note: because important websites are frequently "here today but gone tomorrow", the following was archived from http://www.tricountyi.net/~randerse/sclrmenu.htm on April 21, 2004. This is NOT an attempt to divert readers from the aforementioned website. Indeed, the reader should only read this back-up copy if it cannot be found at the original author's site.

Files on Scalar Electromagnetics

by Rick Andersen

This area, in my opinion, ties much of the information together from the other areas on this web site. Tom Bearden's Scalar EM may be the New Electromagnetics of the 21st Century __IF__ we can get him to "spill the beans" on some specific methodologies and circuitry! In the meantime, we continue to collect, compile, speculate on, and critique his theories, in the hope that some light will be generated along with all the heat.

A. Introduction to Scalar Electromagnetics: What is it? (1997)

What is "Scalar Electromagnetics"?
by Rick Andersen, 7/3/97

Scalar EM is the brainchild of Lt. Col.(retired) **Thomas E. Bearden** -- a systems analyst and wargames specialist who has been advocating a view of electromagnetics which is based on the notion of a vast, unseen background of scalar energies (as opposed to *vector* energies) which underly all physical reality. **[StealthSkater note: also see doc pdf URL]**

What electrical engineers work with today -- claims Bearden -- is a **subset of a higher-topology EM**. Bearden claims that the 4 "Maxwell's Equations" taught today in electrical engineering are actually an over-simplified *subset* of **Maxwell's original work**. The pruning was done by **Oliver Heaviside** in the late 19th Century. Heaviside took Maxwell's original equations -- written in Hamilton's **quaternions** (related to what we nowadays call **spinors**) -- and "simplified" them by lopping off the scalar part of the complex numbers, leaving the easy-to-work-with vector part intact which radio engineers loved. After all, the entire electronics industry as we know it grew out of the telephone/radio technologies of the early 1900s. Who can argue that the "vector" approach is inadequate?

Well, Bearden says that when Heaviside threw out the scalar part of the quaternionic EM equation, he unknowingly threw out the possibility of **unifying Gravitation with Electromagnetism** -- which has been a "Holy Grail" for scientists since Einstein himself wrestled with the problem. That's because the scalar part of the quaternion -- according to Bearden -- was the part that captured-or-modeled the **"stress on the aether"** which leads to curving/warping spacetime a la Einstein. Tom Bearden says we CAN unify Gravity with EM -- and convert back-and-forth between them -- if we understand how vectors and scalars relate to one another and what the ramifications are. **[StealthSkater note: Stan Deyo said that such a relationship existed between nuclear energy and gravity in the 1950s. see doc pdf URL-doc URL-pdf]**

Vector fields can evidently be assembled by properly **interfering scalar potentials** (predicted in 1903-4 by mathematician **E.T. Whittaker** and probably engineered by the Soviets).

Conversely, scalar fields can be created by *destructively interfering* **vector** fields in a nonlinear medium. Varying the vector components rhythmically produces what Bearden calls "scalar waves". These ripples in spacetime are believed to induce a wavelike *stress* in the "**aether**". This in turn leads to **engineering the structure of pure space and/or mass in a localized area** -- in other words, implementing General Relativity (spacetime curvature) on the lab bench!

Tom Bearden has gone on record -- in several of his books published in the 1980s -- to proclaim that the former Soviet Union had created a fantastic arsenal of mind-bending weaponry based on this scalar technology, which they called "energetics" and which Bearden claims was developed from certain discarded ideas originated by Nikola Tesla. Now that the Cold War is apparently over, we're not sure how Bearden views his previous assertions. But we note that he has turned his attention away from Soviet scalar weapons and toward the production of "free energy" from the vacuum of space, using the principles of **optical phase conjugation** but in a more generalized mode. **[StealthSkater note: UNITEL also proposes phase conjugation in their quantum electromagnetic laser designed for interstellar travel via using a "tractor beam in reverse". See doc pdf URL]**

Here is the point:

If Bearden is correct in his Scalar EM theory, then we can build devices which would enable us to **alter gravity, time, inertia, and the apparent mass of an object**. This of course has ENORMOUS implications for military applications, space-vehicle drives, time-travel, teleportation, paranormal phenomena, and just about every other area one can think of.

The Big Question is will the 21st Century see the acceptance, development, and implementation of Bearden's ideas (in plain public view, mind you)? Or will Scalar EM be found to have been just another dead end?

Do certain world governments have these devices NOW? Bearden says at least "3 other nations -- not hostile to the U.S. --" now possess Scalar technology.

We need to build something. Hey, didn't somebody use a strong magnetic field to **levitate a frog** recently? I wonder how far we are from a real **Hoverboard**?

B. The 'Seven Scalars'-- Different views on 'Scalar Waves' (1999)

The 7 Types of "Scalar Waves"
11/26/99 by Rick Andersen

One of my never-ending quests at this Web page is to try and unravel the mysteries behind Thomas Bearden's "Scalar Waves". What are they exactly, and how do you go about making them? After studying so much of his work, scouring the Net and alt-science sources, and talking to people about the subject, I slowly began to see that there are not one but several variations on the Scalar theme. Some of them are dissenting viewpoints, and some are Bearden himself evolving his Scalar EM (now called Energetics). Lately I have added my own "2 cents" in the form of computer models of apparently "new" types of waves that I think fit the "scalar" category. Here's my summary of the 7 types of "scalar" waves

you'll find out there. Your mission -- "should you choose to accept it" -- is to understand them all and then find out which, if any, is the "right" one!

(1) Outphased waves

In Tom Bearden's earliest books, "**scalar wave**" was described as being composed of a pair of "normal" transverse waves traveling together in the *same direction*, but each having its electric and magnetic field vector 180 degrees out-of-phase with those of its partner so that the fields all superpose to zero and are no longer detectable at all. This would be accomplished by delaying one wave by 180 electrical degrees. When the 2 waves superpose, one wave's electric field vectors would point "up" in a given moment of time while the other wave's would point "down" at that same time, leaving a net E-field of zero. The perpendicular magnetic field vectors would likewise counteract each other. Out-phased, nulled, or cancelled -- in other words -- as far as the "target" (toward which the overlapping waves are traveling) is concerned.

Yet, we were not to believe that 'that was the end of that' electromagnetically speaking. Instead, we read that the ***aether*** <u>itself</u> -- pure spacetime -- was now the thing being rhythmically "stressed" by the invisible scalar wave. And that this stress represented a structure or "patterning in spacetime" that was essentially **electro-gravitational**. In plain English, to make a gravity wave you cancel out 2 normal electromagnetic waves to a "zero vector". What gets confusing -- as you follow the Bearden literature through the years -- is just <u>WHICH</u> vectors must be zeroed. If it's the **E** and **B** (or **H**) fields, then that means the waves are traveling together in the same direction. If the 3rd axis-- the **Poynting Vector**-- is the one that must be zeroed, then we have to make the waves travel into each other from opposite directions (counter-propagate).   But if, like Bearden, you don't believe that free-space waves are transverse at all but *longitudinal*, then what? The waters become murky.

But return to the first view where 2 out-of-phase waves travel together as a zero-vector pair. This is the view of scalar energy that is most often represented by "alt-sci" researchers and "New Age" gimmick-makers who are all basically winding coils in a way that causes the coil's magnetic field to be cancelled out. The prevailing opinion is that canceling the **B**-field in this way leaves the **A**-field (magnetic vector potential) -- and any other "electric"-like fields that may exist -- free to radiate outward from the non-inductive coil. The reference here is to William Hooper's "motional electric field" as well as **Wilbert Smith's** "Tempic field" (also referred to as a "time-stressing" or "tensor" field). **[StealthSkater note: see** doc pdf URL **]**

Most of the alt-science underground believe that such coils produce energies ("CHI", "orgone", etc.) that may affect life processes, gravity fields, and/or time-warping energies. The thing that bothers me most is that **nobody has proven any of this** in the 30-or-so years that these "designs" have been around. Instead, we always hear that "psychics" and "clairvoyants" seem to be the only ones "gifted" enough to see or feel the energies emanating from such coils. As I'm fond of saying and to paraphrase Bearden, *that ain't the same as "engineering General Relativity on the lab bench"!*

Bearden himself has long-since discarded this view of scalar waves being produced by simple phase-cancellation (although "*bucking*" fields may still be relevant here). He now insists that the component waves are "in-phase *spatially*, out-of-phase in *the time dimension*". Also, that there needs to be a nonlinear mass (such as ferrite core or photo-refractive crystal) at the focus of the wave superposition -- just mixing waves isn't enough.

I myself am still wondering about these simple phase-nulled waves, though.. If I illuminate a 'target' with, say, 1,000 watts of RF carrier wave, that target will <u>heat</u> <u>up</u> measureably -- especially at close

range. But if I now superimpose another transmitter's beam onto the same target at exactly the same frequency, coming from the same direction but 180 degrees out-of-phase with respect to the first transmitter's beam, what then? Do we not have 2,000 watts of power being focused onto that target? Is there not a **Poynting Vector** (**S=ExH**) representing energy per unit area -- which is the cross product of the **E** and **H** field intensities -- present in each beam?

Yet if we phase-cancel the fields at the target, do the two Poynting vectors vanish too? Or is there still a component of energy there "stressing" the target? Well, the **E** and **H** fields cancelled because their respective vectors were pointing in opposite directions. *But both of their Poynting vectors were "pointing" in the SAME direction.* So I say they don't cancel if the Poynting vector is a "real" entity!

So the question is Is the Poynting vector "real" in the sense of being an *independent entity* or "energy"? Or is it just a mathematical 'artifact' that describes the vector product of the **E** and **H** fields, expressed as a measure of total energy per unit area in the wavefront? Does it automatically disappear when the **E** and **H** fields themselves are canceled? Or can it exist <u>while</u> they're in cancellation such as at a "node" point which is followed by an "anti-node" point further down the signal path? Isn't the energy still there, even though we can't detect it while it's at a null point? Else how can it emerge again <u>after</u> that? Something is weird here!

I still don't buy Bearden's complete rejection of the transverse wave in vacuum. Yet I do suspect that something is wrong with our present insistence on there being no such thing as a "longitudinal EM wave". Isn't the Poynting vector the very component in the **S=ExH** triad that has to be longitudinal by the laws of vector multiplication? Isn't it the longitudinally-oriented "pulsation" that we insist can't be "real" because it might mean that *there's an aether after all* (which is being called the "Virtual Particle Flux" by today's quantum physicists.)???

Or is the Poynting vector just a "mathematical artifact" like classical electrodynamics always said about "potentials" vs. "fields", until the **Aharonov-Bohm effect** blew that dogma out of the water by showing that potentials can have observable effects on charges even when no fields are present? Nowadays the modern view is just the opposite of what it had been before Aharonov-Bohm. The <u>potentials</u> are the *cause* and the <u>fields</u> are the **effects**!

I say that we need to prove-or-disprove the existence of the Poynting vector as a separate entity when the **E** and **H** fields themselves have been phase-cancelled. It's hard to believe that 2,000 watts of power shining on you from a pair of nearby transmitters has absolutely no effect on you just because there's no electric or magnetic field present. Like squeezing a water balloon, the energy is going to bulge out somewhere else.

A reader responds that EM waves <u>are</u> longitudinal (a la Bearden) and not necessarily transverse, <u>can</u> still carry a vertical or horizontal polarization anyway, and that non-inductive coils "<u>do</u> something"...

My 1993 article called **POLARIZE.HTM** argued that if EM waves in free space are longitudinal and not transverse, then there's nothing in the wave's structure that is able to "tell" the receiving antenna anything about the wave's polarization. So we shouldn't need to orient our antennas in the vertical or horizontal plane to get optimal reception. And yet we see this phenomenon right before our eyes every time we orient a TV antenna or put on a pair of Polaroid glasses.

Turns out that what I thought I'd "figured out" by myself was argued a long time ago by eminent physicists working out the structure of light waves. Bearden's response was so unreasonable -- when I asked him about it -- that I wrote my sarcastic POLARIZE file as a wake-up call to him and his

followers to get serious if they really wanted Scalar EM to become accepted in the academic world. Even though Bearden and I have no 'hard feelings' about that discussion or file, I occasionally get e-mail "spankings" from Bearden supporters who think I was "mean" and should apologize to Bearden and retract the file I wrote.

No way. I stand by my view that Scalar EM ought to be able to account for the observed phenomenon of wave polarization. And for 'historical' reasons, I'm leaving that file online. But we still haven't heard from Bearden on the subject.

In a refreshing turn of events, however, a correspondent named Graham Gunderson recently e-mailed me a very interesting defense of Bearden's view that EM waves can be longitudinal and still carry a polarization sense. And -- relevant to out-phased waves -- Gunderson takes issue with another argument -- the one that asserts that self-canceling coils "do nothing". He says they **do indeed** "do something" and describes some of his experimentation along these lines. This is what I like to see -- calm, rational explanation and some experiments to back it up.

You can read Gunderson's presentation **here**.

(2) E.L.F. standing waves

The lower you take a wave in frequency, the longer its wavelength becomes. If you go to zero Hertz (DC), wavelength goes to infinity (assuming that a given 'ray' -- in the wave we're examining -- travels out in a straight line forever. Apologies to Einstein and his curved space, just for now!). If you live on planet Earth with a circumference of about 25,000 miles and if you assume that low-frequency waves curve/refract around the planet (inside the Earth ionosphere "waveguide"), a wave whose frequency is about 7.5 Hz will have a wavelength that encircles the entire planet! Since we are like tiny viruses living on a large Earth, from our point of view a 7.5 Hz wave is practically "scalar" since it is so long that we can't measure any significant gradient over any reasonable distance! The 'potentials', however, still rise-and-fall as the wave oscillates in magnitude. But the wave is so long that the oscillation is more observable with respect to **time** than with distance (space).

Is this what **Nikola Tesla** was really referring to when he spoke of 'tuning his apparatus ("Magnifying Transmitter") until the Hertzian waves had been eliminated'? Did Tom Bearden read too much into this?? If I'm not misquoting here, a researcher named Toby Grotz is of this opinion. **[StealthSkater note: see doc pdf URL]**

In other words, "scalar" waves may not be some "new kind of non-Hertzian wave" at all according to this view. They're just ELF electromagnetic waves whose wavelength is so long that we don't detect the spatial gradient that we normally find in shorter, higher-frequency "vectorial" waves. And not only would they be low in frequency, but they would also actually be *compound* waves composed of the original wavefront and its returning predecessor (akin to a reflection) that just traveled the World in 1/7 second as explained below. In other words, these waves would be **low frequency standing waves**. But still "Hertzian" electromagnetic waves.

If Tesla could have gotten what he wanted-- a worldwide system of power generation based on resonating the earth at its natural resonant frequencies-- then I say that the wavelengths would have been so long that from our point-of-view they could rightly be called "scalar" as all points for miles around would rise-and-fall in potential -- together -- instead of being at different points along the sine wave ripple of the more conventional, higher-frequency/shorter-wavelength radio transmitters in use today.

Also, note that if the wavelength fits the planet's circumference, then that means that the half-wavelength point (at 180 degrees where the sine wave crosses through zero and goes negative) is automatically located at the "antipodes" (180 degrees away, or on the exact opposite point on the Earth from where the transmitter site is located).

For illustration's sake, let's imagine that Tesla had set up a 7.5 Hz transmitter right at the North Pole (one could use a *pulse* transmitter with a 7.5 pulse-per-second repetition rate). When the transmitter is turned on, the signal spreads out in all directions (South, if you're at the North pole) and expands as it travels until it reaches the Equator. This is equivalent to the 90-degree point -- the positive hump -- of a sine wave. With nothing to stop it, the wave continues southward like a "wall of energy" all around the Globe. Yes, it is very weak and "spread out" by now. But notice that as it continues toward the South pole, it is now *converging* upon it so that the energy is coming IN from all directions to focus at the South pole.

