two. Now let's see what happens using equation {6}, but without the radical sign:

$$\frac{k\left(\frac{M}{\frac{4}{3}\pi r^3}\right)4\pi r^2}{c^2} = 1 = r_{\text{schwarzschild}} \quad \{53\}$$

There's a lot to unpack here so let's begin with the density. Since the radius equals 1, the r^3 drops out and we're left with $M / 4/3\pi$:

$$\frac{M}{\frac{4}{3}\pi} = \frac{6.74 \times 10^{26}}{4.19} = 1.61 \times 10^{26} = \rho \quad \{54\}$$

The area likewise is simply $4\pi = 12.57 = \text{area} = A$. Multiplying ρ times A :

$$\rho A = (1.61 \times 10^{26})(4\pi) = 20.22 \times 10^{26} \quad \{55\}$$

20.22×10^{26} . We'll be seeing this number a lot. $(20.22 \times 10^{26})(k) = c^2$. $(k \rho A) = c^2$. $M = 6.74 \times 10^{26}$. $3M = 20.22 \times 10^{26}$. $(k)(3M) = c^2$. So $\rho A = 3M$. Another way to see this is:

$$\frac{M}{\frac{4\pi}{3}} = \frac{M}{1} \frac{3}{4\pi} = 3M \quad \{56\}$$

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The r^2 and r^3 drop out, $4\pi/4\pi = 1$, and we're left with $3M$. $3M = 20.22 \times 10^{26}$, and $\rho A = 20.22 \times 10^{26}$. And so $3M / \rho A = 1$. 1 = the unit radius. This equation works for all massive spherical bodies, not just dark stars:

$$\frac{3(\text{mass})}{(\text{density})(\text{area})} = \text{radius} \quad \{57\}$$

and checking the units:

$$\frac{\frac{kg}{m^3}}{\frac{kg}{m^2}} = \frac{kg}{m^3} \frac{m^2}{kg} = \frac{1}{m} = m \quad \{58\}$$

Staying with dark stars, and $(k)(\rho A)$, let's see what happens when we double the mass:

$$k\left(\frac{2M}{\frac{4}{3}\pi \cdot 2^3}\right)(4\pi \cdot 2^2) = k(4.02 \times 10^{25})(16\pi) = c^2 \quad \{59\}$$

With the mass doubled and the radius doubled, the density *decreases* as the inverse square and the area *increases* as the square (1.61×10^{26} divided by $2^2 = 4.02 \times 10^{25}$). There is a reciprocal relationship, and (ρA) will *always* = 20.22×10^{26} . This should be more obvious when we increase the mass by 100:

$$k\left(\frac{100M}{\frac{4}{3}\pi \cdot 100^3}\right)(4\pi \cdot 100^2) = k(1.61 \times 10^{22})(40000\pi) = c^2 \quad \{60\}$$

Compare with equation {55}. Again, $(\rho A) = 20.22 \times 10^{26}$, and it's obvious that the density from equation {55} has been divided by 100^2 and the area has been multiplied by 100^2 . This only works for dark stars, with their fixed mass/radius ratio but variable size, and is one of the things that make them so special. And as a check, using equation {57}:

$$\left(\frac{3M}{\rho A} = R\right) = \left(\frac{3M(100)}{\rho A} = R\right) = \frac{20.22 \times 10^{29}}{20.22 \times 10^{27}} = 100 = \text{radius} \quad \{61\}$$

This is all very interesting but we're still not done with our unit radius dark star. Now let's compare the old and new methods when computing "forces." First we'll do acceleration due to gravity, or g , (which could be argued is not actually a *force*), expressed as m/s^2 . The conventional way:

$$\frac{GM}{R^2} = \frac{(6.67 \times 10^{-11})(6.74 \times 10^{26})}{1^2} = 4.49 \times 10^{16} m/s^2 = g \quad \{62\}$$

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Now the new way:

$$\frac{V^2}{2R} = \frac{c^2}{2} = 4.49 \times 10^{16} \text{ m/s}^2 = g$$

{63}

Yikes! That's some serious gravity, and the tidal forces associated with such a small radius would be almost unimaginable. No baseball playing here. The point to notice is that any calculation done with g , (there are lots and lots), would be unchanged. The two methods give the same value, but I'm trying to show that the new method is more versatile and more fundamental, besides providing a *mechanism* to explain gravity.

So now we'll use our unit radius dark star to compute the "force" between two massive spherical objects. We'll use two identical dark stars, separated by an arbitrary distance, say the distance between the Earth and the Moon (384 000 000 meters). First the traditional way:

$$\frac{GMM}{d^2} = \frac{GM^2}{d^2} = \frac{(6.67 \times 10^{-11})(4.54 \times 10^{53})}{(3.84 \times 10^8)^2} = 2.05 \times 10^{26} \text{ N}$$

{64}

N is the force in newtons, which is kg m/s^2 . And the new way:

$$\frac{QQ(\sqrt{\rho\rho}/75.4)}{d^2} = \frac{Q^2(\rho/75.4)}{d^2} = \frac{(4\pi \cdot c)^2(2.13 \times 10^{24})}{(3.84 \times 10^8)^2} = 2.05 \times 10^{26} \text{ N}$$

{65}

The density term here (2.13×10^{24}) is huge. Now imagine that we kept adding mass-energy to our dark star, turning it into a supermassive object. The density would decrease as the inverse square reciprocally as the surface area increased as the square. Eventually—at least mathematically—a point should be reached where $GMM = QQ$. And it does:

$$\frac{GM^2}{Q^2} = \frac{(6.67 \times 10^{-11})(9.84 \times 10^{38})^2}{((4\pi)(14.6 \times 10^{11})^2(c))^2} = \frac{6.5 \times 10^{67}}{6.5 \times 10^{67}} = 1$$

{66}

At this point the radius is 14.6×10^{11} meters (in the neighborhood of 1 AU); the mass is 9.84×10^{38} kilograms (about half a billion solar masses); the ratio of mass to radius is of course 6.74×10^{26} to 1; the volumetric flow rate is 8.04×10^{33} cubic meters per second (about 2 trillion times that of the Sun); and the density is—you guessed it—75.4 kilograms per cubic meter. That's about the density of styrofoam. I'm not going to draw any conclusions about whether or not such an object could actually exist. I just wanted to point out the density relationship and where the figure 75.4 might have come from. I *can* speculate though. Maybe this is a size limit. Maybe this is where the neutrons, now in a low density environment, spontaneously decay back into protons, electrons, and neutrinos—kind of like popcorn—slow at first, and then all hell breaks loose. Maybe this is the point where the dark star explodes, and seeds a pair of daughter galaxies.

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Another thing one can't help noticing about this new equation is how closely it resembles the equation describing the coulomb force. This should not be surprising if they are both examples of a fluid medium flowing *into* a spherical body. The difference between the two is that planets and stars come in every imaginable configuration of mass and radius—hence different densities—whereas elementary particles—protons and electrons—are identical respectively.

In the above examples, utilizing identical unit radius dark stars, we have eliminated this difference, and so, with no density term to worry about, we ought to be able to eliminate the

{67}

$$\frac{\sqrt{\rho_1 \rho_2}}{75.4}$$

term and replace it with a proportionality constant, say K , appropriate to the units being used. Then the two equations, gravitational and coulomb, *are* the same:

{68}

$$\frac{k(q_1 q_2)}{d^2} = \frac{K(Q_1 Q_2)}{d^2}$$

as they should be since they are both describing a fluid-like medium flowing *into* a spherical body. There is nothing electrical flowing or radiating *out* of a charged particle, regardless of polarity. This is covered further in the next chapter, and will be used to explain how and why opposites attract and likes repel.

* * *

So, enough with the mathematics already. Let's talk about energy conservation. No doubt many or most of you are having a cow* about energy flowing into the Earth, a sink, and disappearing. In hydrodynamic textbook-speak it sounds even worse—annihilation. Let us please remember that laws of nature are man made, in accordance with his latest understanding of natural phenomena. They can be—and have been—altered, redefined, or even displaced entirely, by man. They aren't chiseled in stone and they haven't come down from on high. The cornerstone of scientific thought is the phrase “as far as we know now,” and we sure as heck don't know everything. We've only been looking through telescopes and microscopes for a few hundred years, and in the grand cosmic sweep of things we've barely climbed down out of the trees. Let's retain an open mind as far as laws of nature are concerned.

Probably all of this transformed aether, after it's done its job (work) of creating electromagnetic fields, is just turned into waste heat—entropy—but if not, it's easy to fit the notion of annihilation into energy conservation. All that's necessary is to increase the playing field to include the whole, infinite, eternal universe and then there is no problem. For every bit of energy that flows

* If you believe in the big bang you have absolutely no right to be critical of anything having to do with energy conservation.

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into a sink and is annihilated, a bit of energy is “created”—a word from the same textbook—in the bowels of a star. A plus for every minus. And the same enlarged outlook applies equally to the second “law” of thermodynamics, or entropy. Scientists go on and on about entropy and closed systems and such, creating no end of controversy—such as the “heat death” of the universe—when all they need do is enlarge their viewpoint to include *everything* and everything will balance out.

Oh and by the way; if the Earth weren’t an energy sink, a place where energy is flowing chronologically into matter, continuously re-creating matter, we wouldn’t even be here to argue about it. There wouldn’t be any *here*; there wouldn’t be anything at all, just the “void.” So what if nature “wastes” a little energy. The total amount flowing into planetary sinks is minuscule compared to the total amount flowing into sources, into stars. The stars are nature’s darlings. Stars make the cosmos *alive*. The Earth and all the planets in the universe are nothing but the detritus of star formation—mere scraps, rubble, debris—pick your own unflattering term. So what’s the big deal about altering a man made “law” a little bit? Nothing’s going to change. Nothing except our understanding of the cosmos.

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Most of the fundamental ideas of science are essentially simple, and may, as a rule, be expressed in a language comprehensible to anyone.

…Albert Einstein…

As far as the laws of mathematics refer to reality, they are not certain; and so far as they are certain, they do not refer to reality.

…Albert Einstein…

All actions take place in time by the interweaving of the forces of nature.

…Bhagavad Gita…

It's no wonder that people have always been fascinated by magnets. Young Albert Einstein is supposed to have been enthralled by the action of a compass, and with good reason. He knew that it was not magic, but that it was pointing out invisible, natural forces. Consider the magnets on your refrigerator, holding up all those pictures and notes and whatever. That magnet is defying gravity. All day, all night, all the time, forever. Amazing. And *supposedly* with no expenditure of energy. It's like magic!

Now, a physics textbook states that that magnet is doing no work. It also states that if you hold a bowling ball out at arms length, for whatever amount of time, you are doing no work. That's a pretty stingy definition. *Something* is going on with that magnet. Force is being deployed. When one works or plays with magnets, one gets a demonstration, apparently, of a force acting at a distance. This is an illusion. What one is actually seeing and feeling is a distortion of the aethereal medium caused by the rather rare configuration of the molecules within the magnet. The molecules are all lined up, pointing in roughly the same direction, unlike poles linked together, as if they were little magnets, which they are. Naturally magnetic elements are rare. Iron, cobalt, and nickel—next door neighbors in the periodic table—and a few others share these special attributes.

We won't be concerned here with electromagnets because obviously outside power is being supplied. What we are concerned with is how and from where that refrigerator magnet is receiving energy. There's no battery inside, it isn't plugged in, it isn't solar powered, yet physics isn't the least bit concerned about a *cause* for this phenomenon. The magnet unambiguously shows us

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that this lack of concern is unjustified—is wrong—and the implications are huge. The molecular motions inside of a piece of wood or a slice of pizza or your own arm are no different from a magnet; it's just that they aren't all lined up, they aren't ordered. They point every which way, and so all the electromagnetic fields cancel out, this being the natural state of most matter. Now, the magnet is not *unnatural*, but it is rather strange as regards the aether. The aether has done, or rather *is doing, constantly*, its job of suppling energy to all the charged particles in the magnet, and that should be that. But those molecules, because they're all lined up, are inducing electric currents; negative one way, positive the other. This manifests as magnetic *fields* at the respective poles, which causes a *distortion* of the aethereal medium. It's like the magnet is *giving back* some energy, due to its highly ordered but unusual state. What we perceive as a magnetic field is the aether endeavoring—and succeeding—to equilibrate the local energy imbalance. It's positive out one pole, negative out the other, and a smooth mixing in-between; all in a sublimely even gradient that fades with distance. Yes, that's what I'm saying—energy is actually flowing *out* of the magnet and being *re-absorbed* by the medium.

This is nearly the same phenomenon that occurs in a current carrying conductor, or wire.* The loose electrons are free to move one way, in the direction the negative energy is flowing, but the copper ions are stuck in the metal. They're not mobile like electrons, and so whenever the current is switched on an imbalance is established. And so again it's the omnipresent aethereal medium to the rescue. What the magnetic field encircling a current carrying wire mostly does is convey excess positive energy in one direction and excess negative energy in the other direction, as well as absorb imbalances. It does all this as it (the aether) is flowing straight down at a high rate of speed (11,200 meters per second here on Earth) Although this velocity is insignificant compared to the speed of electromagnetic phenomena, it does seem to indicate that electromagnetic phenomena would tend to change at relativistic speeds.

Nature, at the most fundamental level, has to be simple. By now the dogmatic theme of my main argument should be apparent, namely, the flow of the universal energy sea into matter. Gravitational *attraction* has been shown to be an illusion—a by-product—caused by this flow. Now we're going to break down the consequences, the end result, of all this activity. Let's see what happens at the level of individual charged particles, the protons and electrons that constitute all matter.

We'll start with a little math, but we sure as heck don't need any differential equations to describe this basic reality. Here goes: one, divided by two, equals *everything*. One, of course, is the aether, or quintessence. The celestial realm; in Egyptian mythology the infinite, the nothingness, the nowhere, and the dark. In other cultures the mystical "One," or God. Unknowable. All pervasive. The Tao. Blah blah not this again. How boring. How about some *action!* How about some *things!* Well, for *things*, you need *two*. Then you have *difference*. Hot and cold. Black and white. Male and female. Yin and yang. Positive and negative, and so on. Duality is the essence of reality. Faraday and his cohorts knew all about the dual nature of electricity and the dual nature of magnetism, but because gravity is only attractive—and any representational lines of force connecting gravitating bodies were straight and equal—duality didn't enter the picture.

* Wires are very unnatural. It's safe to say that if we are the only intelligent, tool making species in the galaxy, Earth is the only place in the galaxy where wires exist. We won't dwell on wire phenomena.

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Now let's consider a charged particle, say, a proton, floating somewhere out in deep space, all alone. Around this proton exists what we call an *electric field*, usually represented on paper as radial vector arrows, pointing outward in the case of the proton. Does the proton *create* this electric field? Yes and no. It participates in the creation, in tandem with the aethereal medium. But what *is* a particle? Einstein's famous equation equating mass and energy tells us that a particle can be considered as a compact knot of energy, and I quite agree. But that's about all I agree with. Science takes that knot of energy as a given. First cause. No accounting necessary. I see that knot of energy more as an *event*, an *action*, a constant *happening*—the *effect* of a *cause*. And here is what is happening: the aethereal sea, or universal energy field, is composed of two components, equal and opposite in nature. What these components actually are—whether tiny particles, some sort of fluid, or something as yet undreamed of—your guess is as good as mine. (I'm not so vain as to think I can reveal nature's ultimate secrets here, but do hope to pull back one of her veils). The proton is a condensation of one of these components. It doesn't really matter which one, as positive and negative are just conventions. They could be called black and white, or part A and part B, or one and zero. The proton relates to one, the electron to the other.

To give a clear and easy picture, let's say the proton "attracts" the positive component (although, for all we know, it might be "attracting" the negative component). Now, when thinking about charged particles, it might help to picture them as being similar to a tiny little spherical *hurricane*, or *vortex*, or *impeller*, spinning rapidly, *sucking* in the positive energy in its immediate neighborhood. But now remember; the system is under pressure, and here we come upon a real chicken and egg conundrum—which came first, the supply or the demand? I can't answer this, but if there is any *sucking*, or *negative pressure* in the universe, it would be right here. Demand. The proton is sucking in positive energy in order to *feed*, or *fuel* its motion, its self.