At the moment all that energy passes through the antipodes at the South Pole, it "crosses through itself" (the 180-degree point on a sine wave) and begins its journey back northward again. 90 degrees later, it is over the Equator again but now traveling in the opposite direction. Finally, it all re-converges to its original focal point back at the transmitter at the North Pole. But at that same moment, the transmitter has fired off a new wave of energy to begin another 25,000 mile journey that takes about 1/7 second to travel.

What we have here is the spherical version of a plucked string, with the North and South poles of the Earth being the nodal points (or endposts) of the "string" and the "loops" or antinodes occurring over the Equator. When we "fit" a wave precisely between two reflecting points, we get energy flipping back-and-forth in both directions simultaneously. And that superposition of bidirectional waves gives rise to a **standing wave** or -- as Tesla called it -- a "stationary wave" which appears to "stand still" (not traveling anywhere) while at the same time "flapping" up-and-down in potential. A system on which a standing wave precisely fits is called a **resonant** system, and it takes relatively little power to get a large oscillation out of a resonant system if you "ring" it at just the rate at which it wants to be rung. It was on this concept -- setting the Earth into a resonant state with (most likely) the higher harmonics of 7.5 Hz, if not that frequency itself -- that Tesla allegedly based his dreams of "plugging your toaster into the Earth itself" and thereby tapping off some of the potential difference between two points where you would put your ground rods/electrodes.

Bearden has mentioned the use of "scalar waves" as carriers of information where military radio personnel could carry on clear-channel, secure clandestine communications using non-Hertzian waves (something like Lt. Uhura's subspace communications system on Star Trek). But this idea seems flawed by conventional understanding. Perhaps it requires unconventional understanding??

The biggest problem with ELF (Extremely Low Frequency) waves as carriers is not the radiation characteristics. Athough the antenna has to be ridiculously large, these waves can penetrate right into the ground and ocean. The U.S. Navy has used this frequency range to keep in touch with submarines at depths that cannot be penetrated by EM waves at conventional frequencies. But the problem is that such low frequencies severely restrict the bandwidth (and therefore the *data rate*) of communications. Slow CW (Morse Code, etc.) is about all that is practical. Voice communications would seem to be out of the question. At 7.5 Hz-or-so, the carrier is lower (WAY lower!) than the frequencies of a man's voice. So how would you modulate the output of a broadcast microphone onto a carrier that is *lower in frequency than the modulation itself?* By conventional understanding, it's impossible. Your carrier has to be higher than the highest modulating frequency. That's why the Navy has to use slow Morse code at ELF to communicate with submarines, etc.

Yet retired Navy man -- **Dr. Eldon Byrd** (a controversial figure in his own right) -- is quoted as having said that there is a *secret technology* that allows one to modulate high-frequency waves onto a lower-frequency carrier. If this is true, it would shed a lot of light on the whole Scalar business, I'm sure! One person with whom I've discussed this speculates that you CAN use a lower frequency carrier than the modulation if you view the resulting signal via a "constellation diagram" such as is used in **QAM** (Quadrature Amplitude Modulation) and other digital data techniques that you find in association with modems, FSK and PSK radio transmissions, etc. I'm still thinking about the ramifications of this. If anyone with digital data knowledge has any thoughts on this, please let me know!

(2a) A variation on the "Tesla" wave theme -- Jerry Bayles' version

Jerry Bayles is a researcher/theorist whose web page **www.electrogravity.com** describes 'scalar' waves as the kind of waves that exist around a **Tesla coil**:

The Tesla coil has a vertical electric field stretching from top-to-bottom of the coil. Since it's a solenoid-wound coil, there's also a vertical magnetic field (NOT spatially perpendicular like normal electromagnetic waves). But they alternate in *sequence* -- i.e., the Tesla coil produces waves that are composed of an **E** and **B** field that are *in the same spatial plane or orientation* but 90 degrees out-of-phase in time.

That is, a vertically polarized **E**-field followed by a vertically polarized **B**-field -- one after the other, alternating back-and-forth between the 2 types of field. Being out of time phase -- as well as in the same plane in space -- means that no real power is being "radiated" in the conventional sense. Yet Bayles says that a second Tesla coil (acting as a receiver) will pick this "transmitted" wave up, and so information can be transmitted via this non-radiating arrangement. So the energy is something similar to the "near field" in a conventional antenna system. Using a leap of logic that takes some amount of reading to understand, he then goes on to apply this configuration to the hull of a saucer-shaped vehicle, outlining a system whereby one would *rotate the standing wave around a craft's hull and thereby create electrogravitational forces that would propel the ship.*

I had a series of e-mail correspondences with Jerry Bayles in which I questioned the conventional antenna/transverse EM wave wisdom (like Bearden does). Bayles' replies helped clarify both my immediate questions and his proposed Tesla coil waves which he believes fits the "scalar wave" definition.

Bayles, by the way, believes there's ample evidence for transverse EM waves in free space and apparently does not find it necessary to buck the entire scientific world with an insistence on longitudinal EM waves -- contrary to Bearden and Gunderson's defense of Bearden's view. Click here to read the **Emails** he and I participated in. You can also find them at his web site.

(3) Electrostatic/electric/dielectric waves

Alt-science guru **Patrick Flanagan** thinks that Tom Bearden makes scalar waves "way too complicated." The way he describes both his Neurophone device and the "Hydronic Wave" device of Wallace Minto -- in his series of Emails to Alain Beaulieu [now collected as a text file on KeelyNet and at other sites] -- makes "scalar waves" to be simply the *weak electric or electrostatic waves that a mismatched, electrically-short antenna would emit* when driven by a high-voltage, high-impedance output (such as an audio amplifer with its output connected to a "backwards" audio output speaker transformer; i.e., the amp drives the 8 ohm winding, which is then stepped up to 1000 ohms-or-more).

This signal is fed into a 3-or-4 foot-long dipole antenna whose free ends are soldered to flat capacitor-like metal plates. The antenna is "aimed" lengthwise instead of broadside like a normal Hertzian dipole would be -- sort of like aiming a rifle -- at a target. Flanagan says that using such an antenna in the receiving mode, connected to the input of an audio amplifier; enabled Minto to actually listen to the "hydronic" or "scalar" waves emitted by schools of fish in the ocean; and that by using 2 of these devices, a pair of fishermen could triangulate onto a school's precise location.

4) Bidirectional wave pairs

The prominent mathematician **E.T. Whittaker** authored a pair of papers in 1903 and 1904 which decomposed any potential (such as a point-charge or even a planet's gravitational field) into a Fourier-like series of waves, harmonically-related, and bi-directional -- each pair (of an infinite number of pairs) composed of counterpropagating waves. Mathematically at least, then, Whittaker put forth the suggestion that Gravity itself might be wavelike or "undulatory" in nature. It is only the superposition of many pairs of inward and outwardly-flowing waves that gives the illusion of a "static" field.

Tom Bearden discovered this work of Whittaker sometime in the mid- to late-1980s and appropriated it as an updated model for his "scalar potential" -- not always clearly distinguished from his earlier "scalar waves". The new twist given to Whittaker by Bearden was this: One of the 2 waves in each pair had to be a *time-reversed* or **phase-conjugate** wave. Here is where Bearden starts using a model that strongly resembles the **Advanced/Retarded** waves of Wheeler and Feynman's *Absorber Theory* -- but in the context of a phase-conjugate mirror as described in the **nonlinear optics** literature.

It is kind of amusing to watch the Bearden literature develop over the years. In order to garner support for his position, Bearden apparently likes to add to names whenever new evidence is uncovered. Scalar waves became "Whittaker waves", which later became "Whittaker-Ziolkowski (WZ) waves" when Ziolkowski proposed "using the product set" of waves (which led to my own computer simulations, by the way). Later still, Stoney (1890s) entered the title, since he recognized that the wave equation can be "run backward" as if time could be reversed. So now we have "Stoney-Whittaker-Ziolkowski (SWZ) waves". And all the while, none of us yet understand exactly how Bearden's scalars are produced. And he can't tell us exactly how because of "nondisclosure agreements"! It just strikes me as comical. But I'm still driven to understand the subject anyway, so I go on writing files such as this one.

(5) Longitudinal waves

As of August 1998, here is Bearden on longitudinal waves:
> "What I called scalar waves are pure longitudinal EM waves(LW)".
> "A longitudinal wave is a time density oscillation".
> "When you make a longitudinal wave, by definition it cannot vary the energy density in 3-space". That is fixed".
> "A longitudinal wave oscillates the rate of flow of time itself about some steady median value".
> "A pure longitudinal EM wave has infinite energy and infinite velocity". We don't make those". Instead, we make a pseudo-longitudinal wave (i.e., a pretty good longitudinal wave that still has some low-level transverse components". See *Nimtz* experiment on superluminal transmission at 4.7 x lightspeed (c)."

(6) Time-density waves

As of late November 1998, here is Bearden on waves:

"The minimum requirement to begin gravity and antigravity studies is to understand longitudinal waves. (Well, a sound wave is just such a wave).

If you have a transverse EM wave and add to it its phase-conjugate replica, the two coupled together do make a single longitudinal EM wave. It is polarized along the line of propagation -- not x- or y-.

If you then take that longitudinal EM wave, phase-conjugate it, and couple its phase conjugate replica to it, you make a "scalar" or time-density EM wave, polarized (vibrating) in the time domain. The overall spatial energy is in overall equilibrium in x-, y-, and z-. However, it has a substructure of 2 longitudinal EM waves polarized along the z-axis.

In turn, each of the longitudinal EM waves has an <u>internal</u> substructure of ordinary transverse waves -- each vibrating in the x- or y-direction or combination of both.

The longitudinal EM wave we are speaking of is comprised of **gravitons** -- i.e., spin-2 quanta -- because it is comprised of coupled photon/antiphoton pairs with each photon or antiphoton being of spin 1.

The scalar EM wave is comprised of "**supergravitons**" -- i.e., spin 4 quanta -- because it consists of coupled graviton/antigraviton pairs with each graviton or antigraviton being of spin 2.

The above is rigorous, although not in present physics in just that precise form. You cannot go any further in gravity/antigravity until you understand that material.

The supergraviton is really the key to antigravity.

Longitudinal EM waves usually interact very little with intervening mass when just propagating through it. But a little interaction does occur. In that interaction that does occur, the interacting mass immediately phase-conjugates and adds the coupled phase-conjugate replica, converting the new interacting component to a coupled longitudinal EM wave/antiwave pair and thus forming a scalar (time-polarized) wave for that interacting fraction.

Well, <u>time</u> is energy compressed by a factor of **c**-squared. So it has the same energy density as mass.

Now that you have some supergraviton interactions, you are invoking the oscillation of very powerful energy changes and therefore very powerful oscillations of the curvature of local spacetime, for that spacetime directly in interaction (yes, spacetime is well-known to interact with matter in General Relativity) with the mass.

From there on, use your ingenuity. You now have your hands on the control of the <u>actual</u> interaction of the local spacetime strongly interacting with that mass (every bit of it; time is ubiquitous and makes no distinction between electron shells and the nucleus of the atoms; it reaches both).

At any rate, essentially from there you can do whatever you wish to with that interacting mass.

Now with sound (as used by the Tibetans), you already start with longitudinal waves. Also, sound waves are easily phase-conjugated. So you can easily make a scalar sound wave by coupling the phase-conjugate to the longitudinal EM wave.

We are interested in the <u>time</u> component -- not the energy component. So the lower the frequency (and therefore the lower the energy component) of the photon, the greater the time component (and therefore the component of energy compressed by **c**-squared so as to make the time).

For **antigravity**, you are much better off at ELF, etc. Forget all that high-frequency delusion. Even with gammas, nobody ever produced any antigravity to speak of yet.

Note that very similar photons (and thereby waves) are known in physics -- e.g., see Ryder, *"Quantum Field Theory"*, 2nd edition, p. 147+. There you find they advance 4 photon polarizations; x-, y-, z-, and t-. The z- polarization is a longitudinal photon and the t- polarization is a scalar photon. However, they do not know how to make practical waves of these.

Here is the <u>magic</u> process for wave type transduction (took me 20 years to uncover it).

Let TW = transverse EM wave, LW = longitudinal EM wave, TDW = time-density EM wave (scalar EM wave), PC = phase conjugate replica coupling, and (I) = in interference with.

So

TW + PC(TW) => LW (of the special kind, formed of spin 2 gravitons rather than single photons).

LW + PC(LW) => TDW (of the special kind, formed of spin 4 gravitons rather than single photons.

To go the other way, use interferometry!

TDW (I) TDW => LW (of the special kind)

LW (I) LW => TW (ordinary EM transverse waves.)

..... We believe that if we can ever get these new processes into the development stage, the World will eventually take its energy from the ubiquitous flow of time anywhere in the Universe. In short, **we will burn time for fuel.**

7) Quadrature-product waves

These are "my" waves. At least, I've never seen them mentioned anywhere else. I computer modeled some of my interpretations of Bearden's vague descriptions of what scalar waves and scalar potentials are. And then I went on from there to try this-and-that until I finally found that specific combinations of **4** waves -- not two -- seemed to be necessary in order to make "scalar"-type waves.

I first modeled this in 1993, but only played with the concepts on-and-off until I presented them to KeelyNet sometime later. Then I added them to my own web page in late 1997. Meanwhile, researcher **J. Naudin** had already taken them and adapted them to a Windows environment, downloadable from his website. (He does not give me credit as the original author, but that's okay.)

I'm tentatively calling these waves "quadrature-product waves" because they are made by cross-modulating a pair of bidirectional (counter-propagating) waves, then doing the same with a second pair, then adding (superposing) the 2 products together in quadrature (not 90 degrees apart in the "North-South, East-West" sense, but 90 degrees apart in **time phase** -- e.g., one pair is made of <u>sine</u> waves and the other of <u>cosine</u> waves). Summing the products of 90-degree time offset waves like this gives 180-degree phase cancellation (the 90s double into 180s) and a "new" kind of wave appears: a bouncing "DC offset" (scalar component?) with a static sine-wave shape of 2x spatial frequency superimposed upon it.

<u>Subtracting</u> the products, on the other hand, or inverting one of the cosine waves before multiplying (modulating) them, then summing the products, gives a completely "static" sine wave which has zero frequency and zero movement of any kind, yet has a spatial gradient -- a kind of stationary "**soliton**" wave. I have not yet generated any of these waves with actual equipment. But the computer models are enticing and I think it will be only a matter of time before someone (if not myself) is able to design a "transmitter" for these waves. I think we will have some "scalar waves", finally, when that happens (if you'll allow me to indulge myself in some fantasies for the time being!). **[StealthSkater note: Preston Nichols (the Montauk Project) mentioned "soliton fields" in relation to UFOs and stealth technology. Don't know if this is the same as what Mr. Anderson is writing about. Check out** doc **pdf** **URL-doc** **URL-pdf** **.]**

C. **[Why Bearden Can't Talk about the details of Scalar research](#)** (1999)

WHY BEARDEN CAN'T TALK
about what he knows in any real detail

Dec. 1999 by Rick Andersen

Back in June of 1998 I emailed Tom Bearden, asking if he might let some "old cats out of the bag" since so much time has passed since he first wrote about them, and since I still wonder about some of the ideas he has since left behind as he has gone on to bigger-and-better concepts. Here's my request followed by his reply:

Dear Tom,

A couple of questions, if I may:

Remember in your older books like *"Fer De Lance"* etc. when you mentioned Frank Golden's ability to monitor the 12 KHz frequency pairs that the Soviets were using to extract power from the Earth, etc? Now that it has been so many years down the road and you yourself have essentially moved on to other things, can you elaborate on any of the actual equipment that was being used?

Like his scalar EM receiver. Or the time the two of you used scalar transmitters to charge up an area and the clocks went haywire. If only some of us could have some info on how to get started on some of these devices, we could possibly have undeniable proof that it's all more than just conceptual.

I did do a search on Jack Dea, whose LC circuit inside a Faraday shield with a strong magnet was suggested in *"Fer De Lance"*. All I can find about Dea on the Net is references to his work involving more "conventional" ELF studies. Just how <u>DO</u> I make a longitudinal wave transmitter and receiver?

I'd just like to make a flea-powered communications setup being the Ham that I am (call sign KE3IJ). And am I correct that non-inductive coils are a dead end?

I hope I haven't asked for more than I should have. But it's these questions that have been haunting me for years now. And if we can't have schematics, can we at least have some specific hints?

-- Rick

Rick,

My problem on experimentation is my **nondisclosure agreements**. When you work with other inventors -- as I sometimes do if I've known them for years and implicitly trust them -- then you have to be extremely close-mouthed about the circuits they have painfully uncovered after years of labor. That's as it should be. Anyone who thinks otherwise, I just say to them, *"Well, then, suppose you take all your income for the last 10 years and give it to me. That's what you are expecting me to ask that inventor if I try to release his painful discoveries. It's all he has to show for years of backbreaking, heart-rending labor."* Ironically, none of the naysayers has yet risen to the challenge and presented me with a check for their income for the last several years! You see the point.

Inventors get a bum deal anyway. I used to write songs, e.g., and I still write books. When I copyright a song or a book, I have rights to it for my lifetime plus an additional 50 years. The poor inventor gets about 17 years after his patent issues or -- as it is being changed to -- he gets 20 years after he first applied. So as you can see, the inventors do not have nearly so powerful a lobby in Washington as do the artists, writers, etc.

Frank's stuff was sometimes so powerful that it literally scared him (and me too). Also, Frank's son had a terrible accident, and Frank changed over to using his unusual EM devices on that boy to save his life. That required several years of unrelenting effort. Not only did he save the boy's life, but also he eventually got him up out of a wheelchair and walking again. He got much of his mental functioning restored also. The doctors just thought it was a miracle, and Frank told them nothing.

So I can't say a word about how Frank did it. All I can hint is that he used a method of direct engineering of virtual particles at a distance, including the formation of virtual and observable charges at a distance. He uses his own very different theoretical approach (the particle approach) from my own predominantly wave approach. Sometimes mine is better, sometimes Frank's is better.

In case of our group's own (limited) experiments, we have a small corporation -- CTEC, Inc. -- of which I am CEO and President of the Board. But I am also bound on specific details of what we ourselves try and do at CTEC. Actually I'm doing a whale-of-a-lot more than most other researchers. At least I'm releasing most of the concepts and principles we work out, even though I cannot release the actual experiments. Also, be advised that 99% of serious over-unity experiments invariably result in failure or indecisiveness. Or something you cannot decipher, or just a fluke that occurred once and its variables are unknown, so you cannot reliably replicate it. Only about 1% show real merit and promise and potential replication. That 1% then becomes the "pure gold" that one is trying to wrestle down to get the corporation started. It becomes the most closely guarded information the corporation has.

If you wish to perform actual o/u experiments, by all means go to *Nature* and look up the **Lawandy** papers and experiments. Lasing without population inversion works every single time -- and it's overunity. Also do some research on the **Fiber Fuse effect**. It works every time (the fiber optics cable has to have a core containing germanium, which most do). It's a weird experiment, and it produces more

energy in destroying the cable than you have to put in. Sometimes -- eerily -- you can reverse the direction of the thing, run it again and RESTORE that cable back to functioning again! In other words, it destroys the cable (say, 15 kilometers of it) in one direction by melting little holes in the core every inch-or-so. Then you run it in the other direction, and sometimes it goes back and REFILLS all those little holes, restoring the cable back to functioning.

For circuits, you cannot do o/u by using a conventional closed current loop where all the load current (and current through the losses) passes back through the back emf (i.e., back up through the source dipole) in the battery or generator. I have released one "*gedanken* experiment" circuit setup to fiddle with which with only a little difficulty can be built and experimented with. It is inherently capable of doing over-unity with some effort. But it will teach one a whale-of-a-lot about where one loses the energy and where one does not. I sent that to a researcher and haven't heard a peep from him since. I'll have an article coming out shortly with that circuit in it for anyone who wants to play with. We already have filed a patent application dealing with the processes of which that is one line of embodiments.

There are no "kits" that one puts together and gets a working o/u device except for perhaps the Lawandy experiment. That can be done in any sophomore optical phase conjugation lab for about $20-or-less. You need a beaker of water, a very weak laser, and some TiO_2 particles sized so that their resonant frequency is at or very near the laser's frequency. You need a little fluorescent dye as is standard in laser experiments. First, you put in a little dye in a beaker of water, then you shine the laser in there. You get a little warm fluorescent glow at the spot where the laser hits the dye in the water, causing it to fluoresce. Nothing extraordinary so far. Then you make a simple change. You put in the TiO_2 particles (which are the main ingredient in white paint, and so they are cheap, except for the sizing).

Now you shine in the laser again. *Voila!* From that spot, now a room-filling, enormous glow bursts forth. And it is <u>coherent</u> light -- not scattered at a bunch of frequencies. You are getting what Letokhov called "negative absorption" -- in other words, excess emission. We previously explained exactly what generates the excess energy density (multiply retroreflecting, multiple passes of the energy flow, multiple recollections and interceptions, and therefore increase of local energy density and asymmetrical self-regauging). If you wish to do an experiment that works every time, get the *Nature* article, consult with your local professor at a laser lab in university, and do the experiment. It's cheap. It works every time. It's validated in the hard literature.

The o/u kits will come of course, but not yet. So meanwhile, what I've been doing is sharing the over-unity principles (which took me enormous time-and-effort to discover and make rigorous so they will withstand technical objections). The idea is that young researchers should not spend the next 30 years of their lives just getting to where I am now. They should start with what I've found out now and go forward. And as best I can release it, they are going to know what I know if they wish to.

Also, in this area there is no substitute for reading (1) the EM and physics foundations literature, to discover for yourself that EM and much of physics are fouled up, and (2) the regular literature to find out what anti-Stokes emission, the Lawandy lasing without population inversion, the Letokhov papers, the fiber fuse effect, etc. are. What must be broken up in the heads of o/u experimenters is the notion that resonance alone will get over-unity, and that all one needs to know is the regular technician electrical stuff.

That's "malarkey", and it's largely why we don't have working o/u devices already. Normal EM has been readjusted and limited so as to specifically exclude those permissible over-unity Maxwellian systems. So obviously one must find SOMETHING wrong with ordinary EM and explore that. To just wave one's arms and spout ordinary EM is nonsense, insofar as over-unity processare are concerned.

Almost everyone wants a kit. But unfortunately, most of them confidently assume they already know electromagnetics. They don't at all because nobody does. Certainly no one understands fully the business of over-unity EM systems.

It's interesting. I had one Internet comment that I had been talking about over-unity for 20 years and had not put a unit on the market. My response was 'Well, you fellows have been experimenting and talking about it for 50 years, and where are your units out there working? In other words, if you know so much, then you show me what you have done. I don't think you can. I've still got 30 years to go before I'm as bad off as those folks.' The pot calling the kettle black, never solved anything. All it generated was a cat-and-dog fight, which I have no time for and no inclination for. There's work to be done and a problem to solve. (Besides, just wait a bit. We have not finished what we will be releasing yet -- not by a long shot. *It ain't over till the fat lady sings.).*

There is a very simple procedure for having a legitimate o/u device in the scientific sense. First, you get the results yourself and produce a working model. That still is not sufficient. THEN you take it to an independent government-certified test laboratory (there are several good ones scattered throughout the country). DON'T take it to your local university. The Testing Labs contain the best state-of-the-art in testing and they are certified. These certified test fellows don't care what you have or what your theory is, etc. What they will do is <u>rigorously</u> test the inputs and outputs. They will certify the results of their tests, specify the test procedures rigorously, specify the instruments, certify the calibration of the instruments, etc. They don't certify over-unity per se. Just the results of their tests to NIST and IEEE standards. But that certificate stands up in (1) the courts, (2) the U.S. Patent Office, and (3) the full scientific community. My own criterion -- for myself as well as others -- is that one doesn't necessarily have over-unity scientifically until that certified test procedure has been successfully completed.

That's what has to be done before one claims to have a "ready" o/u machine. Our own group has not yet reached this point (but perhaps we are getting quite a bit closer!). When we get one and have a successful certification test, we will release that information. And then and only then will we prepare to sell stock in our corporation for capitalization. In the interim, I refuse to do so. Whether-or-not we ever personally succeed, you can rest assured it will not be a stock scam. If I just wanted to get rich, I could have done that long ago off gullible, trusting persons. That isn't going to happen, and I'll have none of it.

Meanwhile, it is not any sort of "shame" if one has not got there yet regardless of how long one has been at it. That's part of research, particularly in entirely new areas -- e.g., look at hot fusion. Decades and numerous labs and billions of dollars, and they are not there yet either. Edison got a storage battery only after some 11,000 failures. Once asked if he were not discouraged because all he had had were failures and no progress, he exclaimed, "On the contrary! I am making enormous progress. I now know 11,000 things that do not work, and never have to try any of them again!" In other words, he was greatly narrowing his search and approaching that part of it where the real gold had to lie.

By developing and releasing a beginning theory of permissible over-unity EM devices which do not violate physics and thermodynamics, one is trying to narrow the search into those areas where the "real gold" lies. That is the most important thing I am doing, or at least trying to do.

Also, if one doesn't have any notion at all of what is required in order to have an o/u machine in the first place, then one is just "fiddling" and not really experimenting. So it's important to get that settled on the front end and to have at least some knowledge of what one must do in order to get o/u. That is something we have indeed spelled out for everyone. They may not like it because it isn't just exclaiming "It's resonance! It's resonance!". But it's there and it's valid. And it tells where the excess energy comes

from (the source is validated by orthodox physics!); how one extracts it (again, that is validated by particle physics but not electrodynamics); how little of it is actually intercepted and collected and used by a nominal circuit (this part has not been explained before, although Heaviside knew it and said so); why our normal circuits are under-unity (this has never been precisely stated before); what must be done in order to have our circuits inherently capable of over-unity (that has not been done previously either); and examples already in physics and validated that ARE over-unity EM processes (these have not been previously gathered together either).

Finally, we have shown how the energy collection process works and what can be done to intercept and collect more of the excess energy flow that is already available in all our circuits. And we've also precisely stated asymmetrical self-regauging as the technical requirement of an over-unity EM system. We've shown how the electrodynamicists already admit that the energy of a system can be freely changed at will, but how they then assumed you must be fool enough to change it twice. And then just so that the two changes fight each other to a draw so that you can't use any of that free energy that you obtained. In other words, they agree that you can take on excess energy wherever and whenever you wish, in a system. Then they insist that you be a stupid fool and deliberately set up a "dueling" system -- a sumo wrestling system -- inside your newly energized system so that you kill the over-unity ability of the system. We've shown that when you push all the load current back through the back emf of the primary source dipole, you set up the "dueling" system (the Lorentz condition) again and destroy any chance at using the over-unity you have gotten. And we have shown that every system we ever built was and is already an inherently over-unity system because its source dipole (not the battery chemistry and not the generator rotation) -- once established -- will freely extract all the energy anyone could ever need, directly from the vacuum. And particle physics has had that in it, experimentally proven, for over 40 years.

So I'm interested in persons who think logically, analyze the over-unity problem itself into parts, and get on with attacking each part in its proper place and turn. When you do that, you are making real progress on eventually solving the over-unity problem. That used to be called "System Engineering" in the early aerospace days. That sort of thing is how I made my living for over 2 decades. I know that method, and it eventually works. What I am NOT interested in is the old continuing notion amongst so many researchers that all one has to do is whip up a few wires and coils, make some resonances, and Presto! over-unity COP will magically appear and power your home and your automobile. It ain't that easy.

But like Edison said, by pointing out the things that alone will not enable over-unity, we are making real progress. We are narrowing our search immensely. And by showing the proper rigorously substantiable theory of over-unity EM devices, we are again making real progress because it tells us in what classes of circuits and devices we have to look, where over-unity COP is permitted, and where we can eventually hit paydirt.

Cheers,
Tom

Tom,

Thanks. I understand. I don't LIKE it, but I understand. I guess I'm just an idealist who -- unlike most inventors -- would not be looking at the whole thing from an "income" point of view. Like the inventors of the MRA device, I'd invite everyone to try it. And I certainly understand that you're not allowed to violate nondisclosure agreements. And I do -- we all do-- thank you for at least bringing the general concepts to the alt-science community to ponder over.

Right now my aims, believe it or not, are not even about "over-unity devices" which is what your answer was in terms of. I just want to prove to myself that I can transmit my voice from here-to-there over non-vectorial waves that normal radios can't pick up. That's why I still ponder over the Bearden publications of the mid-1980s.

Free energy and antigravity are World-changers. A "scalar walkie- talkie" set is more down to earth, although revolutionary in itself. Thanks again for your patience with my questions.

-- Rick

Rick,

Well, we're working on that too. Our work with Fogal can transmit signals "infolded" inside DC potentials, inside fields, or inside waves. We just have to get the Fogal semiconductor in limited tech production first. We demonstrated an early prototype to some government customers but did not have a clean "infolding". They were very interested, so we're still working on it. It's do-able.

In fact, previously Bill demonstrated "cleaning up noise" to Southern Company. The oddity that occurred was that the "infolded signals" exceeded the speed-of-light. In other words, he got through satellites and systems without the usual delay. This is to be expected when using longitudinal EM waves. Check out the Rodrigues and Lu paper for an overview of Undistorted Progressive Waves. Longitudinal waves (or pseudo-longitudinal EM waves) are something else again.

Anyhow, we will have it sooner-or-later.   I already have about 3/4 of the provisional patent application prepared, anticipating when the chip gets produced and Bill gets one working.

Cheers,
Tom

D. [**A reader answers my Bearden Critique: Why EM waves ARE Longitudinal**](#) (1999)

Polarization and Non-Inductive Coils Revisited
12/2/99 by **Rick Andersen**

During the Summer of 1999, I received a very interesting e-mail from a gentleman named Graham Gunderson. The subject was my old bone of contention with Tom Bearden: how can EM waves be longitudinal and yet have a vertical or horizontal polarization? My 1993 file POLARIZE.HTM criticized Bearden for refusing to address the observed phenomenon of polarization which -- to most peoples' thinking -- "proves" that EM waves traveling in free space must be transverse and not longitudinal. Graham Gunderson responded to my criticisms with the insightful letter reproduced below:

Dear Mr. Andersen,

I bumped into your website here and read your entertaining article describing Tom Bearden's apparent oversight regarding wave polarization being integrated into the longitudinal-wave model of Tesla's. Perhaps you stumped him.

For some 3 years, I have consistently read and re-read and re-re-reread about everything he has had published on the Web -- particularly in reference to phase-conjugation. I find both his and Tesla's theories to be simply more intuitive than the effect-no-cause descriptions of events given by mainstream physics. Indeed, when one uses a visual model of the "virtual photon flux", it is much easier to "see" longitudinal waves than Maxwellian transverse waves. Transverse waves belong in-and-around conductors or on charged particles, not in "empty" space. The 'T' in transverse may as well stand for 'translational' in the way Bearden uses the term.