Maybe. Or maybe it's pressure all the way, and the positive component is shoving itself down the throat of the hapless proton, forcing it to spin, like a little dynamo. Suction or pressure? It's a good question, but the latter scenario seems more likely, because pressure is direct and constant, whereas suction introduces ambiguities. I don't know. But I *do* know, that, as the positive component disappears into the maw of the proton and is turned into rotational motion, the negative component, being also under pressure, is stacking up just outside of the proton. The medium, remember, strives for equilibrium, but the consuming proton is literally tearing it apart, leaving it with an ongoing spherical, radial imbalance—a gradient. Outward, away from the bunched-up negative energy, the aether is doing what it does naturally, that is, equilibrating to make up for the continual loss of positive energy. This it does with exquisite precision, and this spherical, radial gradient, falling off via the inverse square law away from the proton, we call a positive electric field.

The positive electric force is represented by lines radiating *out* from the center, but this is wrong. The lines should be representing a medium flowing *in*, regardless of polarity. They begin in one place and end somewhere else, and they never cross because they are all caught up as part of an overall *flow*. The magnetic force is represented by lines at right angles to these—like contour lines on an elevation map or isobars on a weather map—albeit in three dimensions. The magnetic force around a spherical object would be represented by concentric *shells*.

So the electromagnetic field is not some kind of a *thing* that accompanies the proton, or is produced by the proton alone. (A similar process of course takes place with the electron and the other aethereal component). It is a joint *action*, an *event*, that takes place continuously, *in time*. The

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energy of space—the aethereal medium—is not really being annihilated. It is doing work, and this work is most obvious in the case of a magnet. The aether is being transformed; first into rotational motion, then into electromagnetism, then into matter—atoms, molecules, chemistry, and all the *things* that constitute the universe. It's like all this flowing, pressurized energy—call it cosmic energy—is continuously cranking away at an infinite number of tiny electric dynamos, forcing them to spin and hence create.*

If, now, another proton comes sailing into the sphere of influence, or electric field, of the first proton, what's going to happen? Well, they're both *competing* for the same *stuff*. And they both have a spherical *wall*, or *shell* of the *wrong* kind of *stuff* surrounding them, which is itself surrounded by a field gradient, the strength of which decreases according to the inverse square law. If their relative velocity is low, the particles will repel at the first hint of a shortage of *stuff*. The gradients will only reinforce one another, and the particles will naturally seek greener pastures elsewhere. On the other hand, if their relative velocity is high, the particles might approach till their respective *walls*, or *shells* of bunched-up negative energy—the *wrong* kind—encounter one another, manifesting as a highly repulsive barrier. Hence like particles repel.

Now if, instead of a proton, an electron were to come cruising by, it would be surrounded by an abundance of just what the proton wants, or needs. Likewise the proton has just what the electron desires. It's a match made in heaven, and a strong attraction ensues. Hence unlike particles attract. It's really that simple. We've just created a hydrogen atom, or, $1/2 + 1/2 = 1$.

Here's a quote from Faraday out of Maxwell's *Treatise*:

“At every point of the medium there is a state of stress such that there is a tension along the lines of force and pressure in all directions at right angles to these lines, the numerical magnitude of the pressure being equal to that of the tension, and both varying as the square of the resultant force at the point.”

Faraday is referring of course to an electric field around a charged particle. He would have loved this idea about the aether splitting into two parts, uniting gravity with electromagnetism. He was always seeking the unity in nature. And again, this is why the coulomb force equation is so similar to the gravitational force equation. This is why the magnitude of a test charge is irrelevant in the same manner that the mass of falling body in a gravitational field is irrelevant.

A proton, although extremely tiny (radius $\approx .85$ fm), is also extremely dense, at about 6.2×10^{17} kg/m³. So, even though we, at our macro scale, would consider the gravitational potential around the proton to be exceedingly weak, the tidal forces and acceleration of the medium near the “surface” of the proton would be staggering. A comparison with a neutron star would not be unfair. This is what gives an elementary particle the power, the strength, to shear the resisting medium into its component parts, creating electromagnetic fields. It is a job of *work* that is *constantly* being done, and requires an expenditure of energy.

* And besides creating what we call *things*, an amount of waste heat or *entropy* is also created as a by-product.

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The fact that the electron is so different from the proton would imply that the two components of the medium are also different in some way other than just their polarity. It's like one component must be bigger, or slower, or maybe thicker, I don't know. Everything about the electron seems so much more otherworldly, so much more *aethereal*, especially the fact that it apparently has no size other than its "field."

It's like an electron could be compared to the very tip of a twister, a tornado—something with little or no size but incredible energy—whereas a proton would be more like a hurricane, with its energy more spread out and measurable.

So there we have it. From our single substance, or concept—the flowing aether—which is responsible for so-called gravitational "attraction," we simply divide it in two and we have the proton and the electron, their respective electric fields, electromagnetic phenomena of all sorts, chemistry, and matter. That sounds like just about everything that is. Yet science feels no need to account for any of it, from a single refrigerator magnet to the sum total of all the matter and electromagnetic energy in the *entire universe*. No cause. It just is.

Imagine now, if you will, out in the cold and darkness of space, a lone iron atom: 26 protons, 30 neutrons, and 26 electrons, all of them whirring, buzzing, vibrating, spinning, orbiting—constantly, ceaselessly, forever and ever. How can this be? If we are to avoid perpetual motion and gifts from the gods we *must* require an energy input—quintessence.

Whew. That's getting a little heavy. Let's have a little fun with our hydrogen atom as we lead up to the explanation of the so-called strong nuclear force (hat trick!). Let's anthropomorphize a bit and say that our proton is male, lazy, and fat. He sits in the middle of his sphere of influence (semi-drain-field?), letting his sustenance come to him—which it does—from all directions. He's the big dog here. Let's call him Jabba. Our electron is female, wispy, quick, and unable to stand still, literally. She has to continually forage for her sustenance, which always happens to be greatest where she isn't, namely, somewhere on the other side of Jabba. So she continuously hurtles round in precessing orbits, just because she *has* to, to feed herself. We'll call her Tinkerbell. What an odd pair. Course, if they weren't so different we'd be living in a different world, if we were living at all.

Now, even though they're both running flat out, consuming* all they can, they simply don't have the capacity to ingest it all, (the pressurized aether, that is), and an other than perfectly spherical flow pattern is set up. Since the system is spinning, and the aether is still on the job, equilibrating, a bi-polar condition is established, that is, positive at one spin axis pole, negative at the other. This polar asymmetry is responsible for the force commonly known as the hydrogen bond, which plays a large part in much of chemistry—such as the specific angle between the two hydrogens in a water molecule and the structure of the double helix of DNA. These things are well known of course; my point is, that they are caused by aethereal flow patterns, not some magical action-at-a-distance. Indeed all of chemistry could be seen as a result of the various possible combinations of flow patterns between elemental atoms, all of which—with the exception of the noble gases—would exhibit asymmetries.

* I wonder if we could assume that Tinkerbell is spinning 1836 times as fast as Jabba?

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We might say that a hydrogen atom is an *open* system, which is why it is so reactive, or vulnerable. Conversely, considering the helium atom, two Tinkerbells and two Jabbas are able to neatly gobble up all that they need or want, with whatever energy that's left over going to the secondary players, the two neutrons, which could be considered as *ballast*. This renders the helium atom *closed*, or inert; a balanced condition not unlike a tiny planetary body, with a perfectly spherical, radial flow pattern. We could imagine that two helium atoms, all alone in space, would gravitate toward one another—just like massive bodies—whereas the gravitational force between two hydrogen atoms would be vastly overwhelmed by their polar fields.

Now let's look at a larger atom, say, a nitrogen atom, somewhere in the Sun. The Tinkerbells may or may not be around, but Jabba and six of his buddies are having a grand time. They've even enlisted the aid of seven hermaphrodites (neutrons) to join their little group and act as ballast. I forgot to mention that protons are naturally gregarious—yes, the more the merrier! But it's not easy getting into their clubhouse. To get in there with Jabba, each of his pals had to crash through the bouncer's *force field*, that is, the piled up, pressurized halo of the *wrong* kind of energy; Tinkerbell's kind. Once inside, however, they agree to forfeit their personal force field and add it to the communal force field, which they are pleased to do. It's more economical to share, and so some excess energy can be *released*. Party time! This arrangement works fine up until the element iron, at which point the party is getting somewhat unwieldy, and now any new members are required to pay a toll—an energy tax—to be admitted. A point to notice here is that once inside, it's bloody hard to get back out. The barrier works both ways.

All right, this is getting a little silly. The thing is, we don't need some mysterious “strong nuclear force” acting between nucleons. Nucleonic binding is just a natural consequence of the hydrodynamical nature of the system. Without action-at-a-distance, there is no need for “messenger particles.” That's right; no bosons, no gluons,* no virtual photons or any of the other crazy things that have been invented in order to circumvent the void. In fact, the gates to the particle zoo can be thrown open and all those weird creatures released back into the fictional world from whence they came. The universe is contiguous. There are no voids. If a particle can't hang around for at least a second, it isn't *real*. The pseudo-particles one “sees” in a cloud chamber or atom-smasher are just energy re-insinuating itself back into the universal energy field—back into the aether. Feynman was so right when he compared the smashing together of protons with the smashing together of garbage cans full of garbage.

What a tragedy. Think of all the resources, both mental and physical, that have gone into creating the “standard model of particle physics,” with its twenty or so free constants that have to be finely adjusted, and its ever growing stable of absurdities (charmed quarks—it sounds like a breakfast cereal).

I might as well come clean; I have an agenda, and it isn't to free the unicorns from the particle zoo. It's the big bang. I mean, an expanding universe was bad enough, but to extrapolate backwards to the point of a singularity is...is...is beyond the pale.† The big bang—it's not an old theory; what, maybe fifty, sixty years old? But it has so insinuated itself into the world of science as to be almost gospel, a matter of faith. For what else but faith could cause otherwise rational, in-

* Who thinks up these names—schoolchildren?

† The more colorful words I'll keep to myself.

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telligent people to believe in such a monstrosity? It boggles the mind. The cosmic egg. The primeval fireball. You should read Lamaître's own account of his theory; it's hilarious. Crackpot would be a kind description. I suppose, because he was a religious man, and religions all have their creation myths, Lamaître could be forgiven—but not Gamow and all the other supposedly hard-headed scientific types that have embraced this theory.* But, if it weren't for Einstein and general relativity, Lamaître would have been a footnote to a footnote, instead of the instigator of the big bang theory. Einstein's field equations threw open the portal to the world of the bizarre—to expanding universes, singularities, dark matter, dark energy, dark flow, dark, dark, dark.

Einstein may have had the right idea with general relativity, but without the aether, which *he* abolished, the theory was stillborn. Sure it improved on Newton's theory in some insignificant ways, but the damage it has wreaked on physics in general is incalculable. Poor Einstein, working without a medium, became so mired in the complex morass of mathematics that he lost touch with reality. A universe finite yet unbounded? That's oxymoronic, and his attempts to explain it were pathetic. Still, he needed a boundary condition for the math to work. The math—the math, tensor calculus, was so foreboding that only a few people could actually solve the equation—this from the same man who claimed that nature at her most fundamental level had to be *simple*. And so first de Sitter and then Friedmann came up with solutions that implied that the universe was expanding, opening the road to cloud-cuckoo-land, and the inmates took over the asylum, which is where we are now—string theory, quantum jumps, multiple universes, branes, inflation, and gargantuan machines built to tease out the secrets of the *supposed* beginning of time. Sheesh.

So that's how I feel about the big bang. To me, a lifelong atheist, it's easier to believe that some god created the universe than to believe in the big bang theory. When one attributes an unknown phenomenon to god, one is actually saying that they don't know, that probably nobody knows, so why worry about it? It's more intellectually honest than inventing a lot of crazy stuff supposedly backed up by mathematics. Well, in order to abolish the big bang, one has first to prove that the universe is not expanding. In order to prove that the universe is not expanding, one has to show that intergalactic redshift is caused by something other than galactic recessional velocity. The cosmic microwave background (CMB)—besides being trapped in a circular argument of dubious origin—proves nothing except that it's cold in outer space.

I suppose I should remain more scientifically detached, but, well, I'm not a scientist. I'm an interested layman on a quest. When I read physics, I read like a detective, always looking for clues. Always. That's the main thing. It's like, if you want in somewhere, but the door is locked, you just gently lean on that door, and if the door opens, even just a little, you're in. Switching metaphors slightly, I must have been leaning on a looking-glass. Ever since “falling through,” and gaining an inverted perspective on gravity, I've become obsessed with applying this novel perspective of the flowing aether to the universe at large, with amazing results. Remember, this is all just a supposition—an hypothesis. Besides this hypothetical flowing aethereal medium accounting for gravity and electromagnetism, I will next show how it explains inertia, then how photons are conveyed through it, and finally how it explains the large scale structure of the cosmos.

* It is, by the way, still only a theory.

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Inertia—a property of matter.

The other tenet of *special* relativity, besides the constancy of light speed, is the doctrine of the relativity of motion; meaning that, in order to perceive whether something is moving, it has to be compared with something else, which can be stationary or also moving. This means that if you were floating out in deep space, far from any sort of matter, and you knew you weren't accelerating—because you could *feel* that—there is absolutely no way to tell whether you were moving or at rest.

Without an aethereal medium, this would be true. With an aethereal medium, it is false. You see, Einstein was making the same mistake as Michelson. Both men were looking out *laterally*, that is, north, south, east, and west. Special relativity does the same with all those diagrams—everything moving with constant speed—*laterally*. Both men were restricting their researches to the plane perpendicular to the vertical, or gravitational plane. A synopsis of Einstein's reasoning goes like this: two observers, A and B. A is considered at rest relative to the aether. B is moving by at a constant velocity. Measuring lengths and comparing clocks, we see that A and B get exactly the same readings. It's the same as if B were at rest relative to the aether and A was doing the moving, so who needs the aether? Einstein didn't, and so he killed it. This begs the question as to *how* these observers could even *see* with no light-bearing medium, but by then Einstein had surely decided that light was particulate in nature—and that no medium was required for its propagation—what with his paper on the photo-electric effect coming out at this same time.

This, then, could be called Einstein's greatest blunder. But it's not all his fault, for a greater mistake, or rather, an omission of tending to fundamentals, was, as I explained earlier, that of *assuming* basic electric charge to be a given, with no need of a cause. History appears barren on this issue. It seems that back in the late nineteenth century, when all these electric and magnetic phenomena were so new and strange and exciting—when discoveries and relationships were being uncovered so fast, and being immediately put to practical use (telegraph, electric motors, etc.)—that nobody had time to take stock of fundamentals. This is hard to understand. Surely someone must have posed the question—initiated a dialog. Somebody had to notice the smell of perpetual motion, the kinship with *magic*. If the question had been out there, you'd think that FitzGerald or Heaviside or *someone*—someone who believed in the aether—would have arrived at the same conclusion as me, namely, that charge is a consequence of the aethereal medium flowing into elementary particles. It's really the only option.

Perhaps people did consider this, but then this begs the question: how does the aether—if it gets used up—get replenished, or recycled? That's a good question, the answer to which is the place in the cosmic energy cycle where my own investigations began, namely, a way to explain intergalactic redshift other than by galactic recessional velocity. The epiphany; the moment of illumination; the completion of the cycle, occurred instantly upon attainment of the inverted, or looking-glass view of gravity. Either half of the cycle by itself makes no sense.

But back to inertia. I've got some interesting thought experiments that show how one could possibly gauge their motion relative to the aether only—but first must claim, that, since all the universe is a flowing sinuosity—there is absolutely no way to gauge *absolute* motion.

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Our theory states that in a massive body like the Earth, which possesses its own gravitational field, or drain field, the flow patterns of the aether servicing all the individual particles of the body do not change when the Earth's motion changes. Changes *do* constantly take place in the *outer* regions of the field as the planet is perturbed by other planets or by its moons, speeds up and slows down as it orbits the Sun, and travels at outrageous speeds around the galaxy. But we are oblivious to all this motion; we can't feel a thing, here in our *bubble*. This notion of the aether is *completely* different from earlier notions of the aether as just being *out there*, with bodies or planets *moving through it*. It's no wonder those earlier ideas didn't pan out. The reason that the Earth and other massive bodies have so much inertia is because the body's *entire sphere of influence*—which reaches way out into space and interacts with all adjacent spheres*—would have to change, an enormous undertaking.