I, too, was puzzled by the polarization question when I first read it on your site. I had not considered it, but the "problem" is actually an artificial one, given by incomplete understanding and partial realization. Longitudinal waves can and of course do support polarization, in some cases, like that of the Hertzian antenna.

In your example, you use RF antennas as a model. Let's go back through that. Say you have a ground plane with a ¼-wave antenna vertical to it, radiating significant RF power. Now at the "input end" of the antenna near the ground plane, there is a large current flowing from your RF source (coax, whatever) and a rather low voltage. If you were to touch a coin to the antenna at this point, you would see very little or no spark due to that low potential difference. However, touching the same coin to the tip of the antenna would draw a long spark since potential is at a maximum (while current -- at resonance -- is theoretically null).

"Empty" space can be regarded as a huge electrical charge (that's understated!) without a net polarity, resulting mass flow, or macroscopic gradient coupling to charged particles. Thus when you are oscillating the local potential of the photon flux with the antenna tip's pure voltage (at your RF frequency), you are actually altering the local charge density of the VPF at that frequency (diminishing with distance from the tip), giving rise to the longitudinal, traveling wave through "space" and subsequently through time. Air pressure makes a good analogy for this if at the end of your "hose" there are alternations of pressure (blow out) and vacuum (suck in). In reality, "virtual photons" just take the place of air molecules.

Now we know that simply oscillating a point charge at high voltages will not translate to a signal received by another tuned antenna as will an oscillating charge from the end of our transmitting antenna. In both cases, we are vibrating/varying the local intensity of the virtual photon flux. But only the antenna (and not an oscillating point charge) produces what we call an "EM wave". Clearly, "voltage" (potential) varies the intensity of the VPF, giving rise to longitudinal (pressure/density) waves in both cases. Why, then, do we need an "antenna"? And yes, how does the receiving antenna "know" what the transmitted polarity was?

Answer: Because we refer to ALL antennas as DIPOLES. There are actually TWO longitudinal waves propagating through space. If you look up the Hertzian example above (1/4-wave radiator above a ground plane) in an ARRL textbook or something, you will find that there is a "virtual" ¼-wave rod BELOW the ground plane as well -- at least as far as RF energy sees it. It is usually illustrated with a dotted line. Without going into the "why" on that one (even though it's related to this), let's use a simple ½-wave, center-fed dipole in our discussion for brevity. As is obvious, when the potential on one end of the dipole is "positive" at the voltage crest of the RF wave, the potential on the opposite end of the dipole will be "negative". Therefore, we have a simultaneous INCREASE and a DECREASE in the VPF -- equal and opposite -- separated by the half-wavelength of our signal.

Therefore, a distant, resonant antenna will translate this spatial "pressure" difference (although diluted by distance) into a tiny, time-delayed copy of the original **B** and **E** fields surrounding our radiator. Since the 2 opposing compressions/rarefactions of the VPF are separated by the distance of half the wavelength, they will <u>never</u> -- cannot -- cancel. Try imagining red concentric circles emanating from the top point of the dipole, and blue concentrics radiating outward from the bottom-most point. Obviously, the circles will cross and interfere. But they will NEVER TOTALLY OVERLAP TO FORM "PURPLE" (or cancel) until an infinite (unattainable) distance from the radiator is reached.

Now stretch your noodle a bit and use concentric spheres (ghost onions?) to get a 3-D representation of the actual goings-on.

Imagine receiving antennas parallel to -- and perpendicular to -- this imaginary radiator. It may be easy to envision why you -- in theory, ignoring reflections -- recover NONE of the signal when your antennas are crossed (or a percentage of the energy equal to the cosine of the angular difference between the two: $\cos 0^o = 100\%$ [parallel], $\cos 90^o = 0$ [crossed]). The perpendicular antenna sees no temporal or spatial difference between red onion shells and blue ones. In other words, there is no longer a circumference differential between the intercepted red and blue spherical shells.

As an alternative, imagine a yardstick with a piezo buzzer taped to each end. Wire them out-of-phase so that when your signal generator makes them sing, you can still hear a tone even though the sum total acoustic wave is a canceling one. It is their distance from each other that defeats total cancellation. And if you had a second yardstick set up like the first -- but as a receiver (also with crosswired piezos, but connected to an oscilloscope), and the whole setup was in an acoustically nonreflective space -- you would get a signal reading if your sticks were parallel. But cross them and your scope will show a flat line. (Not recommended as experiment. An acoustically nonreflective space is pretty hard to come by...)

Therefore, we can carry polarization information by using TWO longitudinal waves, naturally separated by wavelength -- which is closer to what's really going on. Or we can simply say that it is the separation between the centers of the red and blue "ghost-onions" that determines wavelength. (This is a separation of relative distance as well as a relative separation in time -- whatever term makes you happy)

Incidentally, if you have researched Townsend Brown's work in electrogravitics, you have read that you CAN carry information by varying a single "point" charge with no dipole. But to receive the information, you need a receiver that is a monopole as well. The mode of transmission is still a longitudinal stress wave. But it has no nearby partner with which to almost-cancel at appreciable distances. Being a single VPF stress (gravity) wave, it manifests as a pure fluctuation of the density of spacetime itself (again as 1/distance, being inversely proportional) and this is why such a monopolar receiver will electrically manifest all gravitic fluctuations (supernovae, Earth-orbital variations, etc. as well as any transmitted signal). If you attach this monopole (like a lead ball) to a resonator (top end of a tuned coil, etc.), you can single out a particular carrier frequency just like a tuned antenna will.

If you're unfamiliar with this, dial up the Biefield-Brown work on a good search engine and understand it!!! Non-Hertzian waves are unshieldable and will transmit through any matter (even the whole Earth) as easily as through a vacuum!

(I thanked Gunderson for his fascinating insights, and asked him if he'd mind it if I put his letter up on the Web. Which is what you're reading now. Here's the follow-up from Gunderson:)

Hi, Rick!

Thank you for taking the time to consider what I sent you and respond. I didn't know if I was being taken seriously or not. After all, there's a chance I could be dead wrong in what I wrote -- or at least laughably incorrect.

However, the work I've been doing generally says otherwise and that tends to give me confidence.

I want to say that wow! I'm flattered that you would like to post my response to your file. There's a lot of stuff I'm both able and eager to add to the public knowledge out there for consideration. But I don't have a website or anything, so I guess this is a good start.

I say that in light of the fact that what I presented in that paper are merely methods of visualizing a possible solution and the ideas I advanced aren't really meant as the <u>final</u> answer. Until we have a cohesive and coherent model that can take into account all the confusions and anomalies we encounter in our pursuits, no one (not even Mr. Bearden himself) can say they really know a thing for sure. After all, "phase conjugation" et al is only a mental construct, too. The principle does nothing more than explain effects. It says nothing about the fundamental causes, whatever they are. It is interesting to note that it is possible (even intellectually profitable) to DO AWAY with the phase-conjugate model entirely and treat the entire, mysterious process as a manifestation of more directly visualizable (and familiar) electromagnetic effects. How we think -- in approaching a problem -- colors what we perceive (and infer). Using many (limited) perspectives (instead of ONE limited perspective) gives us more "colors" in our picture of what's going on, and therefore a better chance at accurately rendering reality in our model.

At any rate, I have attached a revised copy of the response file to this e-mail. Most of what I did (in addition to clarifying certain points for the reader) was to "soften" comments I made in reference to Mr. Bearden, since I have total respect for the man and I don't want to be interpreted as otherwise. I am a 23-year-old peon, and I'm new to the game. I don't want to butt heads with people who have spent longer with these theories than I have been alive.

Above all, feel free to choose either version you like. The attached is a .txt file and those are sometimes choppier than they're worth.

As far as the head-butting goes, though, I may still have to don my war-paint. The claim that "bucking" (or self-canceling) coils do NOTHING is absurd.

I challenge anyone who makes claims as such to substantiate them. I make claims to the contrary and I can back them up. Here's a simple test if you (or anyone else) wants to try it.

First you will have to wind a self-canceling coil with very good canceling properties. Start by selecting the thickest (lowest gauge) transformer wire you can find. 18-gauge is about the ideal, but bigger here is better. Thicker wire (besides having low resistance) still stretch less, and any diametral variations along the length will have less effect on the resistance of the wire.

From the <u>SAME</u> SPOOL of wire (ensuring equality between conductors in their metallic purity and exact diameter), cut 2 lengths of wire that are EXACTLY EQUAL in length. The longer your lengths the better, just make sure you can be certain your lengths are EQUAL. You will want enough for at least 100 turns around whatever you plan to wind on. I recommend an old, small wire spool (like those used for consumer speaker wire). As you wind your wires parallel to each other while turning the spool,

try to keep them from overlapping unnecessarily. The "cleaner" you wind the coil, the surer you can be of your results.

The main idea is to keep your 2 conductors <u>identical</u> twins. Try not to stretch-or-bend either wire inordinately or do anything to cause a DIFFERENCE IN <u>RESISTANCE</u> between them.

All you will need besides this coil to see what I am talking about is a good source of high current AC and a big neodymium-iron-boron (neo) supermagnet. I do mean <u>big</u>. The one I used in my original test is a cylinder, 1-inch in diameter and 1-inch long (and worth about $50!) Try to use a good grade (like neo-35). You need a huge magnetic moment to really feel this. (Remember to use a spool that can accommodate your big neo and a few fingers in its bore!)

The bifilar coil will have four wires protruding from its finished form. They should be connected in reverse-parallel so current can flow down either coil in an opposite direction to the other. Twist the connecting leads together to make sure their fields cancel.

You can get your AC current from either a stepdown transformer or a large AC capacitor (something like 100 uF @330 VAC) in series with the coil's connections and 120 VAC. (Remember this coil appears as a pure resistance electrically so there are no resonant/LCR-circuit effects).

I strongly recommend the capacitor approach because it is mostly "watt-less" current limiting and the only thing that will heat in this arrangement is your bifilar coil.

At long last -- when you have a good coil passing something like 10 amps -- hold the neo magnet inside the bore perpendicular to the coil's axis. You WILL feel a **vibration**, no matter HOW carefully balanced your bifilar coil is.

I must admit there are other ways of winding coils that are both more balanced and more effective. But I am not allowed to share the techniques. This should be no loss to you. Ue some imagination and you could well come up with something way better!

The curious thing after all this is that though the vibration (for all the amperage and all the magnet's flux) is very small -- indeed, almost a trifling effect-- it has a very high 120-Hz vibration component. If we were dealing with a pure magnetic field at 60-Hz, we would expect our magnet to dance along at 60-Hz as well -- not DOUBLE the frequency. It is this difference in motion that tells us we are dealing with an unconventional effect.

If you want, you can line the core of the bucking coil with a thick copper tube or shorted coil to attempt to eliminate (magnetically short) the AC field. Normally this will mostly kill the magnet's powerful vibration. Here -- with your bucking coil -- you will notice NO DIFFERENCE. That little jitter that "shouldn't" be there is almost impossible to get rid of. And you can usually only "feel" it with neodymium!

So, I'll try to explain (at least in my own terms) why this effect occurs to back up my claim that bifilar coils ARE more than just heaters. There are 3 major points from which a discussion can depart:

1. Superposition. The bifilar coil consists of 2 coils with current going in opposite directions. For a moment, visualize the simple case. Imagine 2 long, straight, parallel conductors carrying current in opposite directions. Imagine them very close together. One "wire" "makes" a "clockwise" circumferential magnetic field. The other "wire" manifests a "counterclockwise" field. So, the generated fields are opposite. In the quantum mechanical sense, each "field" is independent. In our 3-D

spacetime, we see the fields "bent" and distorted (and mostly cancelled, on the exterior) by each other's presence. But this is just their SUM here in these 3 dimensions. We have to imagine the POTENTIALS as INDEPENDENT ENTITIES. Therefore, the accurate picture is that of concentric circles emerging from each wire, overlapping (and ignoring) the other wire's field. One can imagine the circular "field lines" of one wire being blue, and the same from the other wire as being red.

If the center of each set of concentrics were one and the same, all points on all circles would overlap and "turn purple" (which we can think of as truly canceling at that point in space.) Therefore, it would be hard to picture a net effect. However, our conductors must occupy different locations! This means that the 2 centroids are no longer in complete superposition. The red and blue circles do not ride each other but <u>interfere</u>.

The best way to picture this, actually, is to write a simple computer program that graphs this all out. If you get more complex than this simple case, it becomes easy to see how you cam generate "beams" where the PATTERN of the canceling state REPEATS on certain axes and becomes orderly. At any rate, the picture you will see will be a tangle of overlapping reds and blues. At any point, the vector sum of the 2 opposing colors will be zero or nearly zero. But you will see a host of PATTERNS or a very complex (and pretty!) STRUCTURE of cancelling energies. THIS IS THE STRUCTURE OF THE VIRTUAL PHOTON FLUX "UNDERNEATH" THE "CANCELLING" THAT WE "SEE". There is definitely something going on behind the scenes!

2. Motional E-field. In all this belabored discussion so far, we have neglected electron drift. Electrons are BOTH electric and MAGNETIC particles (due to their spin -- remember, <u>motion</u> is the only difference between electricity and magnetism!) and as they move down the wire, they can be thought of as little moving magnets. (In a sense, this is really what they are.) And when you move a magnet, you get an electric field. So even though the magnetic field (from moving electricity) in our bifilar coil cancels, the electric field (from moving electron magnetism) ADDS!!!!!! This is the "motional **E**-field" that Hooper, Sweet, and others have had the insight to mention. Yes, it is a small effect. But it refuses to cancel when all other things do. It is very pervasive!

Thinking purely in terms of "waves" is a limited viewpoint. Wherever there is current, we are MOVING physical, electroMAGNETIC entities (electrons). And this MOTION results in "fields" that we would otherwise ignore, dogmatize away, or be unable to account for.

3. Photon flux. Whenever we are passing energy through the vacuum, we are altering the natural state of the ambient virtual photon flux. A bifilar coil is one of the most effective devices for "passing energy through the vacuum". All the inductance (energy storage capability) it would otherwise have as a "regular" coil is totally gone, because the very energy that would be ordinarily stored is neutralizing in the opposite (adjacent) coil windings having passed THROUGH the "vacuum" on its way. This extra energy density in space accounts for a (very) small percentage increase in the total ambient photon flux (which is astronomically huge compared to the power levels we normally use in the lab). Extra -- or missing -- flux is a <u>bend</u> in space. Just like a high electrostatic charge or gravity. Put any energy into empty space and it will ALWAYS ripple and distort, to some extent. (Why shouldn't it? Vacuum IS energy!)

This variation in the density of spacetime changes the impedance of the vacuum (or the relative dimensions of electric and magnetic fields). As the raw impedance of space fluctuates (positive or negative delta), a magnetic field has to "fit" into the space differently and this -- at least in theory -- can vibrate the source magnet. (If anybody wants a Nobel Prize, they could find a way to significantly "delta" the intensity of the VPF in raw vacuum and measure the speed-of-light during the shift. Then

they could document that our sacred "constant" had indeed CHANGED in direct proportion to the energy input!!)

Note that topics (2) and (3) above are independent of the POLARITY applied to the bifilar coil. That is, the effects occur in the same fashion if energy is present at all regardless of its "polarity". This introduces a "rectifying" effect that would appear to double the frequency of the resultant effects at AC. This neatly explains the observance of the 120-Hz component in our magnet's motion, and all 3 viewpoints (being unable to diminish their intensity by eddy currents/application of Lenz's law) are immune to conventional methods of shielding.