Local, terrestrial gravity is different, at least for wispy things like us. A big hunk of lead might possess its own weak field, but the aethereal fluid passes through us like we were no more than a ghost. At this point I should say that if this theory sounds unbelievable because you can't *sense* the aethereal flow, or you can't *see* it, well, you can't see Newton's or Einstein's gravity either. Think about it; if you could *see* the aether, you wouldn't be able to see anything else, and you'd probably go mad in about five seconds. It's the same as if you could see air. But you *can* feel it, and do so all the time. Put your arm back out there—all those trillions of atoms in your arm each possesses its own little drain field, with its own established flow pattern. Your arm is *imbedded* in the flowing medium, and because your arm is *competing* with the Earth for the flowing energy *between* your arm and the Earth, and because it's really no contest—the mass of your arm versus the mass of the Earth—the medium wants to take your arm *down* with it. It wants all those myriad drain fields to be as spherical as possible, to be *at rest* relative to its flowing self, to be moving at the same speed. If you were to cut your arm off and throw it down a deep well it might even come close to achieving this goal. When you move your arm upward, or *against* the flow, all those little flow patterns become even more non-spherical, or egg-shaped, which is why it's easier to lower your arm than to raise it.

Now let's consider whether traditional gravity, coming up out of the Earth and *pulling* on your arm, is equivalent. This is where the notion of a "tractor beam" comes into play, but at this point in time a tractor beam is pure science fiction. Gravity as presently understood is all about *pulling*, but *pulling* and *pushing* are distinctly different actions. Just about anything possessing mass can push against any other massive object, but to *pull* an object one has to somehow get a *grip* on it, and *gripping* would entail an expenditure of energy above and beyond that required to move the object. Another way to *pull* something would be to attach a chain or a rope, but that won't do at all when considering planetary bodies. So just *how* is this *gripping* accomplished—that's what I'd like to know. It seems, if it was going to latch onto your arm in some physical way, that it might be *taking*† instead of *giving*? No, that doesn't sound right. This is the main problem with any action-at-a-distance phenomenon—the actual physical process involved—as compared to the mere mathematical description (shut up and calculate). The field is called *physics* you know, not

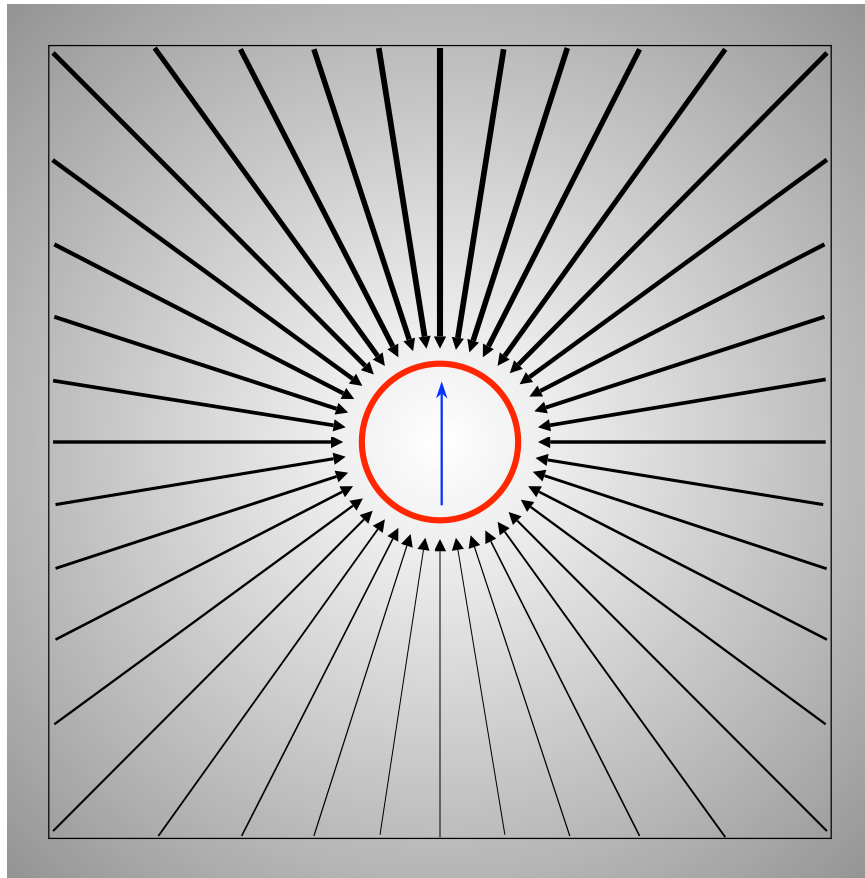
* This is an example of Mach's principle, which, stated generally, is "Local physical laws are determined by the large-scale structure of the universe."

† Though all you physicists may hate this theory, theologians ought to love it. One entity comes down from on high and gives; the other comes up from the underworld and takes.

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mathematical abstractions, and for the last century the physics aspect has definitely taken the back seat, even with the mathematical edifice crumbling everywhere.

Anyway, with the flowing aether theory it's easy to see the similarity between gravitational mass and inertial mass. With gravitational mass, you stand on the surface and the medium flows past (and through) you, pinning you down to the surface. With inertial mass, the medium stands still (relatively) and you accelerate through it. Here on the surface, gravitational mass dominates, and inertial mass only comes into play when acceleration is involved. For your inertial mass to *equal* your gravitational mass—one g here on Earth—you'd have to be way out in space, away from any massive bodies, and under a constant acceleration of one g . But the two wouldn't really be equal, nor even equivalent, because there are no tidal forces in space. Tidal forces only manifest around spherical, gravitating bodies. Plus there are other differences, which we'll get to directly. Einstein covered his behind here by stating that the equivalence principle (his happiest thought) is only valid in an infinitesimal region. If that sounds lame and a cop-out, it's because it is. Let's look more closely.



Here the red body could be seen as sitting still in a gravitational field, or, equivalently, as accelerating through space. Darker vector arrows represent higher velocity aetherial flow. Lighter arrows have to play “catch-up.”

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We'll use two imaginary coordinate systems. The first is a one meter square platform on the Earth, right on the edge of a sheer drop-off. The second is a similar platform, out in deep space, with a rocket motor underneath capable of maintaining a one g acceleration. You would *feel* the same force on either platform, but the actual action—the physics—is quite different. Standing still, on the Earth, the medium is flowing past and through you at a constant velocity. Your individual atomic flow patterns are established and steady, though they are *not* spherical; they are slightly ovoid, or egg shaped, with the smaller, longer end *always* pointing down. Your *weight*, or gravitational mass, is being caused by the shortage of *space*, or energy field, between you and the Earth, which the medium capitalizes on, *pushing* you down. Except for the aether flow, everything is quite static. On the platform in outer space, on the other hand, the situation is more dynamic. As you constantly accelerate, at one g , your motion relative to the aether constantly increases, and so your atomic flow patterns are constantly adjusting. You are gaining kinetic energy. Your inertia is increasing. You are becoming more massive.

So, it seems the two situations aren't really all that equivalent, and the need for a caveat is understood. Now let's jump off of the platforms and see what happens. On Earth, the planet rebounds ever so slightly as you leave it, and your potential energy rapidly changes to kinetic energy. Your gravitational mass, or weight, is now zero. Your atomic flow patterns are *changing*, becoming more spherical—on account of acceleration—which is *increasing constantly*, (at approximately 9.8 m/s^2), trying to catch you up with the flow velocity of the aether. The thing holding you back—the reason that you can't instantaneously match aethereal flow speed (neglecting atmospheric resistance)—is inertia. Inertia is a manifestation of the *time* required for your flow patterns to *change*. If the cliff were high enough for you to attain terminal velocity ($11,200 \text{ m/s}$)—or if you were *shot* straight down with enough velocity—you would be “at rest” as regards the aether, and your atomic flow patterns would be perfectly spherical, just as if you were floating out in deep space. Oh, and when you finally go splat your kinetic energy is returned to the Earth.

Out in space, you step off of the platform, and also experience the change from one g to zero g , but instead of falling—as the platform motors away—you continue along the same trajectory as when you stepped off. Your atomic flow patterns stabilize to accommodate the now steady relative velocity between you and the aether, but they are *not* spherical. Your inertia remains constant. Your velocity remains constant. The difference between standing on the Earth with the medium flowing past you at $11,200 \text{ m/s}$, and being in space traveling through the aether at $11,200 \text{ m/s}$, is that in the latter situation there is no *competition* for the aether *underneath* of you. The medium is easily able, at this relatively slow velocity, to flow in from all sides almost equally well. In other words—there is no gravity. The essence of gravity is competition. Hopefully this isn't too confusing. The point I'm trying to make, again, is that the two aspects of the equivalence principle just aren't all that equivalent. They're physically different. We've just seen, not how *alike* are gravitational mass and inertial mass, but how very *different* they are.

Another one of the awful things about general relativity is the way in which it treats *time*. Time has been spatialized into a curved line. It doesn't *flow*. Einstein claims that spacetime is dynamic, and then proceeds to freeze it into a series of geometrical snapshots which require constant recalculation and revision to represent reality's dynamical nature. You see, what Einstein represents with his “curved,” or “warped,” spacetime is simply the *accelerating* flow of the energy stream.

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It's possible that there is a fundamental relationship between the speed of light and the flow of aether that could bring valuable insights into our understanding of the enigma of time.

There is one feature of the equivalence principle which I *won't* complain about, since it helps in promoting the hypothesis of the flowing universe—that both aspects, that is, gravitational mass and inertial mass, depend upon the same thing—the total number of charged particles and their relationship to the aethereal medium.

Let us now probe a little deeper into the nature of inertia. We'll be needing a lot of room, so we're going out to the great void in the constellation Boötes, in the neighborhood of Arcturus, the fourth brightest star in the sky. Since this great void is the largest we know of, one might consider it the Bonneville Salt Flats of the observable universe. Aethereal flow out here is so sluggish it can be considered, for our purposes, as being static.

For our test object we want something massive enough to have its own gravitational field, but small enough that we can push it around, as well as keep an eye on it. If this sphere were made of something of relatively low density, like rock, or even gold, the medium would pass right through it, working on individual particles, and we couldn't observe changes in the *overall* flow pattern. So let's get exotic and imagine our test object has the density of an atomic nucleus or a neutron star (about 3×10^{17} kg/m³) but is only 2 meters in diameter. This will give it a mass of about 1.26×10^{18} kg, and a surface gravity of about 8.4×10^7 m/s². That's a lot, of course, but as long as we stay at least 3 km away from it the acceleration due to gravity is no more than the Earth's. The speed of the aethereal medium fluxing through the surface would be very close to that of the Earth at 12,950 m/s (Earth = 11,180 m/s).

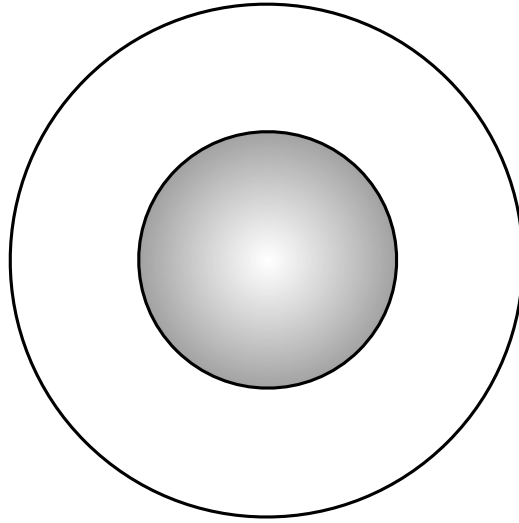
As an aid to visualizing the drain field around our neutron ball, let us construct, in our imagination, a spherical shell, concentric with our ball, about one meter out from the ball's surface. This imaginary sphere will represent the gravitational equipotential of the space around the ball, and is what we will be watching as we accelerate the ball.

To help us (we, of course, are in a spaceship of the latest design) keep track of our imaginary shell, we've embedded numerous lasers into the surface of the neutron ball. These futuristic lasers* have the ability to sample, or measure—via gravitational redshift and computer technology—the inflowing aether field and so delineate on screen our imaginary shell of equipotential.

Our first task is to position our neutron ball such that it is stationary as regards the aether. This would be when our imaginary shell is perfectly concentric with the ball—meaning that the inflowing energy field is perfectly radial and obeying exactly the inverse square law—the state of being “at rest.”

* This might be less magical than it sounds.

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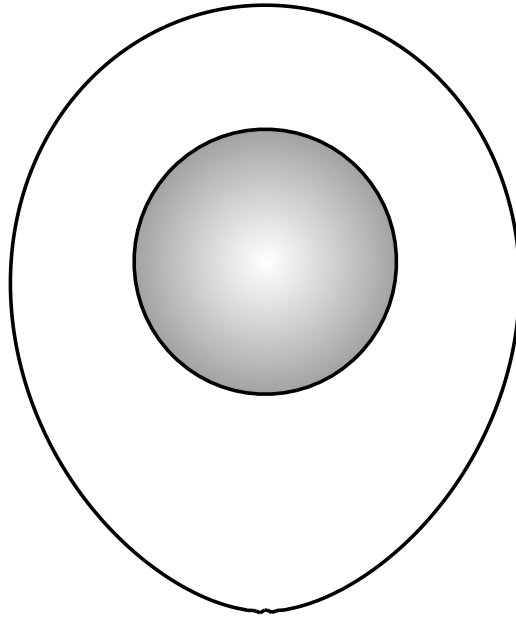
body at rest relative to the aether or free-falling at terminal velocity

We notice on our monitor, when the lasers are switched on, that our shell is ever so slightly egg shaped, or ovoid, indicating that the neutron sphere is moving slightly relative to the aether, so we apply our magic force,* very gently, to the side of the sphere next to the blunt end of the “egg,” till the shell is perfectly concentric with the sphere. Our neutron ball is now at rest—not absolutely, for that is utterly impossible—but definitely at rest relative to local space. Now, this doesn’t invalidate special relativity, but it does put a dent in it.

Anyway, we didn’t come clear out here to define rest energy, we came to play with inertia, so let’s apply a two *g* push for about five seconds. The laser-illuminated shell quickly, but not instantaneously, takes on a slight egg shape—blunt end in the front, pointy end in the rear—gets slightly more egg shaped as the acceleration continues, then quickly snaps back to almost spherical when the force is removed. Now the ball is moving. The reason for the egg shape of the shell of equipoise during acceleration is because the medium, remember, takes *time* to adjust to the new flow pattern. While the ball is being *force-fed*, so to speak, in the front, the medium has to play *catch-up* in the rear. The medium can flow at any velocity up to that of light, but cannot change instantaneously.

* Shoot, as long as we’re being so exotically imaginative we might as well have a magic force. Besides, who wants to tote around a 3 km long chain?

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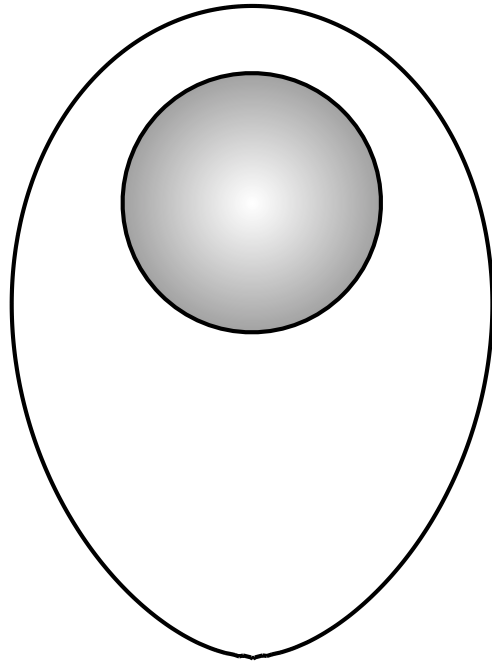


body under moderate acceleration or sitting in moderate gravitational field

Okay, now let's apply a five *g* push for half an hour—same results as the first push, but more of everything. Now the shell, even though the ball is not accelerating, is obviously egg shaped, and the leading edge of the shell has settled in a little closer to the leading edge of the sphere. Our computer calculates that the volume of the ovoid shell is now greater than when it was at rest and perfectly spherical.