I am running out of time, and for now I will have to sum this up. Whether-or-not you decide to actually mess around with this or not (if you do BE CAREFUL with neo magnets --. they are grenades!), rest assured that there ARE tests that can at least cast doubt on some of the statements out there. I have dumped several thousand amps through one of my coils -- in the canceling mode -- by discharging a huge bank of fully charged HV caps through its small resistance. The first observation one makes after this event is that the temperature of the coil goes from room-temperature to untouchably hot in an instant.

If I do this in the normal (summing mode) with the two coils in parallel, the coil EXPLODES and shreds to hair in a shower of sparks. This is fascinating in light of the fact that in this mode the coil has INDUCTANCE as well as its original (bucking) RESISTANCE: this means that FAR LESS INSTANTANEOUS CURRENT is present in the coil's windings, at any moment during the discharge. (The inductance and the resistance both factor into the Ohm's Law equation as "resistance" in the initial case). If the hundreds-of-amps present in the wires in the inductive mode are enough to disintegrate the coil, why are the THOUSANDS of amps in the noninductive mode having NO effect on the physical structure of the coil (not so much as even a sound!)? Why aren't the wires scorching and melting like they do at a fraction of the current? Where-the-dickens is the energy GOING?

If you want to figure that one out, I'll tell you -- it's one to sleep on. I gotta go to bed.

Thanks again for your reply. E-mail me as often as you like, I enjoy hearing from you.

I hope that if this discussion didn't help you resolve any of your questions, that it at least gave you some new things to ponder. I hope it was of use to you -- the ideas in here have definitely been useful for me.

(PS: It is interesting that 'sensitives' can supposedly "see" a change in coils like these when they are energized... that, to me, says more than any magnet really can.)

Happy pondering,
graham

E. On the Production of 'Scalar' and 'Static' Waves (1998)

F. Tom Bearden on Weather Control via Energetics (1998)

G.

H.

On Internal Work and Antigravity with Newton, Faraday, and Maxwell
T.E. Bearden - 08/08/97

Internal work is an eerie kind of thing! There are several things involved. I will try to discuss one-or-two briefly.

First, Faraday believed fervently that his lines of force existed as taut physical strings (everyone at the time -- Faraday included -- believed in a MATERIAL ether). So he thought that EM disturbances were simply the disturbances of these taut strings. That was then a transverse string wave.

So to Faraday, "EM shaking" in the ether was just these physical lines of force shaking (like a transverse twanging string wave). NOTE that he just assumed away the body of any string holder to provide the tensile forces on that string! In short, without realizing it he threw away Newton's third law reaction forces from his material strings.

Maxwell stated point-blank that he would read no other EM theory until he had thoroughly studied Faraday's work. He also wrote a paper on those physical lines of force. He mathematized them with a tube of force concept.

But he also ASSUMED away the body of the mysterious missing string holder and also thereby discarded Newton's third law reaction from his electrodynamic theory. The third law is STILL missing from the theory today!

When electrodynamicists do an experiment -- say by introducing some EM energy to be absorbed, etc. -- the third law recoil force and energy DOES appear. It is GENERATED in their experiment, but the cause for it does not appear in their model! So they piously raise their eyes to heaven and say, "Oh, yes, we know that will occur. That's due to Newton's third law."

Well, Newton's third law is a <u>DESCRIPTION</u> of what happens. It is not the CAUSE of anything being instead of a cause, an <u>EFFECT</u>.

In short, there never were any twanging strings in the vacuum ether. And Faraday's lines of force are not even lines of force! THERE ARE NO FORCES IN THE VACUUM.

In the first place, force is not the primary CAUSE of acceleration of a mass! Force is not SEPARATE from mass. Rigorously, the definition of force is **F** is identically d**(mv)/dt**. As can be seen, mass is a COMPONENT of force. In the vacuum, all that exists are changes in the vacuum potential. In other words, you get gradients of scalar potential and swirls which we identify as vector potentials or currents of potential.

There is no **E**-field in the vacuum, for example, in the sense presently used.

Electrodynamics assumes that at every point in the vacuum, there exists"

    (1) a point unit North pole,

    (2) a point coulomb of positive electrical charge

    (3) a point unit mass.

Electrodynamics theory then describes how those assumed point entities move and react. THAT's what the equations actually describe -- the <u>movements</u> of those 3 entities. They do NOT prescribe what exists in the vacuum WITHOUT that observable matter being there!

Classical electrodynamics still completely and erroneously assumes the MATERIAL ETHER. You would think that they would have got the message since the Michelson-Morley experiment in 1888 destroyed the MATERIAL ether. All that happened was that one day the electrodynamicists said, "Okay, so there's no ether! Okay, we are not using one!" And they never changed a cotton-picking equation!

What really happens with a scalar potential at a point, e.g., is that it increases or decreases. Look at the points in the neighborhood around that point of interest.

If the potential increases at the focal point, then it has not yet increased at the points around it at an infinitesimal distance from it. So it has a set of radial gradients all around with respect to the ambient vacuum potential points in its neighborhood.

Well, each one of those radial gradients is (erroneously) called a force in classical EM. But for each radial, there is an opposite and equal radial. Try increasing-or-decreasing the potential at that point any way you wish. You still produce a set of equal and opposite (bidirectional) EM "forces".

The point is that the waves are always created as PAIRS of equal and opposite waves. It's more like a "rhythmic squeeze" wave than anything else. In the real world, the antiwave portion is actually a phase conjugate -- and superposed spatially upon the wave -- in each bi-wave pair.

That's how Whittaker came to show that any scalar potential is a set of bi-wave pairs . And in each pair, there is a wave and its antiwave (true phase conjugate). But that means that this doesn't generate any NET force!

Voila! It contains excess or minus energy at that point, but it did not translate anything. That increase in the local energy density of vacuum spacetime is ruthlessly a CURVATURE of local ST in the GR sense.

So what is produced in the vacuum is a GRAVITATIONAL wave and not an EM wave at all! This is consistent with modern gauge theory when one thinks long enough about it, because gauge theory regards gravity itself as simply the "restoration of symmetry" when a force of any kind is formed.

In other words, **Sakharov's** hypothesis is true -- Gravity is <u>not</u> a separate field in the sense of Maxwell but is always made from <u>other</u> fields. In fact, it is just NEWTON's THIRD LAW revealing itself -- particularly in electrodynamics!

Now let's look a little deeper. Suppose we have this harmonic set of wave/antiwave pairs (this scalar potential) coming onto an atom of matter.

Well, the time-forward wave halves get stripped off and interact with the time-forward part of the atom (i.e., the electron shells).

The atom can be regarded as a set of dynamic dipoles where a positive charge in the nucleus and a negative charge in the electron shells comprise one of the dynamic dipoles.

The dipole is a "splitter" of the G-wave incoming. It splits that thing into 2 EM waves momentarily.

The forward time wave-half interacts with an electron in the electron shells, and the reversed time wave-half interacts with the positive charge end of the dipole down in the nucleus.

That generates Newton's third law recoil of the nucleus, which is admitted but usually ignored in electrodynamics.

The point is for all the energy interactions ongoing in the electron shells, there are equal and opposite EM energy interactions ongoing in the nuclei. We ignore the latter.

NOW to the inner work. As you can see, when you do some work on the atom with EM radiation, you simultaneously do some equal and opposite inner work in the nucleus. (One can use this to get antigravity, free energy, and all sorts of goodies).

Now in nonlinear optics, one interacts that G-wave (i.e., with its EM biwave pairs) as it is coming in by nonlinear EM wave interactions such as 4-wave mixing. The time-reversed wave-half doesn't get to reach the nucleus. Instead, it is flipped right back toward where it came from. And along with it goes up to all the energy in any additional pump waves on the atom.

So a phase-conjugate mirror -- no matter how powerfully pumped -- DOES NOT RECOIL when it emits the powerfully amplified phase-conjugate replica wave!

The reason is that the MECHANISM generating Newton's third law recoil of the nuclei did not happen because the cause (the incoming "missing" time-reversed wave-half) was redirected before it reached the nucleus.

Now that's an interesting way to intercept the "cause" of internal work -- and redirect and use it -- BEFORE it comes into its causative interaction to generate internal work.

Now if you continue to do the POSITIVE work half (in the Sweet device, the work done in the load), and in fact increase the positive work half while simultaneously rejecting the excess negative half, you have a missing "Newton's third law" reaction for the excess positive work being done in the load. That means you have a missing restoration of symmetry, for the excess positive power being done in the load.

That means you have just exactly that much **ANTIGRAVITY** formed. That is, if restoring symmetry is what exhibiting gravitational force is, then DENYING the restoration of symmetry is what dis-exhibiting (denying) so much gravitational force is.

So by denying the restoration of symmetry for extra power in the load, you create ANTIGRAVITY by just that amount of power.

Let us reason together. Gravitational energy is already known to be (embarrassingly) negative energy. Well, what is "negative energy" in layman's terms? It's just energy that was never there but does work against you. Again, it's just our old friend Newton's third law, hiding in disguise.

So we get gravity when we let the time-reversed half of the EM waves interact with atomic nuclei.

We get an absence of gravity when those waves come in but the antiwaves do not reach the nucleus and do not interact with the nucleus.

READ THAT AGAIN, THAT'S PURE MAGIC!

So to get antigravity, you bring in some EXCESS phase-conjugate (time- reversed) EM energy together with some excess energy (the other half accompanying it, since you bring them in, in pairs. You let the time-forward half go to the external circuit and the load, and do excess work in the load.

But you do not let the excess part of the incoming time-reversed energy reach the nucleus. Instead, you multi-wave-interact with it before it reaches the nuclei. You send it back on its way. So what does that do?

Well, if you bring in extra gravitational energy (cause) and then REPEL it WHILE LETTING ITS INCOMING FORWARD-TIME MATCHING ENERGY BE DIVERTED TO THE LOAD AND DO WORK IN THE LOAD, that's the exact thing as creating that much **ANTIGRAVITATIONAL** energy.

In short, that's how you produce antigravity. Or if you wish, that's how you get a unilateral thrust.

Just point that antigravity thrust in the correct direction, and the unilateral antigravity thrust force will occur in that direction.

For propulsion, then you fly it like a helicopter. With thrust upward, you lift straight up or hover, or lower down gently. By angling the direction to have a forward component, you also move forward while hovering, climbing, lowering, etc.

That was the gist of my theory of gravitation that I got "Sparky" Sweet to test with the vacuum triode amplifier. I had estimated that it would levitate at about 1500 watts.

But one would get magnetic charges (monopoles) deposited in the barium ferrite magnets as one increased the power above the nominal 500 watts design. So I warned him not to go above 1,000 watts because the magnets might explode and kill him. (They go off like hand grenades when the yield point is reached, and Sparky did explode a few magnets at various times this way!)

Anyway, he increased the load in 100-watt increments to 1,000 watts, and that thing reduced its weight on the bench nicely and smoothly by 90 percent. If the experiment had failed, I would have had to go back to the drawing board. But it worked beautifully.

So the gist of the internal work is that you directly involve
> (1) Newton's third law being added back to classical EM,
> (2) turning EM into G and vice versa,
> (3) putting Faraday's missing string holder back in there,
> (4) increasing the potential cause for internal work, then rerouting it back out before it interacts in the nucleus, and
> (5) finding Maxwell's missing "tensioning agent" in the vacuum.

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Maxwell actually pointed out carefully that his theory was not finished because he had assumed this stress in the ether but had not been able to account for it, and therefore further work had to be done.

Heaviside also warned that the present EM theory was just first order and suitable for first order effects, but was not to be considered as "finished".

In his opinion, initially the engineers would have sufficient trouble learning that first order theory and applying it. So the refinement of the theory could come later.

Hope this is a little clearer.
--Tom Bearden

I. [Clarification of Scalar EM and Bi-Directional Waves, by Ed Mason of Nova Research](#) (1996)

In the Summer of 1996, I had a series of e-mail correspondences with a gentleman named Ed Mason of Nova Research located in Florida. He had written the following file SCALAR7.ASC, which never made it up onto the KeelyNet. But he kindly mailed me a copy and we wrote back-and-forth for a few months. His file contains comments on my file -- ANDERSEN.ASC -- in which I critiqued some of Bearden's earlier writings on Scalar EM, and on Bearden's response letter to me, now on the net as BDNLTR.ASC. In this file, Mason offers some very interesting angles of his own on the subject.

SCALAR 7.ASC

ED, Director
NOVA RESEARCH
AUGUST 1, 1996

STATUS: UNCLASSIFIED

NOTE: This paper contains a lot of Bearden's quotes from MANY different papers of his. I have "integrated" them together where I thought they are all related.

NO COPYRIGHT: This paper and ideas therein may be FREELY SHARED according to the high ideals of KeelyNet. However, I would appreciate if PROPER CREDIT is given me for any ideas I have originated herein.

PAPER ON SCALAR POTENTIAL AND SWEET DEVICE
PRACTICAL SCALAR POTENTIAL PRODUCTION EXPLAINED

with SuperConductivity applications and relation to UFO Propulsion described with CIA Area-51 experiments in Scalar Potential devices hypothesized.

In reviewing many of the "Free Energy" text and GIF files on KeelyNet and studying the concepts presented -- especially those pertaining to the theoretical work of such luminaries as Whittaker and

Bearden -- perhaps my comments may provide some more assistance to advances in this new field of endeavor.

In BRDNLTR.ASC, much information was given by Tom Bearden in response to the questions and points raised by Rick Andersen. There appears to be a discrepancy between Bearden's statements that "sum zero vectors" comprise or produce SCALAR WAVES or SCALAR POTENTIAL, and his later statements that Hooper type Bifilar coils (i.e.; Cadeuceus coils, coils comprised of "opposing" field windings) produce a situation in which both the AMPLITUDE and the TIME VARIABLE (+t), (-t) cancel out, resulting in NO NET EM EFFECT.

Bearden reveals this is due to the fact that 2 opposing "fields" are actually comprised of TWO pairs of Bidirectional Whittaker waves (the Forward time component wave AND the Reversed Time component wave) and that there are actually FOUR Bi-D Whittaker waves that cancel out not ONLY spatially BUT TIMEWISE as well. Bearden then says "Major Bummer!"

YET THE SCALAR PUMP POTENTIAL IN THE SWEET TRIODE USES JUST SUCH A 4-PAIR BIDIRECTIONAL WHITTAKER (INTERNAL EM) WAVE SET !!!

One also notes that IF <u>nonlinear</u> material was used in a Bifilar Hooper coil, THEN the usual null effect would vanish and "spooky gravitational effects" are noted. Well, NONLINEAR material <u>is</u> placed at the focus of the 2 pump waves (4 Bi-D Whitttaker scalar waves) in the Sweet device.

"... This agreed with Whittaker, and also now offered a sudden inspiration as to when we got the G effect and when not. We were dealing with 4 waves -- not two -- in the opposing ordinary waves. We had 2 opposing normal waves and 2 opposing antiwaves, with the wave/antiwave coupling. 2 ordinary waves 180 degrees out-of-phase would certainly cancel (spatially) their amplitudes (as is well-known in RAM materials and structures) but would not cancel their energies. The 2 antiwaves would do likewise, spatially.

"The point then became so what would happen in the time domain? Here we got a shocker. The 2 antiwaves would cancel each other's amplitude SPATIALLY and would add energies. But looking at the action (energy x time) aspect, their energies exist in negative time! Well, this meant that the antiwave ACTION would come out negative and would then cancel the added positive wave ACTION because Sum Ewt + Sum Eaw(-t) = 0. Therefore the sum of the whole mess was zero! Bummer! We wound up with everything just vanishing, wherein all the action (angular momentum) seemed to vanish. Well, this showed that the notion of simply having waves 180 degrees out-of-phase of itself would not give gravity effects. So that's why mostly the Hooper approach didn't seem to do much. But if one added <u>nonlinear</u> materials to the core, then one broke the linear cancellation."