Now let's take advantage of all this space out here in Boötes and force our neutron sphere up to half of light speed....(interlude)....Whew—that certainly put a hurt on our energy budget—and now our egg, in addition to being longer overall and closer yet at the leading edge, is also wider at the front quarters as the sphere's drain field reaches out further to the sides. This creates something analogous to a "bow wave," as the medium endeavors to shunt the excess in the front around to the ever lagging trailing edge. The volume of the ovoid shell is now much larger—by nearly 15%—than it was at rest, and this volume, since it is composed of the highest velocity aether, (the nearer to the surface of the ball, the greater the velocity), is a partial measure of the excess energy being *stored up within the system*, like a wound up spring, or an accumulator. The outer portions of the drain field, or sphere of influence, must reach further and further out into space to supply the neutron ball, as if it were *growing more massive*. Which it is! And yet, inside, and on the surface of the sphere everything is quite normal. All of the neutrons are receiving their normal energy input, and a tiny creature living on the surface would notice nothing untoward, would have no idea that it was traveling at half the speed of light.

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body under heavy acceleration or sitting in a strong gravitational field

So, it seems what we're doing here is increasing the V , or velocity, in the equation:

{1}

$$E = \frac{mc^2}{\sqrt{1 - \frac{v^2}{c^2}}}$$

as we approach the speed of light, where E equals the total energy of an object, m equals mass, and c equals the speed of light. This is where weird things start to happen, such as the apparent dilation of time and the apparent contraction of length. Notice please that I'm not saying that these things don't happen—whether apparent or otherwise—or that the math is wrong or anything like that. What I'm positing is a *physical description, a reason, a cause* for the phenomenon of inertia, based on the flow of aether into matter.

An interesting speculation would be to push the neutron ball up to 75% of light speed, (probably impossible), remove the acceleration force, and observe whether or not it could actually *coast forever* in accordance with Newton's first law. I don't think so; I think the system would spontaneously decelerate due to the highly asymmetric nature of the flow pattern. The deceleration curve would probably fall off asymptotically, so that at "normal" speeds the effect would be un-

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detectable. But, if left to itself long enough* in an isotropic medium, the body might eventually—at least theoretically—reach its resting mass.

Here I have cherry-picked a passage from Ernst Mach's 1883 work *Science of Mechanics*.

(the subject is inertia)

“It might be, indeed, that the isolated bodies A, B, C...play merely a collateral role in the determination of the motion of the body K, and that this motion is determined by a *medium* in which K exists. In such a case we should have to substitute this medium for Newton's absolute space. Newton certainly did not entertain this idea. Moreover, it is easily demonstrable that the atmosphere is not this motion determinative medium. We should, therefore, have to picture to ourselves some other medium, filling, say, all space, with respect to the constitution of which and its kinetic relations to the bodies placed in it we have at present no adequate knowledge. In itself such a state of things would not belong to the impossibilities. It is known, from recent hydrodynamical investigations, that a rigid body experiences resistance in a frictionless fluid *only when its velocity changes*. True, this result is derived theoretically from the notion of inertia; but it might, conversely, also be regarded as the *primitive fact* from which we have to start. Although, practically, and at present, nothing is to be accomplished with this conception, we might still hope to learn more in the future concerning this hypothetical medium...” (italics added)

Okay, a lot of you must be thinking I'm some kind of “fool on the hill,” blathering on about gravity when, obviously, gravity is just fine. When I refer to gravitational attraction between two bodies as something only “apparent,” or as a “shortage of aether,” or as a “decrease in the velocity of the medium,” one who has not—as I have—acquired an inverted perspective of gravity, could, most assuredly, still use the term “attraction” to describe the phenomenon.

No, one wouldn't be wrong, but one would continue—as mankind has up to the present—to restrict oneself to the stifling space *between* massive bodies, without a chance to discover what is actually going on in the wider world. Sure, the math works—describing an abstract force operating across empty space—but is this really enough? Probably it is for most people—but what about you scientists? You'll never learn the big secrets of the universe trapped within the Newtonian view of action-at-a-distance.

On the other side however—in the universe of flowing quintessence—all is connected. There are no voids; no discontinuities. Everything has a cause. And so we have a *choice* between two ways of viewing the world: one view, parochial and stultifying; the other, unlimited.

* Impossible, even in Boötes; eventually a gravitational field would be encountered, altering the coasting trajectory.

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One view posits a universe “missing” 95% of its mass. The other has no such problem—everything is present and accounted for.

One view says the universe is expanding and had a beginning; the other views the universe as infinite and eternal.

One view doesn't understand the large scale structure of the cosmos; the other allows anyone of average intelligence to easily fathom the nature of galactic clusters, superclusters, and the great empty regions in-between. All it takes, is to hold out your arm, and realize that it is not being pulled down, it is being pushed.

Light

Nature loves to hide.

…Hericlitus…

For any speculation which does not at first glance look crazy, there is no hope.

…Freeman Dyson…

In questions of science the authority of a thousand is not worth the humble reasoning of a single individual.

…Galileo Galilei…

No one has ever seen a light wave—or photon—and no one ever will. All one can do is try to deduce light’s properties by studying its effects, but so far this hasn’t worked out very well. This difficulty is best exemplified in the contradictory notion of wave/particle duality. This inconsistency of definition would imply that we simply do not know. There is no standard. The quantum mechanical point of view is that you just use whichever one (wave or particle) is more convenient to the phenomenon under consideration. This unsatisfactory arrangement can be somewhat ameliorated by reasoning that—in the end—they are both just forms of energy.

What is truly exasperating, however, is that there is no consistency—when assuming light is a wave—about what *kind* of wave light is, that is, longitudinal or transverse. Again, convenience seems to be the major criterion. If the subject is doppler shift, light waves are always represented as a sine wave:



which is itself a *representation*, an *abstraction*, of a transverse wave. If, however, the demonstration is that of interference effects, say, using Young’s two-slit setup, longitudinal (spherical) waves are always used, resulting in the formation of “wavelets” downstream of the apertures. Light cannot be both. Actually, it can’t be either one.

But now, if there *is* one thing about light that nearly everyone can agree with, it’s the fact that a light quantum, or photon, is a discreet entity. This is a bedrock principle of quantum theory. Upon emission, it travels—like a ray or a projectile—a straight path. A body, upon receipt of the

Light

photon, absorbs the same discreet entity. This fact alone will disqualify the longitudinal wave hypothesis, as this type of wave not only spreads out spherically, attenuating rapidly and bending around corners, but is actually a *wave train*, or series of compactions and rarefactions. This is the nature of a sound wave. This type of wave can be doppler shifted. Light from the sun would never even reach the earth in this mode.

But what about the two-slit experiment? This simple table-top demonstration has been confounding physicists for two centuries, and is not only responsible for the predominance of the wave theory of light over its particle counterpart, but has also played a major role in the way quantum mechanics considers light phenomena, especially the notion of superposition. The two-slit experiment is a nifty parlor trick, but there must be another explanation—it's just too simple, too pat. It is *always* depicted from above, with the plane wave striking the apertures and the issuing forth of the spherical Huygens wavelets, which then supposedly *interfere* on the screen. These wavelets are often shown bending *completely* around the corner—a full 180° arc. This is impossible. Light simply does not behave in a longitudinal manner.

What really destroys the longitudinal hypothesis, however, is polarization. There is just no way to polarize a spherical wave. Polarization implies an asymmetry. Spherical waves are symmetric. Transverse waves, on the other hand, *are* asymmetric, and *can* be polarized. Some examples of transverse waves are ocean waves, plucked guitar strings, or a rope tied to a doorknob that you oscillate left and right (horizontal polarization), or up and down (vertical polarization). Note that these three examples share something in common—they are all *bound* in one way or another. Ocean waves are each bound to the wave in front and the wave behind, and are actually one member of a train of waves. Guitar strings are obviously attached mechanically to the guitar, and placing a finger on a fret just takes the place of the end connection. Supposedly you could let the rope dangle and still make waves with it, but here the rope is actually bound by gravity—you couldn't make waves going up or to the side with the other end unattached.

So, what am I getting at? Just this: any and every book on cosmology, when they get to the issue of intergalactic redshift, first explains about spectroscopy and spectral lines and whatnot, and then they'll show you some version of this:



On the left is a “wave form” supposedly being compressed, or shortened, or *blue-shifted*. My intent is to show this to be impossible for light waves. On the right we see another “wave form,” this one supposedly being stretched, or redshifted—due to the doppler effect—caused by the supposed expansion of space between us and the “receding” galaxy. There are so many wrong assumptions here it's hard to find a place to begin. Let's start with the term “wave form,” which has been placed within quotation marks to distinguish it from what it is—an abstraction of an abstraction—from what most seem to *think* it is. It seems that quantum mechanics and the notion of action-at-a-distance has conned an entire generation into believing that there is, actually, in space, a *wave form*, or:



Light

a “thing” that can be doppler shifted; either stretched (redshifted), or contracted (blue-shifted). But a photon is a discreet entity! A self-contained unit. It may follow a path that can be described by a sine wave, but let’s not confuse the mathematical abstraction with the real thing. A photon can only be thought to “exist” somewhere along the sine wave *path* at an *instant* of time. There is nothing to “stretch.” When a photon is emitted from a distant light source it can have no information about photons in front, in back, or alongside of it. There is most certainly no “wave train” connecting it back to its source.

What a receding galaxy *would* show would be an increase between the arrival times of individual photons. Thus a particular event, say a supernova explosion, that happened far, far away, would *appear* to last longer than an identical event seen closer. The same principle applies when measuring galactic rotation profiles. The parts moving toward us would cause photons to bunch up, resulting in shorter event duration. The parts moving away would do the opposite. This could be *extrapolated* as a doppler shift, but it is *not* a doppler shift. In one of the doppler examples often given, that of an ambulance siren, the entire contiguous wave train is modified by the moving source. Light simply does not behave like this.

Somewhere around 1929, Fritz Zwicky, who first discovered that galaxies were not obeying the known laws of gravitation, and who was also aware of the anomalous redshift of distant galaxies, attempted to explain the redshift phenomenon with a theory he called “tired light.” The idea was that light (photons) lost energy as they traversed the vast reaches of space, begging the question, where did the energy go? (I know). That this theory never gained traction might be attributable to Zwicky’s famously prickly personality. More than likely though, was the fact that people were solving Einstein’s field equations of general relativity, and coming up with answers that indicated that the universe was not static. Einstein, however, preferred a static universe, and so countered with his cosmological constant, an additional term designed to keep the universe from expanding or contracting.*

Also at about this time, first Vesto Slipher at the Lowell Observatory in Flagstaff, Arizona, and then Edwin Hubble at Mount Wilson in California, cataloged the apparent redshifts of numerous distant galaxies. Hubble correlated all this information, and found that distance and redshift related in a linear manner, that is, the further the galaxy, the greater the measured redshift. There were only two ways to explain the phenomenon; either the galaxies were all receding, radially, from the Earth at a high rate of speed, or the light from the galaxies was losing energy as it crossed the vastness of space. Now, nearly every history you will ever read will say that Hubble “discovered” the law that bears his name, the “Hubble constant.” In truth, Hubble was never comfortable with the notion of galactic recession.

Allow me to cherry-pick a few excerpts from Hubble’s “Our Sample of the Universe,” *Scientific Monthly*, 1937:

* Talk about lipstick on a pig. Many popular writers even refer to the field equations of general relativity as being “beautiful,” an incomprehensible notion.

Light

“...Many possible types (*of universe*) are ruled out, but a unique structure is not determined. In the second place, the law of redshifts proves to be a vital clue, but the origin of redshifts, an essential element in the interpretation of the clue, is still an open question...”

“...Thus the accurate formulation of the law of redshifts presents a dilemma. The familiar interpretation of redshifts as velocity shifts leads to *strange and dubious* conclusions regarding the time scale. The alternative interpretation that redshifts do not measure actual motion leads to conclusions that appear simple and plausible...”

“...We may say with confidence that redshifts are the familiar velocity shifts or else they represent some hitherto *unrecognized principle of nature*...”

“...We could completely describe the law of redshifts by stating that light loses energy in proportion to the distance it travels through space. The description seems plausible, although we do not know how the energy would be lost...”

“...Let us assume that redshifts are velocity shifts...The observable region appears to be non-homogeneous, and we seem to occupy a *special, favored position* in the universe...”

“...First we postulate rapid expansion, and it leads to discrepancies, then we postulate an additional effect in order to balance the discrepancies; then we postulate an additional effect in order to balance the discrepancies introduced by the first. The procedure seems artificial...”

“...The familiar interpretation (*velocity shift*) leads to a strange and dubious universe; the alternative possibility (*tired light*), which some might call a strange and dubious interpretation, leads to a simple and familiar conception of a universe so vast...”

“...The revelations of this telescope seem to force upon us a choice between a small, finite universe and a universe indefinitely large plus a *new principle of nature*...” (italics added)

A new principle of nature is exactly what I am proposing, in which light loses energy to fulfill one aspect of the grand drama of the flowing universe, that of *heating* or *pressurizing* space. Does that seem so unnatural? What does seem unnatural is to assume that the range of light is infinite, with no attenuation of energy. This is the realm of perpetual motion. This oversight—as in the case of not assigning a cause to account for electric charge—likely occurred in those upheaval years of physics around the year 1900. When light waves were first discovered, theoretically, by Maxwell, around 1860 or thereabouts, it was a mere curiosity. Electricity and magnetism were all the rage; here was a quasi-magical force that could be harnessed to do nearly anything. Maxwell’s thousand page *Treatise* only had a few pages devoted to light, near the very end. It’s hard not to believe that, had he lived, Maxwell—who was nothing if not thorough—would have come to the same conclusion, namely, that there is no free lunch for a light wave. Indeed he would have insisted upon it. Maxwell believed in the aether, and that the aether had

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the quality of “potential” built into it—that any elastic action-reaction would generate friction—no matter how slight.

But the men who inherited the field after Maxwell’s death hated the concept of potential. It made calculations more difficult. They wanted to “kill,” to “murder” (their words!) the potential. And so they did. What today are called “Maxwell’s equations” are not the equations of Maxwell. They are a stripped down, streamlined version—sans potential—and are mostly attributable to Oliver Heaviside, a man of a more practical bent than Maxwell. Maxwell’s equations, in their original form, are applicable only to a world filled with an aethereal medium.

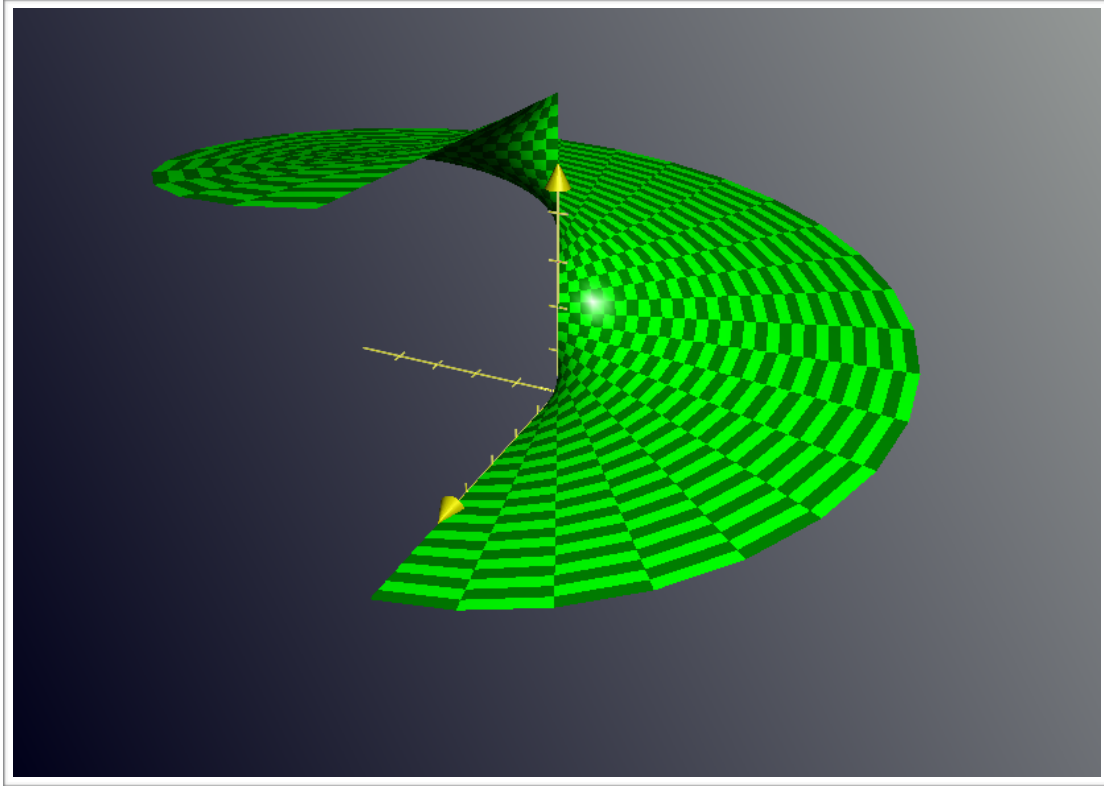
Here is Maxwell in the preface of his *Treatise on Electricity and Magnetism*:

“For instance, Faraday, in his mind’s eye, saw lines of force traversing all space where the mathematicians saw centers of force attracting at a distance. Faraday saw a medium where they saw nothing but distance. Faraday sought the seat of the phenomena in real actions going on in the medium, they were satisfied that they had found it in a power of action at a distance impressed on the electric fluids...I have therefore taken the part of an advocate rather than that of a judge, and have rather exemplified one method then attempted to give an impartial description of both.”