"...The magnitude of the electrostatic scalar potential created by the accumulated charges (spray pumps) represents the local magnitude (flux/spray density) of that virtual photon "spray". It has nothing to do with the mass of the charges except that Nature has built those particular masses to be "little self-powered spray pumps."

NOTE: Scalar potential is CREATED BY the ACCUMULATED CHARGES, et al

"When we "charge up" an accumulator -- such as a steel sphere or a capacitor -- we push in the electrons so that they pack closer together, and we thus increase the virtual photon spray density because we've accumulated more sprayers in a confined volumetric region. The volumetric spray density represents the magnitude of the electrostatic scalar potential (ESP) in this analogy."

"Contrary to conventional wisdom, Whittaker proved that this scalar potential -- this "spray density" -- is internally organized into hidden, flowing, bidirectional EM waves. EM force field wave energy is flowing in both directions. In the electrostatic scalar potential, the net Poynting vector resultant is zero. But it is a "sum-zero system" composed of an infinite set of opposite but equal finite Poynting vectors. That zero vector resultant is a scalar EM potential. It's got lots-and-lots of EM energy flowing both in-and-out simultaneously. But these flows are normally balanced and in equilibrium."

"... Actually, scalar potentials (Vacua! Spacetimes!) from charged particles -- both static and dynamic --..."

"... For a very recent proof that the potential is a flow process -- and in fact consists of bidirectional EM waves -- see Hsue, C.W., "A DC Voltage is Equivalent to Two Traveling Waves on a Lossless, Nonuniform Transmission Line," *IEEE Microwave and Guided Wave Letters*, 1993, Vol. 3, p. 82-84."

"... Rigorously the scalar potential is composed of a dynamic, opposing vector force field wave internal structure. Internally it's vectorial; externally it's scalar. Whittaker (1903) tells how to make standing scalar potentials -- these can be made as beams."

NOTE: THE "ZERO SUM" exists WITHIN the structure of the Scalar Potential ALREADY. There is NO NEED to "oppose" ordinary ES or EM "fields" because as said before they are ACTUALLY "effects" caused by a SCALAR POTENTIAL ESTABLISHED BY ELECTROSTATIC CHARGES OR MAGNETIC "FLUX". Comments by Bearden regarding "ZERO SUM" actually applies to the INTERNAL MATHEMATICAL COMPONENTS of SCALAR POTENTIAL. Early writings indicate that T. Bearden realized this fine point only later.

"Now, of course, one can take equation [1] above and apply Whittaker (1903) to it, and mathematically decompose the PHI-sub-q term into a set of hidden bidirectional EM wavepairs in a harmonic sequence."

"...The source already acts as a "dipolar antenna" to continually receive "scalar potential" current dPhi/dl (mass-less displacement current) from the vacuum."

PHIq is MASSLESS DISPLACEMENT CURRENT aka electric charge. This -- being composed of Bi-D wavepairs -- is identical to electrostatic scalar potential.

THEN the 4 waves:

"Then all that remains to be done to tap this vacuum-furnished "pumping" energy is to utilize standard 4-wave mixing theory from nonlinear optics and introduce a small signal wave input. By standard textbook theory, up to all the energy in the pump waves will then be emitted by the nucleus as a phase conjugate replica (PCR) (time-reversed replica) of the signal wave input."

"... Treating the stress-pumped nonlinear nucleus as a PPCM, it follows that the stress energy of the vacuum can be tapped by a 4-wave mixing mechanism in the atomic nucleus to provide amplified phase conjugate EM wave outputs from the atom in response to small signal wave inputs." (Utilizing Scalar Electromagnetics to Tap.., et al)

"... Hence the vacuum/nucleus flux exchange system is not locally in equilibrium because part of the in-flow is being gated by 4-wave mixing accomplished in the PPCM barium nuclei into forming an organized PCR wave, which in turn goes on out of the atom instead of back to the vacuum. Any local

vacuum energy extracted is just instantly replaced by the surrounding vacuum -- just as a raging ocean instantly refills the hole left in dipping out a spoonful..."

"...Up to all the power in the pump waves A1 and A2 may be output in phase conjugate replica wave A4 in response to a small signal wave input A3."

In other words,

[the following is my paraphrase because I could not reproduce his ASCII diagram properly in HTML -- R. Andersen]

pump wave A1 is actually a pair of bidirectional Whittaker waves, propagating into the phase conjugate mirror (PCM) from direction A. A2 is another Whittaker pair coming into the PCM from the opposite direction, B; (and that actually adds up to *four* waves in all: [2(-t) x 2(+t)]).

A3 is the input signal "tickler" wave which may be quite weak in power/intensity.

These "three" waves, then -- A1, A2, and A3 -- are all aimed at the PCM. In response, it "echoes" back a 4th wave -- the time-reversed, phase conjugate reflection A4 -- which may be enormous in power level as compared to the tickler A3. The PC wave backtracks down the path taken by the tickler wave A3 and delivers its power to the spot where the original "tickling" source is located.

PCM: Silicon, Barium, ionized plasma, granite (has silicon), crystal (SiO_2).

PUMP WAVES: Set up Scalar STRESS potential. Even NON-OPPOSING waves or charge accumulations can do this. (READ the quotes ...)

In Tesla's experiment, A1 and A2 are NOT required BECAUSE "Earth's fiery core" ALREADY contains the stress.

Of course, when one OPPOSES two equal vectorial forces such as would occur if 2 capacitor plates are charged to the same (-) potential -- or if 2 electromagnets are situated such that the N poles face each other -- then one would derive the infamous ZERO NET VECTORIAL SUM OF FORCES.

In reality, one would observe a net EFFECT of zero on an object or substance placed within the focus of the opposing forces. However, THE FORCES ARE STILL THERE. In Millikan's oil drop experiment (by which the charge of the electron was established), 2 opposing plates charged to equal polarity impelled an oil drop to hover IN THE CENTER between plates. The forces' net effect on the oil drop was zero, therefore the oil drop remained motionless. However, the fact that the oil drop did NOT fall to the lower plate indicates that the FORCES STILL EXISTED.

Further, in a certain fusion reactor design known as the "Magnetic Mirror" concept, a ionized plasma is held between a set of OPPOSING magnetic field coils. By increasing the flux strength of the opposing coils in an equal manner, the VECTORIAL SUM of the opposing magnetic forces is ZERO. But YET THE PLASMA WILL BE COMPRESSED from a former state of motionless equilibrium with respect to the focus of the opposing forces. The fact that plasma compression OCCURS indicates that THE FORCES CONTINUE TO EXIST even though a mathematical VECTORIAL ZERO SUM of forces exists in the arrangement.

Tesla's scalar wave unit consisted of a transformer enclosed within a zinc box in which a primary was interfaced to TWO OPPOSED ("bucking") SECONDARY COILS.

What is the point of all this? Well, apparently NON-OPPOSED flux or accumulations of electrons are accompanied by SCALAR POTENTIAL. The scalar potential is ALREADY composed INTERNALLY (according to Whittaker, not Bearden) of pairs of temporally (not spatially) opposed bi-directional Whittaker EM waves (virtual photon and anti-photon pairs, which is a SPIN-2 GRAVITON). One does NOT have to "oppose" coils or charged spheres to set up a scalar potential. HOWEVER, if one DOES oppose coils, capacitor plates, etc., then although the FORCES involved (i.e., Scalar POTENTIAL, a STATIC ordering, et al) do NOT vanish, their NET EFFECT on something DOES. This corresponds to the mathematical VECTORIAL SUM ZERO.

The Scalar potential associated with the opposing forces (i.e., that of which the forces are "effects") STILL EXISTS. Therefore, the potential "activates" the area of SPACE/VACUUM where that particular scalar potential exists. And IF a NONLINEAR MATERIAL (i.e.; MASS) is placed within the scalar potential activated zone, THEN the 2 pairs of normally "null effect" internal Bi-D Whittaker waves EXERT AN EFFECT ON THE MASS.

How? The Scalar potential in the zone still exists. This vastly increases "virtual photon exchange" (virtual photon/antiphoton) with the electron shell and nucleus. But because a nonlinear material is placed at the focus, THEN a significant percentage of anti-photons do NOT interact with the nucleus. The VP exchange being vastly increased is what constitutes the state of the matter being "activated". The non-interactive antiphotons then appear as "Time Reversed displacement current". The Scalar Potential (paired Bi-Directional Whittaker Waves) are thus DECOMPOSED by NONLINEAR MASS into FREE time reversed EM waves and time forward waves.

Probably the reason any effect at all has been observed in the Hooper Motional Field generator (without a nonlinear core) is because in practice the two opposing fields were not EXACTLY equal.

IN CONCLUSION:

The Scalar Potential can be set up whether opposing forces are established or not. But in either case, scalar waves or potential requires INTERACTION with nonlinear matter in order to produce any time reversed phenomena.

ADDITIONAL NOTES:

The Sweet device could be utilized at very high power outputs to liquefy cryonic substances such as Helium, using no pumps or bulky moving parts. Now, what would happen if a time-reversed current were established in a superconducting field coil, setting up a time reversed magnetic field? If the coil containing the perpetual time reversed current were immersed in liquid helium, would the effect of the current maintain the liquid state of the Helium, which in turn would maintain the superconductive state, which in turn MAINTAINS THE TIME REVERSED CURRENT FOREVER?

- In the Herbert Schirmer UFO abduction case (Nebraska 196's), the reptioid alien stated that their craft were propelled by "reversed magnetism".

- In the Betty/Barney Hill abduction, the inside surfaces of the UFO were "freezing cold".

- Some witnesses who stood DIRECTLY UNDER a low-altitude disk felt weightless and AS IF TIME HAD STOPPED.

Do some UFO's use time reversed power?

- Many UFO contactees have received ideas and designs from aliens for "FREE ENERGY DEVICES"(!!!). The late Harrold Menger was one example.

Since the SOVIETS and United States work on scalar electromagnetics, now UFO-type craft have been REPEATEDLY seen coming FROM and flying OVER the Groom Lake CIA AirForce Area 51 at night. Probably someone has gone a lot further with this than Dr. Sweet or Col. Tom Bearden have suspected. The CIA has a MULTI-BILLION DOLLAR budget (all unaccountable) to invest in this type stuff. And they HAVE used Area 51 for years. (Some say the CIA raises much of this "funding" via drug running operations. But since this is a SCIENCE BBS rather than a POLITICAL BBS, no more will be said here.) There are ALSO many documented evidences indicative of the fact that the CIA has long been interesting in BioPhysical effects weapons, Psi Weapons, Mind Control, etc. Scalar waves MAY have an effect ON THE MIND.

If Col. Tom Bearden, Dr. F. SWEET, or any "responsible" parties wish to comment on, yell about, or offer ANY proposal of interest; you may e-mail me at: NovaOne@juno.com

or WRITE:

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J. [Questions and Answers on Ed Mason's file](#) (1996)

Questions and Answers regarding the "Scalar7" File

As soon as I'd reviewed Ed Mason's "Scalar7" text file, I had lots of questions for him. In the document that follows, Mason replies (boldface type) to my inquiries (plain type) in a dialogue-like fashion.

Dear Rick:

I received your message and will try to respond as best as I can. I am starting to wonder if Bearden really knows what he's talking about at all. I am tending more to going by what Whittaker said.

Well, here goes with the answers:

8/10/96

Dear Ed,

Thank you VERY much for sharing SCALAR7 with me. I'm going to mail Bearden a copy. Let's see if he responds to it. As for the copy of his latest letter to me that you requested, I'll try to copy & mail it within the week. I've gotta "borrow" the copier at my job.

Please let me summarize what I think you've said. If you agree that I've understood you correctly, maybe then we can get a "definitive", briefer-than-Bearden's-usual document written, defining/describing Scalar EM.

If I've understood you correctly, I almost feel like saying "Why couldn't Bearden have just told us this in the first place rather than putting out 10 years' worth of books with vague terminology?" Of course, I realize that …

[ANSWER: Either he didn't know himself, or he is an inveterate BS artist. I tend to think he didn't know all the answers himself. Most scientists DON'T (and don't CLAIM to have "all the answers", like theologians claim to do)]

… like you surmised, he hadn't seen all the fine points (just what & where does the zero-vectoring take place, etc.). So it's not that I'm complaining. He has done a great service in pioneering Scalar EM concepts; maybe now we …

[ANSWER: True.]

… can "interpret" him in the light of more current understanding, as Minkowski interpreted Einstein for the rest of us Earthlings.

So here goes my summary of concepts; please correct me or comment wherever you feel is necessary:

1) What we call in plain English a "DC static charge", Bearden says is (or produces) electrostatic scalar potential. (Also holds for magnetism.) Yes/No?

[NO. Is an EFFECT OF a scalar potential. The scalar potential is ASSOCIATED with a static charge OR a magnetic "field". In the final analysis, these are all mental models utilized to describe various related EFFECTS that are occurring. The SP describes one type effect or phenomenon, the "field" or "charge" describes a related phenomena or effect.]

2) Based on Whittaker & Hsue, the "potential" is composed of (or can be analyzed as) harmonically-related sets of bi-directional EM waves which sum or superpose-or-convolute into a 'static' potential. (Whittaker wondered about the similarities to a gravitational field, and Bearden ran with that concept.) Yes/No?

[ANSWER: A WHITE beam of light can be "analyzed" or "separated" (via a prism) into COMPONENTS comprised of colored light. This example may provide a good model for understanding scalar potentials.]

(Question: Why must they be HARMONICS? I'd expect to see ALL frequencies …

[ANSWER: The particular frequencies or harmonics probably determine the type of scalar potential and the type of (or frequency) of the associated EM or ES (as well as other energetic) effect. There probably can be "white noise" SP's, however.]

… randomly in there like white noise, but in wave/antiwave pairs; see earlier Bearden on 'natural' vs. 'artificial' potentials.)

I had serious problems with that word "bi-directional", knowing that Bearden USED to say that scalar waves were 2 out-phased SAME-directional waves; bi-directional waves superpose as STANDING WAVES, which are not STATIC, but …

[ANSWER: The standing wave APPEARS to be STATIC.]

… made up of ALTERNATING-polarity fields at the waves' LOOPS or ANTINODES, and zero field at the NODAL POINTS. The standing wave does not travel 'left or right' but just 'stands' and "flaps" + and - in each half-cycle.

And so I wrote Keelynet files arguing that bi-directional waves are not the same as 2 waves traveling together in the SAME direction, "opposing" in the sense of being 180 degrees DISPLACED in phase, which was certainly …

[ANSWER: good point.]

… Bearden's original point of view. So I took issue with his use of the word "opposing". I also noticed that only recently has he begun to speak specifically of opposing the POYNTING VECTOR of each wave with the other which is a far cry from the 180 degree phase shift/summing mentioned 2 sentences above, in which both waves' Poynting vectors are "pointing" in the same direction.

Granted that I understand almost none of the math in the Whittaker papers, I nevertheless took it for granted that when Whittaker said "bi-directional", he himself had NOT YET ENTERTAINED the thought of "time-reversal", which …

[ANSWER: See my explanation below ...]

… of course solves my problem with counter-propagating waves summing into standing waves, as opposed to summing into a "DC charge" or scalar potential. Whittaker meant bi-directional in the spatial sense, as we all do who …

[ANSWER: RIGHT !!!! But one component is of a DIFFERENT NATURE than the other.]