I too have an agenda, mentioned earlier, which is to prove that the universe is not expanding, hence no “big bang.” Intergalactic redshift is the key issue. We’ve seen that Hubble himself was dubious about velocity shifts. We can’t understand redshift unless we can better understand what light really is—an age-old question—so now I will attempt to explain the nature of light.

Light (this includes all electromagnetic radiation), first of all, is not any kind of a *thing*. It is an *action*—a disturbance in the aethereal medium—and traces out the path of a helicoid. A helicoid is simply a helix that is connected at every point to an axis through its center. Some common examples are: a child’s slide that spirals tightly around a pole on its way down; a tight spiral staircase; or a single fluted screw, like those used to lift grain or water. The word spiral as used here is technically incorrect, as a spiral actually has a changing radius, whereas a helix does not, but no matter. The radius, or amplitude, of a helicoidal light wave never varies, no matter the frequency. If you could take a time-lapse photograph of a photon along its axis of propagation, that is, directly in front or in back, (quite impossible), of one full wavelength, the photon would appear perfectly round. The number of times the photon revolves—one full wavelength—per second is its frequency. No difference with convention there. Allow me to point out here, that if you took something helical, like a spring, or a Slinky, and looked at it from the side—that is, perpendicular to its axis—what you see is a perfect sine wave.

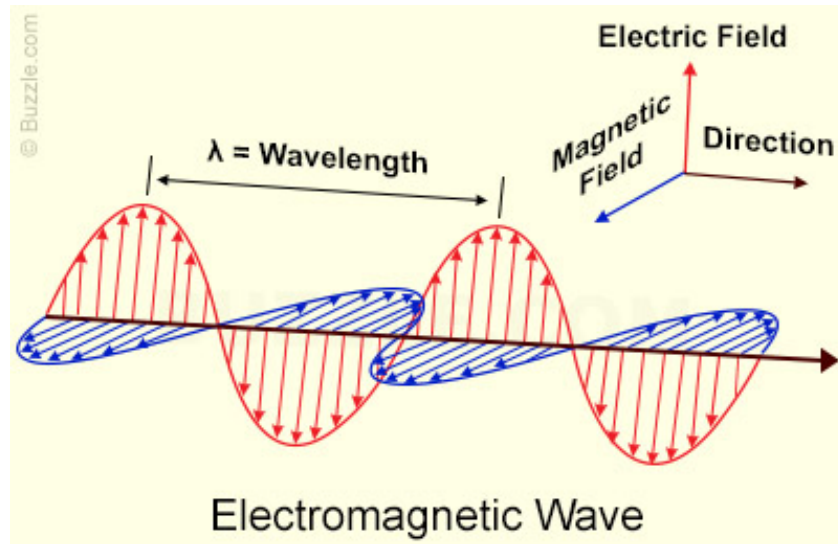
Light



helicoid ($z = \theta$)

Now let us open our physics textbook and look at the diagram depicting a transverse light wave. In the first half-wavelength we see the electric vector; perpendicular to and in phase with it we see the magnetic vector. In the second half-wavelength we see them each 180° opposite from their first positions. When we are taught about light waves, we are told that a changing electric field “creates,” or “sets up” a changing magnetic field, which creates a changing electric field, which creates a changing magnetic field, and so on. Looking at the diagram, this doesn’t seem physically possible, not with the electric and magnetic vectors peaking at the same time, or, “in phase.” What was just described above—creating fields—could only take place in *time* and *space*. It seems the textbook wave, if it could do anything, would just sit there and vibrate. And what about that place on the axis, in the middle of the wavelength, where the vectors cross? That is peculiar; it almost implies a discontinuity.

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No, if you want this thing to go, to travel, to create, you've got to slide those magnetic vectors forward, or backward, a quarter wavelength, in-between the electric vectors. Then things can happen. Now you have a spiral staircase. Now you have continuity.

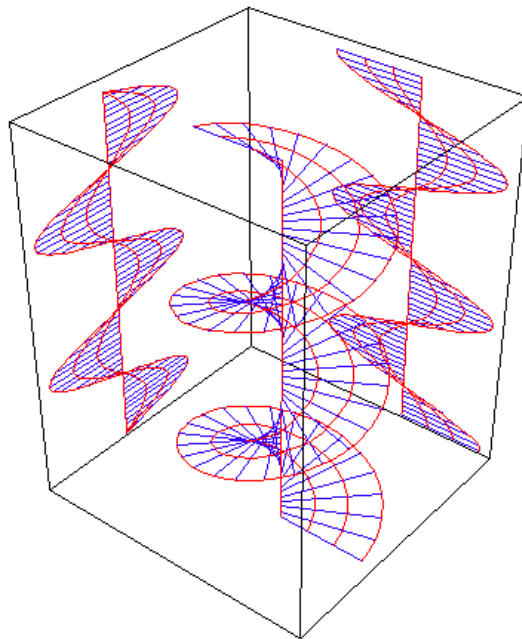


Diagram showing relationship between helicoid and sine-wave. Notice that the two sine-waves, at right angles to one another, are 90° out of phase.

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Now let's explore the action, first by means of a crude analogy with a spiral staircase. This staircase has one step every 90° . Four steps equal one cycle. Some faith is required here; you're standing on the first step, but all the other steps are invisible. As you step up to where the next step should be, the step begins to materialize under your foot, and begins to dematerialize under your other (first) foot. As you place your full weight on the second step, it is now solid, and the first step has disappeared! Your faith has been rewarded, and you continue to climb the "magic staircase," which only ever manifests one complete step or two partial ones at a time. In like manner, our helical light wave only "exists" or is "manifest" at one constantly changing portion of the full wave*—say maybe about one fourth of a cycle—and is a feathered-out scintillation in both front and back. So these vectors are "chasing" each other around the axis—magnetic, electric, magnetic, electric—kind of like two squirrels chasing each other up and around a tree trunk. Unlike the squirrels though, the energy dance is smooth, and sinuous, and extremely efficient.

Actually, the squirrel analogy is poor; there is only *one constantly changing* vector. Let's imagine again that we're sighting along the axis, looking head on at an approaching photon. Let's use a clock face to keep track of the changing vector as it rotates and advances. We'll begin at 12:00, and say this vector is 100% electric, and by convention we'll call it positive. As the vector rotates, and the photon advances, the radial aspect of the vector changes continuously. At 12:00, or rather immediately after, a magnetic field begins to form, displacing the positive electric field from its place on the axis. At 1:00 the vector is $1/3$ magnetic, all of it inboard, (toward the axis), and $2/3$ electric, all of it outboard, (away from the axis). At 2:00 these ratios have swapped, that is, $2/3$ magnetic and $1/3$ electric. At 3:00 the vector is now 100% magnetic, the positive electric field has been displaced outboard into nothingness, and a new, negative electric field forms on the axis, displacing the magnetic field outboard. At 4:00 the vector is $1/3$ electric, all of it inboard, and $2/3$ magnetic, all of it outboard. At 5:00 the ratios have swapped.

Now, what is happening, is that the expanding, rotating electric field is creating, or inducing, electric *tension* in the aetherial medium—similar to, but different from, the way a charged particle creates an electric field—that is, the neutral energy field is being *displaced* or *sheared* into an unbalanced electrical state by the kinetic energy of the advancing, rotating, electric field vector. The electric portion of the wave is responsible for the "action," the magnetic portion is more of a "reaction," or a manifestation of the medium doing what it does, that is, seeking an equilibrium.

The real action, however, takes place at 6:00 and 12:00. There is a strange and beautiful mystery about electromagnetism in general concerning all this perpendicularity and right hand rules and, well, *squareness*. It must be a clue to some deeper meaning of nature, but unfortunately I can't see past that veil. Anyway, at 6:00 an event happens. Every 90° an event happens. It seems, at 6:00, the electric portion of the vector, now at 100%, hits a wall—has displaced the aether as much as nature allows—and, in effect, goes "over-center"—perhaps even changes polarity—and the medium *pushes back*, like a spring, converting the potential energy acquired from 3:00 to 6:00 into kinetic energy—both rotational and linear—from 6:00 to 9:00. Somewhere around 7:30 this angular and linear momentum is "handed off" to the magnetic field in a manner not unlike a baton being passed in a relay race, hence there are four hand-offs per cycle and a continuum is

* A good example of this would be a "wave" going around a sports stadium. The fans represent the aether, and are only engaged with the wave as it passes by their immediate neighborhood. The wave isn't a *thing*, it's an *action*, mediated by the crowd.

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established. As to the geometry of this action, there is only one straight line—the axis—and everything else is curving like a screw, with the degree of curvature being dictated by the wavelength.

Also at 6:00, the magnetic field that started on the axis at 12:00 disappears from the outboard limit of the vector, and at the *same time* a new magnetic field is induced on the axis. At 9:00 the negative electric field disappears from the outboard end of the vector, the magnetic field is at 100%, and a new positive electric field is induced on the axis, which begins turning kinetic energy back into potential energy. 12:00 is exactly like 6:00. It seems likely, in the interest of symmetry if nothing else, that something similar happens at 3:00 and 9:00 with the full magnetic vector.

Now, if we compare this rapidly rotating, helicoidal photon with the textbook photon—the transverse wiggly thing—which one would be more likely to go straight? Also notice that the helicoidal photon exhibits polarization in the normal manner: 12:00–6:00–12:00–6:00. Oscillating. When 12:00 is manifest, 6:00 doesn't exist, and vice versa.

This is from Newton's *Opticks*:

“query 26] Every ray of light has, therefore, *two opposite sides*, originally endued with a property on which the extraordinary refraction depends, and the other two opposite sides not endued with that property. And it remains to be enquired whether there are not more properties of light by which the sides of the ray differ, and are distinguished from one another.” (italics added)

Okay, now for the fun part. At 1:30, 4:30, 7:30, and 10:30 the vector is 50% electric and 50% magnetic. 1:30 and 7:30 are alike as concerns inboard/outboard order, with 4:30 and 10:30 being the opposite. Now, when a photon makes “contact” with matter, it's pure chance as to where on the 360° circle the contact will be made, and therefore it's pure chance as to *what will happen* at these four points of equal electric/magnetic intensity. This is the 45° line in-between all the 90° lines. If contact is made at 12:00, 3:00, 6:00, or 9:00, the result of an experiment could be predicted with near 100% accuracy. Not so with the in-between places—every 90° there is a “liner”—a not one and not the other. *Chance* enters the arena. And this is not a sharp line; it's fuzzy, and dynamic, and contingent. Other factors are called into play—particularly angle of incidence—but also things like temperature, movement, surface electrical tension, etc. We might call the rotating, advancing photon a *cosmic wheel of chance*.*

The other main factor to notice about this photon is that it is chiral. With all these right hand rules to account for, it appears inevitable that a photon can only spin one way, and that is most likely right-handed, that is, anti-clockwise when looked at coming toward the observer. In the above description, with the clock face, I had the photon spinning clockwise, or left-handed, just to make the example easier to understand. Anyway, it's one way or the other—it's not both ways and it's not either way. This represents a huge natural asymmetry, but it only makes sense. A pro-

* Einstein would have been appalled that indeed god *does play dice with the universe!*

Light

ton spins one way, an electron spins one way, and as light interacts with matter these spin orientations must be an important part of the interaction. As Mach said, we're only given one world. In this world light is right-handed, and anti-matter is not favored.

The rotation of the plane of polarization of a light wave caused by the "Faraday effect" can be explained using this chiral, helicoidal notion of a photon. On passing through a dielectric medium, such as glass, in the same direction as an applied magnetic field, the magnetic portions of the ray are—twice per cycle—*augmented* a tiny amount, advancing, or turning the plane of polarization *clockwise* from our viewing position at the magnetic field source. Upon reflection, with the ray now propagating against the applied magnetic field (toward the observer), the magnetic portions of the ray will now be *diminished*, or retarded, again resulting in a turning of the plane of polarization *clockwise*, or rather a doubling of the first result, as opposed to an expected cancellation of the two rotations. While what is actually going on in the dielectric medium is not known—it could just as well be the electric portions of the ray are the ones affected—it is simply the screw-like nature of photon propagation that assures the observed result.

So then; basically what we have for a picture—an abstraction—of a photon is a quartered circle, a very common geometrical shape from antiquity onwards. Two kinds of sides, equal and opposite.* The mathematical relationship is simple yet unique. In all the known universe there are no other numbers that satisfy the relationship:

$$\begin{array}{ll} x + x = y & x \cdot x = y \end{array} \quad \{1\}$$

except:

$$\begin{array}{ll} 2 + 2 = 4 & 2 \cdot 2 = 4 \end{array} \quad \{2\}$$

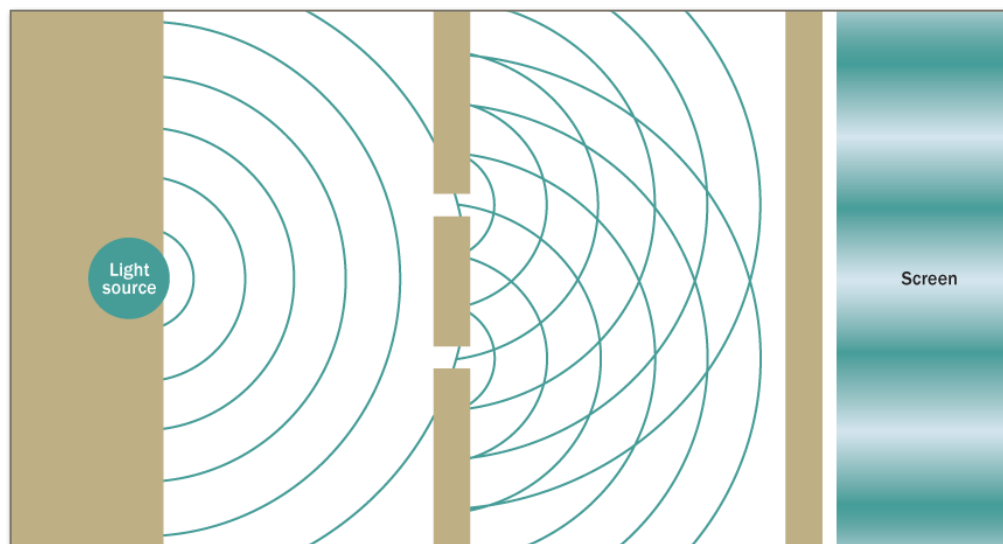
that is, two numbers, either added together or multiplied together which give the same result. We all know that at the most fundamental level nature has to be simple. Photon emission, absorption, and propagation are among the most common activities in the universe. It shouldn't require complex mathematics to describe these actions. Remember Occam's razor.

Let's briefly explore some other light/matter interactions, namely diffraction, refraction, reflection, and emission. We'll begin with reflection, for example, when you see a partial reflection of yourself in a glass storefront. Of the photons reflected from your body and traveling to the glass, half will make contact with the glass in electric mode, and be reflected; half will make contact with the glass in magnetic mode, and be transmitted, and so a ghostly image is presented. It might actually be the other way around, regarding which is reflected and which is transmitted, but the thing to notice is that the photon exhibits kind of a *digital* nature. This or that. Yes or no. This fact—that for some phenomena only two of the four sides are *in play*—will help explain diffraction effects, that is, dark and light areas (fringes). It's possible that light doesn't actually "interfere" with itself, that "interference" is merely an optical illusion attributable to two of the photon's characteristics, namely, the digital nature and the continuously varying vector intensities.

* A yin-yang symbol comes to mind.