… drive on 2-way roads. Yes/No?

[ANSWER: See below.]

However, Bearden seems to interpret Whittaker as supporting the time reversal view. He makes it sound (at least to me) that time-reversal WAS implied by Whittaker. Lately he has added Barus, Stoney, (1890's), and Ziolkowski (1985) to his list of supporters and has thereby ASSUMED -- if I read him right -- that Whittaker's bi-directional waves CONTAIN time-reversed antiwaves AUTOMATICALLY.... because Bearden doesn't believe in transverse waves. Rather he believes in Tesla's LONGITUDINAL waves which he says are the result of a transverse wave and its time-reversed twin "slapping together", compressing and rarefacting the 'ether'. (I'm curious as to YOUR view: Are normal EM waves transverse or longitudinal?)

[ANSWER: He has built his concepts not only on Whittaker but also on models produced by those expert in Quantum Mechanics. In QM, there is an INTERPRETATION of the equations to the effect that (+) charged particles "travel backwards" in time. Namely, that anti-particles are "time reversed". This is where Bearden gets the idea of T(-) or time-reversed photons a la the T(-) component of a Bi-Directional Whittaker Wave.

In actuality, what the equations refer to as TIME is actually a quantum energy state of a particle associated with PROCESS. When the quantum energy state described as "time" is of a certain value, then processes associated with a particle appear to "slow" or "speed up". There is no actual PAST or FUTURE. Simply an Eternal NOW.

That is, the problem of Causality Violation is non-existent because the Past and Future have no REAL existence and, basically, physicists have erroneously assumed a subjective concept called "time" to have objective existence. There is a flow of PROCESSES in objective reality -- not a "flow of time". The process rate slows when the mass of a particle increases due to an associated increase in inertia. This is <u>misinterpreted</u> (in the light of the current thinking about "time") as "time dilation". In reality, the hypothetical Einsteinian spacecraft achieving 'c' would carry dead occupants. The mass and inertia of their bodies would increase to the point where they would collapse.

Therefore, the "time-reversed wave" is <u>not</u> ACTUALLY traveling back in time. It is simply a distinct type of electromagnetic wave having certain energetic characteristics.

Also note that neither Col. Bearden nor the late Mr. Sweet EVER produced one bit of physical evidence that they actually produced "frozen wires" or "clocks slowing" or his famous *"other phenomena which I am not at liberty to disclose"*. ALL we have is 'his word' that this occurred. In academic science, one is not so secretive. One would produce video tapes SHOWING the effects occurring or the ice on the wires. But as I said, Col. Bearden has a MILITARY background and Mr. Sweet a commercial one. The two mindsets favor secrecy. Military scientists can't openly publish because of a fear that the enemy will read the scientific journal (and they DO). Commercial Corporate scientists can't blab because the company's competitors will STEAL everything.]

So now my conclusion is -- as you put it -- the "opposing" of the waves has already taken place automatically INSIDE the scalar potential, and -- as such -- maybe there's no need for any external, overt efforts to "oppose" 2-or-more artificially-generated waves. Yes/No?

[ANSWER: Both methods work as explained in my paper. BUT <u>nonlinear</u> mass must be used in order for EFFECTS to appear. Actually, I suspect a "non-opposing" configuration would work better. That is, several charge sources arrayed in a certain non-opposing manner.]

3. So what this seems to imply is that HIGH STATIC CHARGES may be about all we need to make "scalar" effects.... Plus, maybe a "tickler" wave to "ring" or oscillate the magnitude of the static charge, to get time-reversed waves.

So how about this: Charge up a large sphere or plate or whatever and "leave it there", as Bearden had said several years back. Now "oscillate the PHI application" (his words again) -- "tickle" it, by "illuminating" the charged sphere or plate with a normal EM transmitter wave/beam. In other words, focus a transmitting antenna (dish or whatever) so it "shines" upon the sphere/plate. If its static charge already contains hidden frequencies (wave & antiwave) -- a "spectrum" as it were -- then our monochromatic probe wave would mix with the static DC charge, modulate it, and perhaps cause it to "sing" back to us at the frequency with which we probed it.... except that the "song" would be carried on a time-reversed, phase-conjugate wave, right? Yes/No?

[ANSWER: Missed something. TWO, THREE, or MORE such charged spheres with NONLINEAR MATERIAL at the center. The "tickler" is directed AT THE NONLINEAR

MASS. The nonlinear matter is excited by the high scalar potential (consisting of paired T(+) and T(-) EM "virtual photons". The nonlinearity decomposes the SP just as a prism breaks apart the "white light" I used earlier as an analogy. The T(-) photon component follows the tickler signal path BACK and you should (according to everything Bearden et al. has said) get a FLOOD of power. Except the power is all "time reversed" in nature. That is, a DIFFERENT TYPE of electrical power.]

I suspect that a "magnetic field" produced with the "reversed electrical power" is anti-gravitational in effect.

Well, I'm going to be doing some experiments soon. I have a nice piece of Jade I can use as nonlinear mass ....]

4. Bearden makes a big distinction between "photons" and "antiphotons". He also makes many references to - and + charges in terms of one being "time …

[HMMM ... that suggests a POSITIVE electrostatic field might just be better at making T(-) reversed waves appear. Good. A measly TV flyback unit already puts out a nice strong +25KV. One can use a junk TV set .... as a HV(+) source.]

… forward" vs. "time-reversed", etc. Similarly, his older books describe how when a Scalar transmitter is biased "above ambient ground potential", it dumps energy (exothermic) into a distant interference zone, while biasing the transmitter "below" ambient "extracts" energy from a distance, producing 'cold explosions' in the interference zone, etc. It appears to me that where he used to talk in terms of "biasing the transmitter", he now talks in terms of "positive time vs. negative time energy", etc. Thus, it might make a big difference whether I put a positive or negative static charge on my sphere, and the effects produced might depend on which charge polarity I use. Yes/No?

[ANSWER: YES. I suspect so ....]

5. If you agree that I've captured the essence of what you were telling me, then most of the non-inductive coil schemes we've seen are invalid unless they're wound on special core material.

[ANSWER: YES. In using "bucking coils" as Tesla did, at least each coil produced a NET external magnetostatic potential. They merely "opposed" in a region of space between the coils. But a "Bifilar coil" kills the magnetic potential before the potential can appear OUTSIDE the coil. That is, there is no net magnetic effect produced external to the coil windings as an axial magnetic effect. I noted that Tesla never seemed to use Caduceus coils. Also my own (and as you said - your) tests with Bifilar coils never did anything.]

Also, directing twin transmitter beams from normal radio transmitters, both focused in the same direction, toward a distant target, but 180 degree phase delayed, producing a null -- the basis of interferometry -- is also invalid as a "scalar" generator.

[ANSWER: No, because even though the net EFFECT appears to be ZERO the component forces are STILL there. RE-READ the part in SCALAR7 about the plasma being COMPRESSED AND HEATED by a set of EQUALLY OPPOSING FORCES THAT SUM TO ZERO...]

If the forces themselves "zero out", then how do they manage to compress a **plasma** (as they CONTINUE to "sum to zero" while each component increases in magnitude but in balance with the other)? The Millikan oil drop experiment is another example.]

Also, use of a "Magic-T" microwave waveguide -- or using transmission line reflections -- to "null out" the RF radiation to zero vector, is invalid.

[ANSWER: No, just unnecessary.]

And to refer to our household appliances' AC line cords as heretofore unsuspected scalar generators/antennas is also wrong. Yes/No?

[ANSWER: Probably very bad, inefficient ones. Very weak.]

5. What about detectors of Scalar EM? Any thoughts? You suggested I put one of my thresholding detectors inside an RF shield and then "broadcast" to it from an AC? modulated "scalar" transmitter... and I might get a "buzz"... have you had any results with this yourself?

[ANSWER: Haven't tried yet.]

I did find that the detector made with a NEON bulb made the loudest, most "uneven"-sounding noise in terms of crackling, clicking, popping as opposed to the smooth "hiss" that the other types made... by the way, the neon bulb …

[ANSWER: ODD. Plasmas constitute a NONLINEAR material. I recently read something I'd downloaded from the Internet about a new model of ball lightning involving 2 OPPOSING circulating plasma rings AND associated magnetic fields within the ball lightning. Hmmmm .... nary a mention that SCALAR EFFECTS would be widespread in such a plasma sphere. The author (a Soviet scientist) repeatedly produced ball lightning IN THE LAB based on this theory. I'll have to convert the HTML format to text and send that to you.

… has to be "kicked" into conduction by a pulse that you supply, then the current is carefully backed off until the bulb is operating in the "starvation" mode just before it extinguishes. Lots of raucous, rushing noise at that point. 8-or-9 series-connected 9-volt batteries will do it if you don't have a DC power supply in the area of 70-90 volts, which neon bulbs need.

One other type I've played with but didn't mention last time is the capacitor across the - and + inputs of an op-amp -type, which Hodonawec presented in one of the *Popular Electronics* magazines around 1986. He named it a "QND Detector" and claimed that it picked up gravitational waves. Again, all I've gotten was a steady white noise hiss although I have seen the baseline on the oscilloscope (with which I was monitoring the output) bob up-and-down in step with me tapping my foot on the floor underneath the lab bench where I was testing the detector. My guess is that it was picking up my movement …

[ANSWER: OR LIFE ENERGY ????? OR BIO-ELECTRIC FIELDS/SCALAR POTENTIALS ?]

… as my body modulated the background hum in the room. Sensitive little bugger.

Well, this is all I can come up with for now; hope you can clarify some of this and let me know if I'm finally "getting" it.

Regards,

.... Rick

K. [Phase Conjugate/Time Reversed Waves vs. Scalar Electromagnetics -- A Critique of Bearden's writings](#) ('andersen.asc', 1996)

L. [Bearden's Response to the critique 'andersen.asc'](#) (1996)

7/27/96 by Rick Andersen

When I had uploaded ANDERSEN.ASC up to KeelyNet in February of this year (1996), I sent a copy to Tom Bearden through the mail, not really expecting any response from him (although I did 'wish' for one in that file).

To my surprise, Mr. Bearden did respond. Iin fact, he sent me 3 documents: A response letter (a document in itself) which is reproduced here, a new 'What is Scalar EM'-type paper, and a short paper to be published in one of the alt. energy periodicals. He was a gentleman all the way, considering how in my ANDERSEN file I had 'taken him to task' regarding his use of wave mechanics terminology in my trying to understand where he was and where he now stands regarding Scalar EM. He fully expected that I would eventually upload his letters to KeelyNet. In fact, he instructed me to do so, but only after I had waited at least 10 days while a colleague was applying for a patent on a device which will form the basis for the world's first STAR TREK -TYPE "SUBSPACE COMMUNICATIONS" SYSTEM.

February 15, 1996

Dear Rick:

Just wanted to get off a quick response to your welcome letter and critique. I was very pleased at the constructive way you look at things -- that's always welcome! It has long been my firm position that (1) anyone who tries to do something new makes some mistakes along the way (I sure do, and I still have to have good erasers on my pencils!); and (2) in this emerging "field that is not yet a field", researchers do not have to agree with each other, but they should disagree like gentlemen -- i.e., politely. Also, anyone who takes the time and effort to construct such a careful critique is to be commended. And so I was delighted at your approach and findings.

I want to send just a few comments. Unfortunately, I'm "dead in the water" with 16-hour days until well past June 1996. But we hope to put one or more "new EM systems" on the market by mid-Summer or late-Fall. So I just have time to make some "hit and miss" observations that may be helpful to you.

Time and Time Reversal ----------------------

Physicists have no understanding whatsoever of the basic element-TIME. It's still one of the great mysteries of both physics and philosophy. So if one doesn't know what TIME is or how its passage is operationally CREATED, then the business of a time-forward timestream and a time-reversed timestream (always relative, of course, to the external OBSERVER'S timestream, which seemingly is always time-forward) can get very, very confused and messy. That's exactly where physics is at present.

However, there is an electromagnetic mechanism that generates the flow of time itself. I discovered the gist of it in 1971 while at Georgia Tech to get my Master's degree. Have only published just a bit on

it; but have recently covered it a bit more in papers I am slowly writing for *The Virtual Times*, Internet node WWW.HSV.COM. It is an engineerable mechanism, so it can eventually be TESTED and falsified-or-upheld.

Basically, present physics considers that photons -- which are composed/made of "energy x time" -- only carry ENERGY! That's like saying a moving board -- made of (length) x (width) -- can only carry length and not its width! Plus which, no one really knows what a PHOTON is. E.g., in 1951 4 years before his death, Einstein wrote to one of his oldest friends:

> *"All these 50 years of conscious brooding have brought me no closer to the answer to the question, 'What are light quanta?' Of course, today every rascal thinks he knows the answer. But he is mistaken."*

And the picture hasn't changed since he wrote that. I spent an evening once with Eugene Wigner -- the physicist who put time-reversal into Quantum Mechanics, and a scientist whom I greatly admired. For an hour-or-so, we had a most delightful conversation until he asked me to explain what I do and to explain scalar electromagnetics. I explained that in my view, a photon transports both energy and time, and that a mass that "absorbs" a photon's ENERGY (which just turns into a wee bit of excess mass, via Einstein's equation $m=E/(c^2)$) must temporarily turn into MASSTIME -- not mass -- since it is now "coupled" to a time-tail (the delta-t portion of the photon that just "lost its energy". Then when this MASSTIME emits a photon, it turns back to MASS (the time-tail of the intermediate "masstime" is torn off by the emitted photon, to couple with the photon's energy, leaving behind an entity -- mass -- which *a priori* did not and could not exist in time.)

Wigner was thunderstruck. He fully agreed that the photon was composed of (energy) x (time), but did not believe it therefore "carried a little piece of time" was well as a little piece of energy. So, he affirmed, it was only the energy that was quantized. Of course I had stated that it was the whole photon (action, or angular momentum) that was quantized, not just the energy component by itself. The energy will be DISCRETIZED but not quantized. I did not press the issue further because I had too much respect for Wigner to press him. But I was quite taken aback that he could believe that something made of BOTH energy and time could only carry a finite amount of ENERGY but could <u>not</u> carry a finite amount of TIME!

The virtual photon exchange in the local vacuum (i.e., the magnitude of the scalar potential of the local ambient vacuum) determines the rate at which little virtual ENERGY x TIME quanta interact with a given mass at that locality. And that rate of "adding and subtracting little essentially -- infinitesimal time-jumps" determines the ambient "rate of passage of a mass particle through time". [The observable photon exchange of the mass with its environment represents the extra jumps added onto the fundamental "background rate of passage" of the mass through time.]

Note that the ambient vacuum's virtual photon exchange with the mass is the electrical charge of that mass. (Even neutrons do this, since one quark is continually flipping in each nucleon so that protons in the nucleus continually turn into neutrons and vice versa.) In short, this "ambient passage through time" is the object's electrical charge, and that's what determines it. Note that physics already accepts the positive charge as just a time-reversed negative charge. Dirac, for example, did not predict the positron as such. Istead, he predicted an electron traveling backward in time, which we (the external observer) could only see as a positive charge traveling forward in time but in opposite spatial direction.

This relationship between standard mass-less charge PHI of a fundamental particle and the ambient potential of the local vacuum also implies that ELECTRICAL CHARGE IS NOT QUANTIZED [just as Tesla stated], and now that is rather easily shown as follows:

Electrical Charge Q is not Unitary --------------------------------

First, **q** is not a UNITARY thing at all even though physics erroneously treats it that way! This is easily seen. Any fundamental electrical charge (e.g., an electron or a proton) automatically has its own scalar potential PHI, as is well-known. Well, PHI of vacuum is just the virtual photon flux of vacuum, or it can be so modeled. The PHIe of the electron, then, just represents a change or gating in the virtual photon flux of the local ambient vacuum [all potentials superpose; the electron's potential is just superposed upon the ambient vacuum potential (AVP), although usually the AVP is just ignored.]