Light

When a light ray passes close enough by the edge of a body to cause an interaction, it is a matter of chance as to which portion of the photon's active side—the side *in play* in the particular circumstance—will present to the body. Assuming the electric vector to be this side, the point of contact, or action, would be somewhere between 10:30 and 1:30, or between 4:30 and 7:30. The electric intensity of the vector varies continuously, peaking at 12:00 and 6:00. It seems likely that different deflections would ensue according to the point of action, resulting in a Gaussian probability distribution (bell curve), with the 12:00 and 6:00 “hits” being in the center of the distribution. The two sides not in play, in this case the magnetic vectors, would in effect separate, spatially, the two adjacent probability distributions, resulting in the alternating dark areas seen in a so-called interference pattern. If light rays actually interfered with one another, wouldn't they be doing so all the time? Why just under certain experimental conditions?



Returning to the famous Young two-slit experiment, light passing through a narrow slit is just a special case of diffraction, with two edges involved instead of one. The two slits must be positioned very close together. It's not impossible to imagine that the photons passing through one slit effect the “state” of the adjacent slit—perhaps via electric surface tension—with only so many “states” being allowed by nature. This would establish the condition whereby the action described above—probability distributions, or *scattering*—would be multiplied, resulting in the familiar fringe pattern. Again we appeal to Occam's razor. Do these photons (or electrons) exist in an indeterminate state (superposition) until an observer causes a “wave function collapse”—a notion freighted with ambiguity—or is it a simple matter of scattering angles? This is speculative, obviously, but it sure would be nice to jettison the notion of superposition and let Schrödinger's poor cat out of the box.

More from Newton's *Opticks*:

Light

“query 1] Do not bodies act upon light at a distance, and by their action *bend its rays*; and is not this action, other things being equal, strongest at the least distance?”

“query 3] Are not the rays of light, in passing by the edges and sides of bodies, bent several times backwards and forwards, with a motion *like that of an eel...*”

“query 4] Do not the rays of light which fall upon bodies, and are reflected or refracted, begin to bend before they arrive at the bodies; and are they not reflected, refracted, and inflected, by one and the same principle, acting variously in various circumstances?” (italics added)

So far we have two qualities of light/matter interaction: the digital nature, or sides being in or out of play: and the relative intensity of the continuously changing vector, with its effect on scattering angles. With refraction we add a third quality, namely, the effect caused by the angle which the photon presents to the dielectric interface *before* refraction takes place. Remember the photon is extant, spatially, a distance of about a quarter of a wavelength. Thus it will present a curving angle to the interface, said angle varying continuously with wavelength. Hence a short wavelength, high frequency photon will strike with a much more blunt angle than a long wavelength, low frequency photon. Current dogma uses the principle of least time, or least action—a somewhat mysterious notion—to explain the phenomenon of refraction. How does the photon, or light ray, upon arrival at the interface, *know* what it is in for, what is up ahead? How does it *know* the refractive index? It doesn't stop to reconnoiter. It has no idea what its mates are doing. It could only be that the ray's path through the dielectric medium is foreordained by the angle it presents—a simple geometric/mechanical relation corresponding to the wavelength, or color, of the light—and the principle of least time is simply an ad hoc, historical artifact.

So it would seem, referring back to wave/particle duality, that both aspects are mostly illusory; the wave aspects as outlined above, concerning diffraction and interference; and the more obvious particle nature, exemplified by the photo-electric effect and Compton scattering. The helical wave falls somewhere in-between—it is neither and it is both—a refreshing outcome and a possible standard.

Before we get to neutrinos, and ultimately to redshift, here's another passage from Maxwell's *Treatise on Electricity and Magnetism*, this coming near the very end of the thousand page, two volume work:

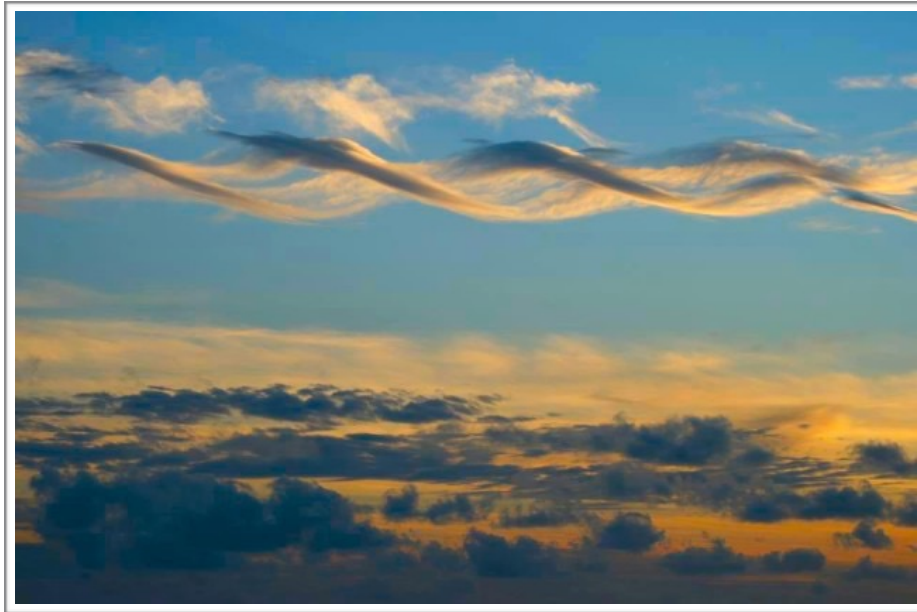
“821] ...whatever light is, at each point of space there is something going on, whether displacement or *rotation*, or something not yet imagined, but which is certainly of the nature of a vector or directed quantity, the direction of which is normal to the direction of the ray...the magnitude of this vector remains always the same, but its direction *rotates* round the direction of the ray so as to complete a revolution in the periodic time of the wave...the direction and the angular veloc-

Light

ity of this vector are perfectly known, though the physical nature of the vector and its absolute direction at a given instant are uncertain...This vector is always perpendicular to the direction of the ray, and *rotates* about it a known number of times in a second..." (italics added)

I can't describe how encouraging it was for me to read this—to realize that maybe I wasn't hopelessly lost in the wilderness—that someone had been here before. It was certainly worth slogging through that whole book. Twice.

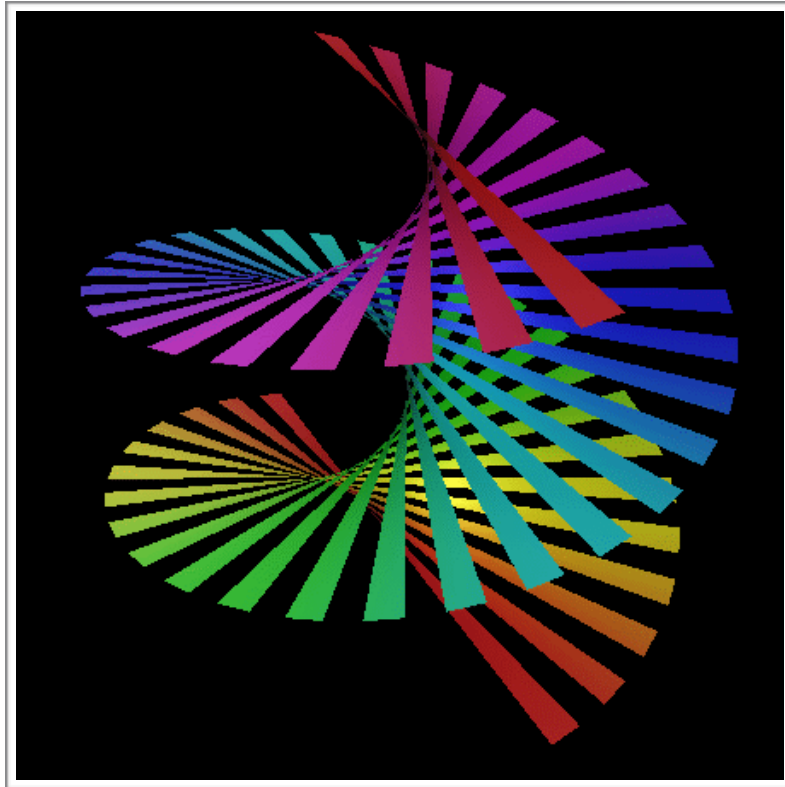
Now let us, in our imagination, enclose our helicoidal ray in a cylinder, the diameter of which is equal to the photon diameter (whatever that is), then cut through, or section it, so we can view it from the axis. This is our clock face or quartered circle again. The question is; how much space, that is, area of the circle, and volume of the cylinder, is our photon occupying? My best guess would again be one-fourth, and spatially would be shaped pretty much like a quarter circle, with energy content being greatest in the central region, on and adjacent to the axis, attenuating to an insubstantial scintillation in the outer regions. And so, for the quarter wavelength in cylindrical space that our photon is extant—in one instant of time—one-fourth of the volume would be occupied. This is by nature quite speculative. It's possible and/or likely the photon is more condensed and ribbon-like. Either way, there is a lot of room left over in the imaginary cylinder.



So why don't we place another photon, of identical wavelength, on the same axis, in a double helix arrangement—that is, 180° opposite the first photon, but phase-shifted 90°. That will give, for every vector and every time, an exactly equal but opposite measure of electric field strength to magnetic field strength. For example, when the first photon vector is at 12:00 and 100% electric, now there will be extant—on the other side of the axis, at 6:00—a vector 100% magnetic for the second photon. Thus complete field cancellation is accomplished, and we've still only used

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half the volume of our imaginary cylinder. Obviously what we're describing here is a neutrino. Now instead of a single bladed propeller we have a two bladed, balanced propeller; instead of a single fluted screw we have a two fluted, balanced screw. This appears to be a very natural and highly economical fit. Why would nature create separate platforms for the two entities when she could fit them both on the one? And we know she is pleased with the double helix formulation—we literally couldn't live without it—DNA.



double helicoid (neutrino)

When a particle and an anti-particle annihilate, a pair of high energy gamma rays are produced that propagate out in exactly opposite directions. It is a highly symmetric event. A neutrino is the product of an asymmetric event, for example, radioactive beta decay. It can't recoil both ways and so distribute the energy in two directions. Since it seems, in beta decay, that there is more radiant energy released than a single photon can handle—but only one degree of freedom available for escape—the energy left over after electron recoil is split between two photons, which then exit the scene on the same axis; a neutrino. Neutrinos, of course, lose energy as they propagate, and so also heat and pressurize the aethereal medium, or space, just like a photon. Like two photons.

Light

Science has already ascribed the properties of helicity and spin to the neutrino, along with the more dubious properties of mass and left-handedness. How strange that science knows practically nothing about light, yet is able to assign such definite attributes to this ghostly entity. One wonders how much of this information is *extrapolated* mathematically. If we can't see a light ray we sure as hell can't see a neutrino.

So, it seems what we have, in the big natural drama, are three “platforms,” each composed of a duality. We have the radiant platform with its two aspects; photon and neutrino. We have the matter platform with its two aspects; proton and electron. And finally we have the aethereal platform with its two aspects; electricity and magnetism. Now “three” is a good place for this reductionism to stop. Three is the minimum number of legs required for stability. Three is the number of dimensions required for reality, and three is the number of phases in the cosmic energy cycle: radiant, aethereal, and material. We can put the razor aside for awhile.

It's interesting to note that light, or asymmetric radiation, plays the same role to the neutrino that the hydrogen atom plays to the helium atom. The neutrino and the helium atom are both symmetric, inert, closed, and, well, perfect. The photon and the hydrogen atom are both asymmetric, active, open, and, um, less than perfect. And one is basically just half of the other.

Now let's have a go at photon emission. In a universe filled with a pressurized aethereal medium, right down to the atomic nucleus, anyone could conjure up something probable—without math. Basically, atomic photon emission is just release of excess pressure. Let's imagine an helium atom in its ground state. Forces are balanced. Aethereal inflow is uniform and laminar, that is, not turbulent. To describe the interplay of magnetic and electric forces between the electrons, protons, and neutrons—even in this relatively simple system—is likely beyond the reach of mathematics. So now a photon comes along and is absorbed* by the atom, adding its energy to the system. Now the system is unbalanced and out of whack. One of the electrons, probably the one closest to or responsible for the absorption event, gets forced out of its current orbit into a higher one—just how high being dependent on the photon's energy. Notice there is no mysterious quantum “jumping”; the action is caused by simple hydrodynamics. When the electron is *pushed*, or *accelerated* out of its orbit, it creates turbulence and *eddies* in its wake. A spinning eddy breaks off, and, now on its own, becomes a rapidly spinning vortex, drawing in and feeding on the over pressurized medium surrounding it—in effect, *condensing* energy into angular momentum—causing pressure to be relieved. At some break-even point, outside pressure forces the electron back down, and the surge in pressure forces the vortex out, at which point it “becomes” a photon and exits the scene. Voila.†

* Absorption is less clear-cut than emission. It might have something to do with sympathetic frequencies, or maybe something as simple as equalized angular momentum—like matching gear speeds in a transmission.

† There; that wasn't much more complicated than describing the flushing of a toilet.

Light



It seems everything in the universe that isn't flowing or swirling is going round and round; spinning; rotating—an action apparently preferred by nature—and one we are far from finished with. Angular momentum is easily the simplest and most elegant way to store up energy. With the rotating, helicoidal photon, its energy content scales *directly* to its frequency, or angular momentum. A high energy photon is like a compressed Slinky, whereas a low energy photon is like a stretched out Slinky. Which would you rather get hit with?

Rotation also provides the means for regulating the speed of light. Basically the speed of light is just the speed of induction. Remember that a magnetic field is just a manifestation of the aetheral medium as it tries to put to rights imbalances caused by those pesky electric fields. In the case of those refrigerator magnets, which could be considered as not moving, the magnetic field can reach out in any direction for help in equilibrating the local imbalance, and so does. In the light wave, however, nature has assigned the poor magnetic field a task of truly Sisyphean proportions. In order to neutralize the *rent*, or *shear*, or *displacement*, caused by the electric field, the magnetic field has only one option as to where to seek help, and that is forward—in the direction of propagation—into the future. There's certainly no help from behind, not at this speed—nor from the side; there just isn't enough time for a flow pattern change. And so every time (twice per cycle) the magnetic field reaches out into the future to repair the now, the present, it inadvertently creates (to its dismay, again and again and again) another electric field. And this continues until the photon either interacts with matter or runs out of energy (angular momentum)—just like a spring winding down—but definitely not *forever*.

Going back to our clock face, recall that the magnetic field is present and active all 360° of the circle, with maximums at 3:00 and 9:00 and minimums at 12:00 and 6:00. Whether or not the fields at these minimums are actually connected—thereby keeping the magnetic loop intact—or separate, as in the earlier description, is an interesting question. The latter view would seem to imply magnetic monopoles, which would make light even more enigmatic.

To see how the speed governing mechanism works, we'll use just 90° of our clock face, say, 12:00 to 3:00. For our first example we'll use an X-ray photon, something rotating really fast.

Light

The vector (we'll stick with a left-handed photon to avoid confusion) rotates from 12:00 to 3:00 in an extremely small amount of time. The magnetic field, which is propagating toward us, the observer, into the future,* is, even though moving at the speed of light, only able to travel a relatively short distance forward. Consequently, it only has an equally short time to induce the next electric field, said field being spatially and temporally identical to it. And so it's the same all round the circuit, or cycle, and we have the equivalent, path-wise, of a compressed (tight) Slinky — which not only packs a wallop, but does so while presenting a very blunt angle—able to knock an electron out of a metal surface, but unable to penetrate the Earth's atmosphere.

For our slow rotation example we'll use a photon from the infrared band of the spectrum. Speed of rotation from 12:00 to 3:00 is glacial compared to the X-ray. The magnetic field now travels much, much further towards us—into the future—in the allotted time, and consequently has more time to create its electric counterpart, again, identical spatially and temporally. This is the equivalent, path-wise, of a stretched out Slinky. It doesn't have near enough energy to knock an electron out of metal or go through flesh, but it can warm you on a cold night or allow you to see in the dark—to see *heat*—with night-vision goggles.

They both—X-ray and infrared—propagate at the same velocity, the speed of light. This is the velocity of induction,† the velocity at which the magnetic field can *reach into the future*.‡ This cannot happen in a void. It is a consequence of the electromagnetic properties of the aether. We could think of the helicoidal wave as a single-fluted screw, *screwing itself* through the medium; or as a single-bladed propeller *slicing* its way through; or simply as (my favorite) a *twist in space*. And as light twists through space, through the aether, light heats it. Joule proved that a simple paddlewheel in water, powered by the force of gravity, turns work into heat. Can it not also be thus for light and space?

Maxwell again, from the *Treatise*:

“...the system has a quality of potential energy, which is capable of being transformed into motion, but which cannot begin to be so transformed till the system has reached a certain configuration, to attain which requires an expenditure of *work*, which in certain cases may be infinitesimally small...At these points, influences whose physical magnitude is too small to be taken account of by a finite being, may produce results of the greatest importance...” (italics added)

Although I differ with his general philosophy, I stand firmly with Bishop Berkeley here in being critical of analysis, or calculus, for throwing out or ignoring “little bits.” Ignoring the fact that

* Which is why we can't really see it.

† The outer parts of the photon are traveling—especially in the case of the X-ray—faster than light, but the photon itself, the *signal*, is not.

‡ The definition of time?

Light

light is *not* 100% efficient has helped bring upon us the twin horrors of the big bang and the expanding universe. There is no free lunch in nature. Light loses energy as it propagates, in a linear relation to distance, and basic electric charge requires a cause.

At this point the well informed doubter might well ask “but what about the signal duration problem?” This was a serious setback for early champions of the tired light theory. It is a known fact that a far distant event, such as a supernova, seems to last longer (greater duration) than a similar event seen closer by. We touched on this earlier. If the distant galaxy is *not* receding, as I claim, what then is causing the signal dispersion?

Space

Imagination is more important than knowledge.

…Albert Einstein…

Nothing can be created out of nothing.

…Lucretius…

Energy is a quintessence of so subtle a nature that it cannot be contained in any vessel except the inmost substance of material things.

…Torricelli…

So, you want to know what causes signal dispersion? It's the expansion of space.

“What!? But you've been arguing the whole way that space is *not* expanding!”

No, I said the *universe* is not expanding. Space *is* expanding.

“I'm confused.”

Allow me to explain.

Space—all of space—is criss-crossed, at all times and everywhere, by radiant energy. Photons and neutrinos are constantly twisting, agitating, and heating space (aether) so that it can flow, under pressure, into matter. Much of this radiant energy doesn't get very far from its source. A star recycles a large amount of its radiant output right in its immediate neighborhood, due to gravitational redshift. It's expended in twisting through the high velocity aether streaming into the star—part of a constant recycling—and a toll which must be paid. But most escapes, and off it goes, out into interstellar and intergalactic space. The latter is where our current interests lie, namely, the so-called voids between galactic clusters and superclusters. These are definitely not voids. They are bubbles. “Bubbles” is not a metaphor. They are bubbles of pressurized aethereal medium.

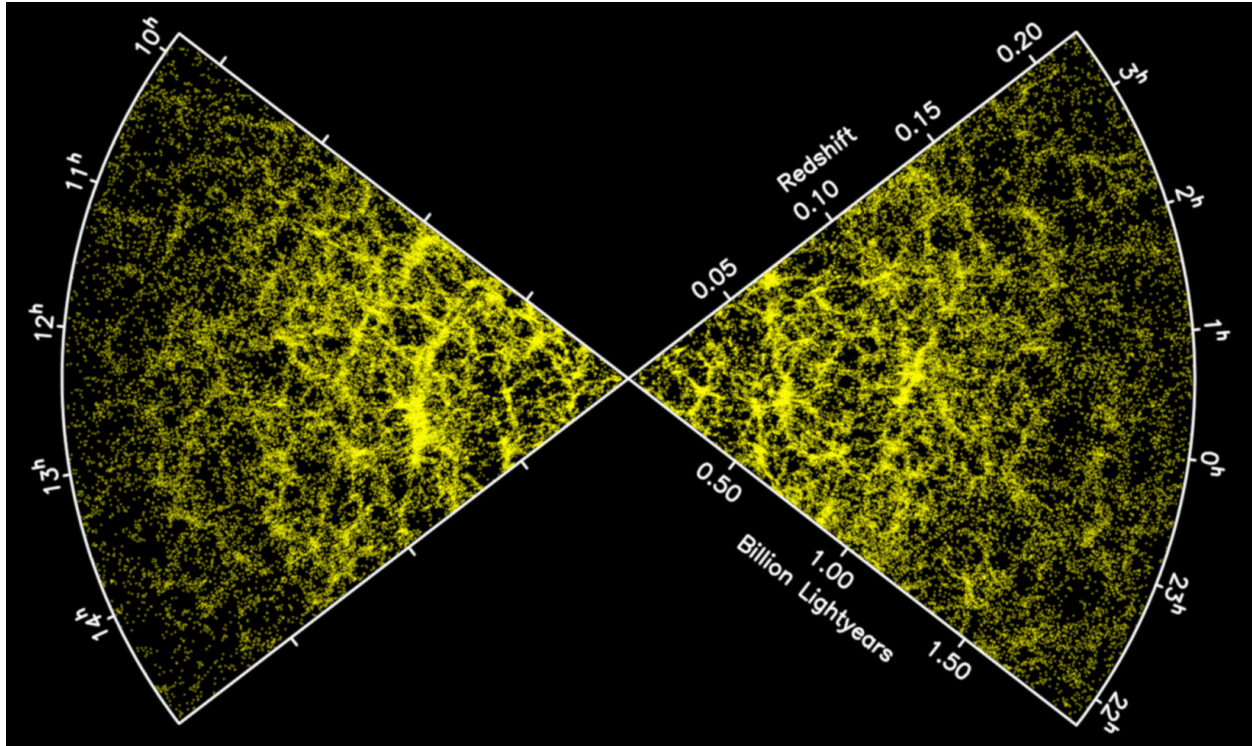
Space



Imagine that we're back in our spaceship and we're visiting one of these empty regions. With the naked eye we see nothing, just blackness. But with a telescope we can see distant clusters and superclusters just about everywhere we look. Our "bubble" appears to be roughly spherical. Our task now is to map the flow of aether into yonder galaxies. Our ship's computer does this for us by analyzing the whole situation and placing on our screen little vector arrows that show the flow of the myriad streams. But we're not really concerned about where the arrows point *to*—we want to follow them *back*—to find the place in the bubble where all the *feet* come together, that is, where all the non-pointy ends of the vectors coincide. Now think about it; the bubble is being constantly *reinflated* by all the radiant energy flowing through it. Somewhere near the center, where all the feet meet, at the origin of flow, energy—the aethereal medium—is actually doing something analogous to *upwelling*, as if out of nowhere. It could not be otherwise.

So, in this bubble, space—not the universe—is actually expanding, just like it is in all the adjacent bubbles. They aren't pushing the universe *apart*, they're pushing it *together*, into the spaces in-between the bubbles where all the matter is, into what we might call the skin—the soapy film—of the bubbles. And indeed this is how the universe looks at the largest scale; like foam. This isn't merely my opinion; this is what our telescopes reveal. Radiant energy, heating the bubbles, makes it happen.

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They say new theories should predict new phenomena, and so here I will wager my whole theory on one, although it's probably not actually verifiable or falsifiable. I predict that these central regions of the bubbles would be the most pristine and pure places in the entire cosmos. There would be no stars, no planets, no rocks, no dust, no atoms, no particles of any sort; no matter at all, just pure, unadulterated energy, or quintessence. If god lived somewhere this would be the place. It's not easy to get here either—it's *uphill* all the way—from any direction. It is the inverse of the center of a massive body; like the material world turned inside-out.

Now back to signal dispersion. Imagine two photons, from the same star, following similar trajectories, a few light-seconds apart. An individual photon crossing this central region of the bubble would experience nothing untoward; first upstream against the aether flow, then downstream with the aether flow. But a strange thing happens relative to the two photons. Between the time that the first photon passes the center, and then the second photon passes the center, the *space* between them will have increased—as if the *road* was growing out of the center in both directions—with the result that the two photons are now, permanently, further apart from one another. The difference might not be great, since the medium out here is moving so slow, but how many of these bubbles would a light ray cross in a million, or a billion, or five billion years? And so the *time*, or *duration*, of a distant event would *appear* to be longer than normal.

So much for signal dispersion. Let's slay some more dragons. The expanding bubble explanation for the large scale structure of the universe eliminates the need for so-called "dark energy," because the universe is *not* expanding. Now let's examine a spiral galaxy and likewise dispatch with the "dark matter" hypothesis.

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But first, let's return to our own solar system and see if we can't discover on a smaller scale what is wrong with current theories of gravity. Newtonian gravity and general relativity both assume that the gravitational force extends radially from a massive body, attenuating via the inverse square law. This works fine *in* the solar system, because it is a system, a unit. It was born a unit and has always been a unit. It is assumed that gravity, although weakening, retains the radial pattern. This is where the problem lies. Outside the unit, where everything isn't gravitationally locked into place, aether is free to *flow*. Just like we saw with Saturn—where the lateral flow velocity diverged at the polar axis and shifted to converge at the equatorial plane—so this same process takes place with the solar system at large, with all the planets and moons and other matter in the ecliptic playing the role of Saturn's bulge and rings.

The aethereal medium is drawn where it is needed. Supply and demand. Or rather, demand and supply.* That means *less* at the polar axis and *more* at the ecliptic. The shift is probably occurring clear out in the Oort cloud. And here I will make another prediction, this one theoretically verifiable. This concerns the anomalous "slowing down" of the Pioneer 10 and Pioneer 11 spacecraft as they exit the solar system. If they are anywhere near the ecliptic, as I assume they are, they are being slowed down because there is more aether flowing in, more "gravity" than current theory predicts. If, on the other hand, these spacecraft were leaving the solar system via the polar axis, there would be an anomalous *speeding up*, as here they would encounter less aethereal flow, less "gravity" than current theory predicts.



If anything in a spiral galaxy wanted "out," the polar axis would supply the easiest avenue of escape.

* This is our basic chicken and egg conundrum again.

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The principle would be the same for anything with a disc. If we could see the aether flowing into a spiral galaxy, we would see a stately, ponderous, beautiful, *spiral*—as if the aether were an extension of the spiral arms. We would see the usual divergence at the polar axis, with the entire flow shifting globally toward the disc. Outside the disc, and co-planer with it, the flow would be heavier, more swift. Likewise with the flow into the spiral arms. More mass draws in more energy, more space. As the spiral flow moves into the central regions of the galaxy, the spiral tightens. This is the transition zone. Inside of here the flow finally turns radial as the acceleration rate picks up, and so the nucleus of the galaxy becomes *locked*, and rotates according to Newtonian mechanics.

Well, we can clear the books now. If freely flowing aether can account for the galactic winding “problem,” there is no need for an ad hoc “dark matter.” If there is no dark matter and no dark energy, then 95% of the universe is *not* “missing.”

Just for fun now let’s go visit a galaxy with an active nucleus, also known as a radio, or Seyfert galaxy. To picture these we have only our imagination or an artist’s rendering to go by; a super-massive, rapidly spinning dark star with an accretion disc and jets of material shooting out both ways on the polar axis, deep into space. The aethereal flow here, if we could see it, might look like a gigantic hurricane—or rather two hurricanes, one in each hemisphere—each with an “eye” at each pole. Here space and time supposedly get dragged around with the disc. Even at the polar axis the medium is rotating so fast that the equivalent of a low pressure zone, or *shaft*, provides an outlet for anything under pressure or being accelerated magnetically.

Some researchers, notably Halton Arp, believe that a galactic nucleus can grow to be “too big for its britches,” so to speak, and actually explode, hurtling great chunks of itself far out into space along the polar axis, in effect “seeding” a pair of daughter, or companion galaxies. This doesn’t seem impossible, and is one way of explaining the enigmatic nature of the quasars. Here is another fitting place for the application of Occam’s razor. Current dogma says that they—the quasars—are *impossibly bright* at their plotted locations (up to 12 billion light years away) based on their extreme redshift. Arp contends that they are much closer, and shows, photographically, in almost every case, a pair of quasars, and on a line directly between them the supposed parent galaxy. Arp had a strange idea about the source of the extreme redshift that I thoroughly disagree with, but think that he is correct otherwise—that they are companion galaxies and not so far away. My contention, which should come as no surprise, is that the extreme redshift is gravitational, not recessional. If these young galaxies were seeded from dark star material they would be extremely dense, but not dense enough to veil themselves with an event horizon—to “cover themselves up”—at least not at the present. And so they’re out there, naked,* exposed, radiating energy like there’s no tomorrow. (More on quasars later).

Finally we come to the kernel of our argument against the “expanding universe”—the phenomenon of gravitational redshift. But first, since we’ll be using a dark star to help explain some aspects of redshift, let’s see just why the heck nature created these things in the first place.

* No, not a naked singularity; there is no such thing as a singularity.

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Newton's *Principia*, in which gravity is first described (at least mathematically) first appeared in 1687. About a hundred years later, in 1783, the English natural philosopher John Michell penned a letter to his friend Henry Cavendish in which he envisioned a star of a density so high that light would not be able to escape its extreme gravitational pull. The French mathematician Pierre Simon Laplace reached the same conclusions as Michell a few years later. Dark stars remained a theoretical curiosity until 1915, when Einstein's general theory of relativity was published. The German physicist Karl Schwarzschild then provided the first complete solution to the field equations of general relativity, in which the notions of a central singularity and an event horizon were first expounded. The event horizon has ever since been known as the "Schwarzschild radius."

{1}

$$\frac{2GM}{c^2} = r_{\text{schwarzschild}}$$

This is the point where gravity is so strong that light cannot escape. Or, this is the point where the inflowing aethereal medium matches that of the speed of light, basically the same thing, but with a *cause*.

The American physicist John Wheeler coined the term "black hole" in the 1960s. At that time, it was thought that *nothing* could escape from the event horizon, hence the term *black* instead of just *dark*. Some time later the English physicist Steven Hawking showed that a black hole could indeed radiate somewhat. There is a lot of current research being focused on black holes (dark stars), especially the enormous ones inhabiting the centers of galaxies.

Now, as long as we subscribe to the general relativistic view of a black hole as having a central singularity and an event horizon, these objects will remain enigmatic. Mathematics and physics both break down or "blow up" at a singularity. This suggests that something might be wrong with the theory. Might there not be a simpler explanation?

Yes. Variable density. We explored this in chapter one using a dark star of unit radius to make things easy to see. This ability sets dark stars apart from all other celestial objects and defines their reason for existence, their *job* in the cosmic scheme. That job, or purpose, is nothing less than that of a cosmic pressure regulator. And not just the huge ones inhabiting galactic centers—all the smaller ones too—wherever they may be. Think about it; if this pressure I've been droning on about weren't highly regulated, the basic physics of the universe could vary. Like the atomic fine structure constant; like basic chemistry; like gravity. Especially gravity; if gravity could vary we would need adjustable home run fences.

Now, what the numerical value of this cosmic pressure is, in pascals or whatever, isn't that important (although it would be nice to know!), but there *must* be a regulating mechanism to cover for the vagaries of chance. Supply for the demand of energy must be maintained, but with a margin of error built in. Stars aren't regulated; they burn flat out, and their number and size can vary. Dark stars are like cosmic ballast. Stars are energy sources. Planets are energy sinks. A dark star is both; it's a big, adjustable sink, but it can give out as well as take in energy, depending on conditions. The regulating mechanism is totally automatic and foolproof. It is based on the dynamic, reciprocal relationship between light and gravity (aethereal flow velocity). You could think of dark stars as *nodes*, distributed throughout the material part of the universe, constantly *sampling* the local pressure of the medium, and automatically making fine adjustments.

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Let's explore a couple of hypothetical examples. Suppose a region of a galaxy experiences two supernova explosions at about the the same time. Most of the radiation would escape into deep space, but an awful lot would get dumped into the immediate neighborhood, heating it. Oops, I've been using the wrong word. Aether is incompressible. The supernovae would add to the *volume* of space, not the pressure. Increasing volume would equal increasing *velocity* at the surfaces of local sinks, in effect increasing the force of gravity. This won't do. Now, sinks on the other side of the galaxy wouldn't feel this, nor would anything outside of the galaxy. The aether is always and everywhere flowing *in*, and so the big dog in the center *feels* everything that happens in the galaxy. The result would be an increase in velocity, or gravitational force, at the event horizon, with complimentary outcomes. One; the dark star soaks up all the excess volume by virtue of its ability—unlike normal sinks—to vary its energy input. Whatever is available, the dark star accepts. The complementary aspect results from the increased velocity of the aether at the event horizon. Escaping radiation would be even further redshifted, *cooling* the dark star's radiative output until the excess volume of energy (space) has all been ingested, or *sequestered*. In this situation the black hole would be *increasing* in size. This net increase of energy is the same as an increase of mass via $e = mc^2$, and so the surface area—the event horizon—would grow as the square of the mass increase, while the density would decrease as the inverse square of the mass increase.

For the opposite example—suppose an old galaxy for some reason just hasn't been creating many new stars—the old ones are dimming, and so the local aethereal volume is *tending* to decrease. We're talking eons here. Nothing happens fast at this scale. The complementary reactions? Aethereal velocity (gravitational force) is reduced at the event horizon (variable input, the dark star's unique specialty), resulting in less redshift and an outpouring of hotter, more energetic radiation to help bring local conditions into equilibrium with the universal pressure constant. The dark star would be *decreasing* in size and *increasing* in density. All this regulating is the result of the constant interplay between light—the universal metric of time and distance—and the variable speed of the aether, which can vary anywhere from zero meters per second to the speed of light. The event horizon of a dark star is the only place in the universe where these two values are equal, though of course their vectors are opposite.

How's that for a natural governor? It's not totally unlike a steam engine's centrifugal, rotating balls type of governor. Automatic feedback. And so a dark star may be invisible in the optical range but *would be* visible in infrared. Or maybe it's even lower, say in the microwave band. Maybe it regulates the temperature of space at $2.7K$? Maybe the cosmic microwave background (CMB) represents the temperature/pressure of space? By the way, if nothing can escape from a black hole, how do the "gravitons" get out?

For this last part I were hoping to apply some real mathematics to the situation, but since the actual lifetime of a photon isn't known we'll keep to the usual approximations. We'll be needing our clock face again, but this time instead of rotating vectors we'll use it like a real clock. A photon's lifetime, or rather, *potential* lifetime, scales directly to its emitted energy, or angular momentum. As far as we know, a gamma ray photon has the greatest energy. We'll place them in the zone between 12:00 and 1:30. X-rays go in the zone between 1:30 and 3:00; ultraviolet from 3:00 to 4:30; visible light from 4:30 to 6:00; and infrared, microwaves and all the longer wavelengths fill out the circle. So what we have is a circular representation of the electromagnetic

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spectrum,* with placement on the clock face representing the potential lifetime of each frequency. For the photons at 12:00 the clock is fully wound. For the photons at 6:00 the clock is wound half way, and so on. The clock is powered by a spring.

A photon's life can be construed as either time or distance. Since we don't know what these are, we'll use, as our base time scale, just our ordinary tick-tock time here on Earth. Now we choose a frequency to examine, say, a green photon that starts its life/journey at 5:00. The clock face is cleared of all other frequencies, the clock hands are set to 5:00, and the clock spring is wound to 7/12 of full. When the clock reaches 12:00 the green photon is considered completely unwound and ceases to exist. (Maybe we should call our photon Cinderella).

Now, when a photon is propagating through deep space, away from any strong gravitational fields (drain fields), the effects of the aether flow on the photon, though not negligible, are certainly quite small relative to the photon's great speed. If the photon was approaching a galaxy, traveling with the aether flow, the clock would tick a little slower than "normal." When the photon is exiting the galaxy, traveling against the flow, the clock would tick a little bit faster than normal. In the long run all these little differences would wash out, with the average time rate being about "normal."

Okay? Now let's get extreme and aim our photon at a dark star—straight on at a docile, medium sized, non-rotating dark star. At the event horizon, aether is flowing in at the speed of light, with velocity attenuating outward according to the inverse square law. As our photon approaches, her clock begins to slow, and slow, and slow, and when her speed matches that of the aether—at the event horizon—her clock stops entirely, and she disappears. Actually she would probably disappear a little before the horizon for want of "traction," but the point we're trying to make is that a photon *cannot be blue-shifted*.† Its clock cannot run *backwards*. It is said that light streaming toward us from the Andromeda galaxy is blue-shifted because our galaxies are approaching one another, but this is just the bunched-up photon fallacy again. A photon cannot *gain* energy. This would be like, say, you drive your car up a mountain, and, even if you coast back down with the engine off, fuel is not going to go back into your tank. A photon can only *lose* energy. Please remember that current theory says a photon can go *forever* without losing energy. I'm saying that this is completely wrong—and that a photon is exactly analogous to a wound up spring.

For the opposite journey—starting inside the event horizon and traveling out through it—Cinderella probably wouldn't make it. Not enough energy. Whatever is in there behind the veil is radiating, like a quasar, in gamma rays and X-rays.‡ Only the strongest radiation would make it past the event horizon. So let's reconfigure our clock face for a gamma ray at 1:00; that is, hands set to 1:00 and spring wound up to 11/12 of full. This is a rude way to begin a journey, but here goes. This is a lot like a salmon swimming up a waterfall. The photon has to leave the surface (?)

* This is not even close to actual scale; it's just for illustrative purposes. The separation between categories in the real spectrum is also fuzzy, just like a rainbow.

† A radio wave *can* be blue-shifted, and *can* be redshifted—a radio wave is subject to doppler shift—but a radio wave is not the same as a light wave. A radio wave is composed of myriad individual light waves (photons) traveling in sync. This misunderstanding has led to a great deal of confusion in astronomy.

‡ Maybe a black hole is just a ball of degenerate radioactive matter. Who knows?

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of the thing inside—wherever the heck that is relative to the event horizon—power through the event horizon, and get a ways past it with enough energy left over to be of some use. If we could see the gamma ray's clock, the second hand would be an invisible blur, the minute hand would be a visible blur, and even the hour hand would be moving too fast to follow its movement. Remember, the photon is still moving, as always, at light speed—against a flow of aether also moving at light speed—so something has to give. That something is *time*. When the photon emerges on the outside, at about 7:00, half his life has disappeared in a tiny fraction of a second. Half his potential traveling distance has been expended climbing the waterfall. This is Einstein's warped space-time in action. This is gravitational redshift at its most extreme.

Here we should make clear the large difference between the potential of a photon emitted from a massive body like a star, and a photon emitted by hot gases or whatever, distant from massive bodies. A 1:00 gamma ray photon emitted from a baseball size chunk of radioactive material floating in deep space has 11 hours* of time/distance ahead of it. The same photon emitted from a quasar might have only 8 or 9 hours, due to his salmon swim escape from the clutches of gravity. Also, this phenomenon of gravitational redshift can only happen (except in the case of reflection) *once* in the life of a photon.

So now let's launch a photon from a quasar and watch his clock. We'll use a blue photon, located at 4:30. We set the clock hands to 4:30 and wind the spring 15/24 of full. We know the base, or "normal" clock rate (the propagation rate). We know that the new, added on, gravitationally induced rate will decrease via the inverse square law—but we can't know what that rate is unless we know the mass and radius of the quasar itself—and so we'll just estimate something that keeps the math simple and follow the trends. Okay, so we emit the photon, and see that his clock hands are rotating really, really fast, as he propagates away from the "surface"†—radius 1. Half-way or thereabouts to radius 2, all the outbound photons with frequencies just over and just under that of our photon, that is, all the 4:29 and 4:31 photons, are absorbed by gaseous elements in the local atmosphere. Our blue photon has thus acquired a spectral "tag." It is now bracketed by two dark absorption lines, a situation that remains for the duration of the photon's flight.

Now, everyone agrees, that, as light propagates, it gets redshifted—all of it—and at the same rate. Only the *explanations* of this phenomenon vary. As our blue photon travels through time and space, in sync with the clock's hour hand, he is always bracketed by the spectral lines. Now for the mind-bending part. Let's say that 1/2 hour of *normal* light speed travel‡ gets us out of the quasar's sphere of influence, and from here on it's just normal tick-tock time. That would put us a 5:00, and our blue photon should now be green. But our photon's clock says 5:30! And he's turning red! The reason, of course, is because his clock was running *faster* at the beginning of the journey. We're talking about a *rate of a rate*, on top of a rate. Our helicoidal photon, twisting through the high velocity, highly accelerated aethereal flow near the massive quasar, had to expend more energy, hence winding down his clock spring at a faster rate than normal. It's just like if you were peddling along on a one speed bike at a certain rate, or speed. If you want to main-

* Remember, 11 hours of clock face time equals billions of years of actual time.

† "Surface" in this case is a rather nebulous concept, as we're considering the quasar, or galaxy, as a unit.

‡ We don't even need an observer here; we're allowed a god-like perspective because everything in the cosmos scales to light speed.

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tain that speed while climbing up a hill, you've got to pedal harder, to use more energy. And, like the earlier car/mountain analogy, if you come to a downhill and coast—no matter how fast—*energy would not go back into you*. No blue-shifting allowed. The second law of thermodynamics should make this point clear.

Okay, so now our photon travels for another half hour of normal clock face time—many, many years of actual time—and is swallowed by a telescope on Earth. It's 5:30, but our photon's clock says 6:00, and he is almost into the infrared. An astronomer, whose job it is to assign a distance to the quasar, notices the spectral tag, consults and compares this with the laboratory spectrum charts, and plots a distance *inferred* from the comparison. Incorrectly. He or she won't account for the *compressed time* from the first half hour of travel time. The astronomer will see 1.5 hours of time-distance instead of the true figure of one hour, and so will plot the quasar fully 1/3 further away than it actually is. This is a mild example; in reality it's a lot worse. They've got quasars that are maybe 100 million light years away sitting (oops, I mean *flying away*) at distances of 6, or 8, or 10 billion light years. And quasars are just one of the most glaring examples. All starlight is gravitationally redshifted according to the star's mass and radius, which by the formula introduced in chapter one:

{2}

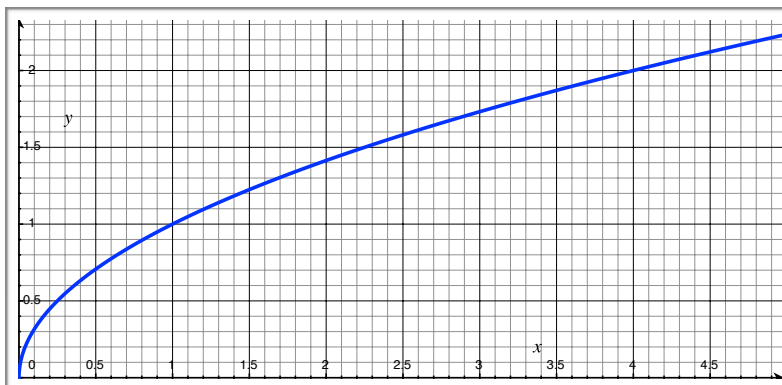
$$\sqrt{(\pi C)^{-1} \left(\frac{mass}{\frac{4}{3}\pi r^3} \right) (4\pi r^2)} = V_{surface} m / s$$

gives the velocity of the aethereal medium at the stellar surface. This velocity is compounded by the rate at which the medium is being accelerated, that is:

{3}

$$\frac{V_s^2}{2R} = g = m / s^2$$

This rate is greater for a small, dense body, and lesser for a large, sparse body. This rate is determined mostly by radius, and dictates how much *time* it will take the photon to propagate out through successive radii. This is especially important during the first few radii as the energy loss rate near the surface is at its highest. It would again be similar to a salmon swimming up a waterfall, as the water at the base of the falls will have gained velocity over the duration of the fall.



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This is what a light quantum has to contend with as it propagates away from the surface. More *time* spent swimming up through the high speed aether is paid for by the photon in terms of its potential life, or duration. That is, it is redshifted. More *time* spent propagating through high velocity aether equals more redshift.

Application of the inverse square law:

$$\frac{V_{\text{surface}}}{r^2} = V_{\text{field}} m / s \quad \{4\}$$

where r is the *unit radius*, gives the velocity of the medium anywhere in the field, and basically establishes the size of the body's sphere of influence. For example, the Moon is about 60 Earth radii away. This would give:

$$\frac{V_s}{r^2} = \frac{11180}{60^2} = 3.11 m / s \quad \{5\}$$

Pretty slow. For the Sun's drain field at the distance of the Earth we have:

$$\frac{V_s}{r^2} = \frac{617000}{215^2} = 13.35 m / s \quad \{6\}$$

And further out yet, at the orbit of Neptune, the medium is barely moving:

$$\frac{V_s}{r^2} = \frac{617000}{6465^2} = .0148 m / s \quad \{7\}$$

The outermost limits of this sphere of influence would be feathered-out and indistinct—would be dependent on the mass and position of other massive bodies (Mach's principle). Calculating the force of gravity would become increasingly difficult as the distance from the star increases. Calculating flow velocity and direction in the outer regions of a spiral galaxy would be a formidable task if possible at all, but we don't need to invent imaginary *dark* entities to explain galactic dynamics. *Nature is and must be simple, but she loves to hide.* What has remained hidden from astronomers, or what has been forever misinterpreted, is the time-distance compression phenomenon induced by gravitational redshift. The upshot of this is that the stars—all of them—may be a lot closer to us than we think. The entire spectroscopic redshift baseline—based on light from the Sun—is way off. Everything should be *more redshifted*. There should be *no blueshifting*.

And what about Olber's Paradox? Why isn't the night sky white with stars? Current dogma claims that it's because of the expanding universe—the truth is much simpler (Occam's razor yet again)—photons have a limited lifespan. Just like a spring, they wind down, and shift out of the optical band. Which explanation is more simple, more natural? The CMB is nothing but a photonic retirement home. Somewhere in the microwave band is where a photon's spring finally

Space

winds down. The electric and/or magnetic fields simply can't reach out that far into the future—the connection becomes more and more tenuous until it is broken—and the photon simply ceases to exist. It was never really a *thing* anyhow, it was an *action*. It's no wonder space is dominated by microwave energy. No matter where on the electromagnetic spectrum a light quantum begins its journey, they all end up in the same place—the CMB—some just get there sooner than others. Radio waves, as I stated earlier, are a different kind of animal.

Just one more example, if I may, and we'll be done.. Let's resurrect our green photon, Cinderella, whom we so callously annihilated earlier, and send her on a journey from the Sun to the Earth, to see if she changes. General Relativity predicts a solar gravitational redshift of .001 nanometer—hardly measurable. The theory of the flowing universe predicts a much larger amount. Okay, Cinderella is emitted from the solar surface—here she comes, into my eye, and what my brain sees is—yellow, like the Sun. Now, I'm not saying that the Sun is actually green, but has anyone ever got real close to the solar surface, and looked? No. The vast majority of gravitational redshift takes place right up close to the surface, where conditions are extreme. I don't know if there's even a way to find out; if a heat-proof probe were dropped into the Sun, sending back video, the signal would be redshifted just like the Sun's rays, turning green to yellow. It's an interesting paradox.

There's a beautiful relationship going on here, between gravity and starlight. The ratio of the *velocity* of the incoming aether to the *loss* of photon energy is exactly one to one, and this applies anywhere and everywhere within the star's sphere of influence. It's like, the sky feeds the stars, the stars pay back this amount, and the rest goes out to light up the heavens.

the end

Epilogue

How is it that the sky feeds the stars?

...Lucretius...

All right then. There's my little fairy tale. I realize I haven't proved anything. Well, maybe one thing—that bit about an incompressible fluid flowing into a spherical sink. The rest is by default speculative, but, anyone would have to admit that I have been consistent as regards my main premise—that aether exists and flows into mass—conferring upon mass the property we call existence or *reality*.

The gist of the argument has been the attempt to show how seemingly diverse phenomena could all be linked to this premise, and this I believe has been accomplished. Gravity, electromagnetism, matter, inertia, light, and the large scale structure of the cosmos all fall out naturally and simply from this single concept. No doubt I got many things wrong. I wasn't really worried about the details; a gross outline of reality is all I was hoping to portray.

Mathematics is a powerful tool that, used incorrectly, can lead one away from truth and light—and into darkness and confusion—which is where science, especially theoretical physics, seems to find itself today. Attempts have been made to unite general relativity with quantum theory ever since these ideas came into existence, with no success. The field of mathematics has grown exponentially as we cast ever more complex mathematical abstractions across the void—a void that doesn't even exist.

I realize my theory will go nowhere because I'm not a bona fide member of the physics community. I don't have the math skills to take it much further myself, so I need help. Maybe someone sympathetic and in possession of those skills will take an interest in my tale and attempt to prove or disprove all or part. Well, actually, it's the whole thing or nothing; it all fits together as a package. It's a win-win situation for you, the scientist or physicist. You either get the pleasure of shredding some crackpot theory, or, if I am right, and you help me prove so, you can escape—as I have—from Plato's cave of shadows, out into the light and air, and realize that you, and the ground under your feet, are connected, intimately, to the entire universe.