That fits well with particle physics where any electrical charge is automatically a broken symmetry (in that very vacuum flux). Also, a reversal of electric charge is also a time-reversal and vice versa. So any electrical charge is already a little "engine". It is gating a little part of the ambient photon flux of the vacuum through its mass and then back out to the vacuum. THAT'S WHAT ELECTRICAL CHARGE IDENTICALLY IS. For the electron, it's just that PHIe of the electron that couples to and interacts with the mass, and it's entirely MASSLESS. So **q** becomes a system of 2 things, rigorously defined as follows:

$$Q \equiv m_q \times PHI_q = \text{mass} \times \text{mass-less charge} \quad [1]$$

So what we have done is clearly differentiate between the MASS-LESS part of **Q** from the MASS-LESS part [sic?], and show the coupling action as the coupling operator **x**. This is the first rigorous definition of electrical charge ever advanced insofar as I'm aware. To quote M.P. Silverman, *"And Yet It Moves: Strange Systems and Subtle Questions in Physics",* Cambridge University Press, Cambridge, 1993, p. 127:

> "The theory of Quantum Electrodynamics provides a comprehensive and (as far as experiment has been able to confirm) correct description of the interaction of charged matter with electromagnetic fields. And yet, curiously enough, we do not know exactly what charge is, only what it does. Or, equally significantly, what it does not do."

But since potentials superpose, then let us add a potential PHI2 to the local vacuum potential PHIv, so that the total ambient potential PHIt= (PHIv + PHI2). Let us now look at an electron placed in that potential PHIt. Now the mass of the electron is exposed to a different (let us take a higher) value of ambient virtual photon flux. Consequently, it will change its mass-less electrical charge PHIe (its VPF exchange rate) and also its mass before being reemitted, and each one's energy portion turns into a little bit of excess mass while lingering as we covered before.

If an electron could never change its mass-less charge PHIe, then it could never have a greater PHI flux density on one side than on the other. Consequently it could never develop a del-PHI across it. There would then exist no **E**-field, and the electron would not be translated.

Tesla stated that he regularly made (in his very high voltage experiments) electrons that had some 50 times the charge of a "normal" electron that was driven only by the ambient vacuum potential PHIv, and not by (PHIv + PHI2). Tesla came close to the more modern interpretation I gave above. He considered that charged occurred as thin surface layers on the electron mass and additional layers could be added - or-subtracted.

So you see, we have just rather thoroughly revised the foundations of Electrodynamics with equation [1]. And now we are consistent with demonstrated change of the rate of flow of time and of mass in relativistic situations. Increasing a mass's velocity through the vacuum flux increases its interaction rate with the virtual photon flux (VPF), just as driving a car into a rain increases the reaction rate of its

windshield with raindrops. This gives an alteration in mass-less charge, plus also an increase in mass due to ADDITIONAL VPF absorbed and "lingering" momentarily in the mass, with their delta-E portions temporarily turned into delta-m's via **delta-m = delta-E / c^2**, but with their time-tails remaining momentarily coupled to the mass so that the mass is actually now MASSTIME.

Relativistic increase of mass is actually an increase of masstime. You get the "time dilation" simultaneously. The above is why.

It is this lingering of the **delta-E / c^2** -- in the "mass region" -- and the coupling of the time-tail so that not mass but now "mass time" exists, that makes a mass "exist" in the first place.

Now the "arrow of time" reveals itself when we consider the nature of an atom, with its "time-forward" electrons outside and its time-reversed nucleus "inside" the electron shells as "Faraday cages". In other words, the electrons are in orbit (1st order picture only) so photons absorbed in one point of their orbit linger a bit and are re-radiated at a different point. In short, the electron shells continually scatter WHATEVER order is incoming in the photon flux exchange. So disordering of EM energy (i.e., ENTROPY) is continually occurring by this photon scattering from the electron shells. Since that is largely what we "see" and observe, we "see" and observe a positive time stream where (1) the Past is continually destroyed (dis-ordered) and the Future is not yet available. So the overall entropy of the photon interaction with atoms indeed yields the apparently one-way direction of time's arrow. Yet this is only <u>half</u> the story. We will pick up the missing NEGENTROPIC half shortly.

The observable-photon exchange with the electron shells/shields results in discrete "jumps" of the atom through time. Mostly this observable-photon exchange occurs serially -- i.e., it's mostly SINGLE PHOTON AT A TIME interactions. In short, it's a serial operation, not a parallel operation. On the other hand, if the signal density of the environment gets sufficiently high (say, on the order of 500,000 signals per second per square meter), then the probability of multi-photon interaction will have significantly increased. In that case, one starts to get the nonlinear optical effects: PUMPING, PHASE CONJUGATION, SELF-TARGETING, AND THE LIKE.

Then in the exposed living body, one gets very anomalous "deep penetration" of even very weak electronic smog signals where the cells and their parts act as pumped phase-conjugate mirrors. This creates a self-targeting effect wherein the emitted PCRs from the outermost absorbing cells target and backtrack impinging natural EM signals from deeper within the body. This creates a nonlinear "spurious energy diffusion" effect wherein the spurious energy -- even though minute -- readily penetrates deeply into and throughout the body, including into the bone marrow where the immature cells of the immune system are born. This is "low level jamming" of the internal EM that the body uses to CONTROL the production of those immune cells. So now you begin to get erratic immune cells being formed.

Slowly, over a long period of time, that noise jamming of the immune system results in rather noticeable immune disorders (arthritis, etc.) and also noticeable cellular disorders such as leukemia, cancer, genetic changes, etc. Since the MASTER CELLULAR CONTROL SYSTEM (Popp's version, extended Becker's version also) is directly affected, then so is normal cellular mitosis. If you expose the person to a very much denser electronic smog (as in the Persian Gulf war), then you get an acceleration of all the above EM smog symptoms and disorders that USUALLY can result only over a long period (years). That's the real explanation of the Gulf War Syndrome, and that's why it covers such a bewildering array of symptoms. The other Gulf War factors augmented and aggravated the causative electronic smog factor, but they were not the PRIMARY culprits.

That's also the solution to the problem of how electronic smog does or does not produce long-term cumulative effects in exposed persons. Note that the "energy deposition" experimental methodology presently being utilized by most EM bioeffects researchers simply assumes away the problem and will never, never show what I have described above BECAUSE IT EXCLUDES THAT FUNDAMENTAL "DEEP DIFFUSION" MECHANISM. That's why the laboratory experimenters have not been able to clearly demonstrate any causative mechanism for the epidemiological studies that show correlation between long term exposure to weak EM fields and radiation, and cancers and leukemias. As Devyatkov stated, it's the sheer number of signals -- regardless of their weakness or the sources producing them -- that is the main causative variable. I put it a little more exactly: It's the sheer signal density that drives the probability of multi-photon interactions instead of single photon interactions, which in turn drive the anomalous "deep penetration" and long-term debilitating effects. I put all that in my Priore paper in "Explore!" with all the technical mechanisms in grand and gory detail.

Some 2 decades ago, I was also able to define MASS without referring to "its ability to resist a disturbing force." Mass also is a dynamic energy- flowing, changing system. That definition took a bit of doing, but it appeared in my odd and perhaps a bit naive little paper "Quiton/Perceptron Physics: A Theory of Existence, Perception, and Physical Phenomena," National Technical Information System, Report AD-763210, 1973. The paper contains a new definition of mass independently of force -- something which exists nowhere else in physics. One kg of mass represents 17.053×10^{50} "switches-per-second" of action quanta across the surface of the mass, in a flux exchange between the mass and its environment where one switch equals $h/(4\pi pi)$. The same paper -- though crude -- derives Newton's 3 laws of motion in relativistic form and the square law of gravitation.

But back to our "time stream". There are jillions of time streams -- SIMULTANEOUSLY -- for any mass moving forward in time. Time streams have internal structure and are composed of a multiplicity of much finer time streams. A mass "moves through macroscopic time" in successive little "discrete jumps" due to the observable-photon flux, where after each jump the mass exists as mass, and DURING the jump it exists as masstime. So "the" Macrotime stream is like a special sewing machine stitching a cloth. The stitches go in one-at-a-time, but each stitch is "pulled back out" prior to the next one. That's the Macro timestream.

At the same time, the "continuity" of the mass's "existence (in time)" -- relatively speaking -- is provided by the myriads upon myriads of little virtual photon interactions occurring with that mass (as electric charge) in any finite length of Macrotime, no matter how small. For one "OBSERVABLE-PHOTON induced jump," jillions-and-jillions of "far, far tinier VIRTUAL-PHOTON induced jumps" have occurred. So these "inner, hidden, virtual photon induced" time streams are all woven into the "Macro" timestream induced by the observable-photons.

So time-flow has an internal structure, which is electromagnetic and can be directly engineered using an approach based upon the 2 Whittaker papers.

Now re-examine this notion of "entropic" Macrotime flow, as determined by the observable-photon scattering interaction with the electrons in the electron shells of atoms. For each photon interaction with an electron, there is an equal and opposite or antiphoton NEGENTROPIC interaction with the nucleus. (As explained elsewhere, there is no "photon" interaction as such anyway. The photon always occurs in space coupled with its antiphoton twin as a spin-2 GRAVITON.)

For every divergent/scattering/entropic/positive-time photon interaction with the electron shells, there is an opposite and equal reconvergent/negentropic/negative-time antiphoton interaction in the nucleus. THAT'S WHAT HAS BEEN "HIDDEN" IN NEWTON'S THIRD LAW ALL ALONG -- THE NEGENTROPIC HALF OF SPATIOTEMPORAL CHANGE.

When a graviton (photon/antiphoton pair) approaches an atom, it sees a separated assembly of negative charges (time forward, in the electron shells) and a slightly separated assembly of positive charges (time-reversed, in the nucleus) charges. So it sees an assembly of dynamic electrical dipoles, considering one positive charge coupled with a negative charge (we are just to rough first order here, of course, but that is sufficient). Now in a dipole, one end is TIME-FORWARD (exists in forward or entropic time flow) and the other end is TIME-REVERSED (exists in the backward or negentropic time flow). That's particle physics, not Tom Bearden.

So the incoming graviton is "split" by the receiving dipole. The forward-time portion of the split graviton (i.e., the photon part) interacts with the forward-time portion of the atom (the electron end of the dipole) whilst the time-reversed portion of the split graviton (i.e., the antiphoton) of the graviton interacts with the reversed time portion of the atom (the positive end of the dipole, which is in the atomic nucleus). Therefore the nucleus recoils (Newtonian 3rd law recoil). That is the normal reaction except that now we have added the causative mechanism for Newton's third law reaction force. Note that it agrees with Quantum Field Theory, where all mechanical and electromagnetic forces must be generated by absorption and emission of virtual photons. It follows that such must be true also for Newton's third law, and we have now shown it overtly.

Now if we have a phase conjugating material (sufficiently nonlinear material), then the antiphoton cannot reach the nucleus. Instead, the incoming EM waves (actually longitudinal and composed of gravitons, not just single photons but coupled photons/antiphoton pairs) undergoes MULTI-WAVE interaction in space, not PHOTON/PARTICLE interaction. The antiphotons are redirected in this wave interaction, externally away from the atom rather than into its nucleus. In the well-known phase conjugate mirror, the antiphotons are redirected as the phase-conjugate replica wave. Notice we are not just using the QM notions; we are following the "Macro wave" picture. But what it means is that the nucleus now will not recoil because the antiphoton/photon interaction that creates Newtonian third law recoil of the nucleus does not occur.

This is a DEMONSTRATED experimental fact. In a phase-conjugate mirror, no matter how powerfully pumped the antiphotons (of either the input signal wave or of the pump waves) never reach the nuclei. Consequently the nuclei -- and the material they compose -- do not recoil because the GENERATING INTERACTION for the Newtonian third law force did not occur.

In the Sweet vacuum triode experiment where we reduced the weight of the device by 90% on the test bench, we used an adaptation of the foregoing notion (which due to legal constraints I still cannot PRECISELY reveal). I hinted at it in the the Ansatz paper in IECEC, but am still unable to say much more about it. Let's just say that if you make a phase conjugate mirror highly pumped at ELF frequencies (Sweet was using 60 Hertz) and do the pumping in the internal Stoney/Whittaker/Ziolkowski channel inside the scalar potentials, you will get beautiful nonlinear optical effects at low frequencies!

THIS IS A MAGIC <u>SECRET</u> -- MARK IT WELL! In the internal channel, you are now in the region where myriads and myriads of "pump" waves -- represented in the particulate view as the absorption and emission of virtual photons, or as the virtual photon flux exchange between the ambient vacuum and the mass -- are occurring continuously at every frequency imaginable. Therefore all frequencies -- regardless of low or high or optical -- will all act in the nonlinear fashion. In other words, all that business of time-reversed waves, time-reversed particles, absence (or increase or decrease) of nuclear recoil, everything gets involved. This way you get the NLO effects at ELF. The gravitational effects occur as an inverse function of the frequency. So the lower the frequency, the better. You can hardly obtain or measure the antigravity effects at optical frequencies. At ELF, they are easily

measurable and obtainable. But you can't do much to get EM phase-conjugation at EXTERNAL frequencies. At INTERNAL ELF frequencies, it's the rule rather than the exception.

At any rate, all that mess was necessary to clarify this business of time and time passage rate and time-reversal. It ain't as advertised in the leading textbooks. And it is directly engineerable.

Notice that we've also got the exact mechanisms for homeopathy in the above if we bother to dig it out explicitly and show it. It's there for the taking, and it is engineerable. You see, in Equation (1), the homeopathic procedure of "potentizing" can simply "SWZ-structure" the magnitude-fixed **PHI-sub-q** portion of the electric charge **q**, where we insist that q≡ **PHI-sub-q x m-sub-q**. This "structuring" of the mass-less charge flux can easily be shown by the superposition of potentials. 2 charges with some deterministic SWZ structuring in the PHI-sub-q portions will interact DIFFERENTLY than 2 charges with only "randomized" SWZ structures. Since charge and charge distribution largely is responsible for driving chemistry reactions, then this means that we can change the chemistry by SWZ structuring charges via Whittaker's 1904 paper (the second one of the two I so often quote).

Note, however, that we have changed and extended both classical and quantal electrodynamics by destroying one of their favorite postulates -- the postulate that every charged fundamental particle of a given type (e.g., electrons) is identical to every other such particle. Now individual electrons can also be individualistic in their internal SWZ structures comprising their PHI-sub-e's. Homeopathy does the "mixing of potentials" and thus the "potentizing" indirectly by altering the H-bonding structures of the solution. The H-bondings (making and breaking) can be treated as a single potential as Hsu showed. This "fluid H-potential" thus decomposes according to Stoney/Whittaker/Ziolkowski. "Mixing" potentials of dissolved compounds alters the entire H-potential, since potentials superpose and their inner structures also diffuse and superpose. By combining Whittaker, Kaznacheyev, Priore, and Hsu, the H-potential can be directly and strongly altered electromagnetically.

Ordinary EM theory utilized Whittaker's 1904 paper, but not his 1903 paper. The resulting "other" potentials are sometimes referred to as "superpotential" theory, and the other potentials (Debye potential, Nisbet potential, Dirac potential, etc.) were also found to be most useful. They are all takeoffs in the manner of Whittaker 1904 though different potentials result. A good paper that discusses all this is Patrick Cornille's "Inhomogenous Waves and Maxwell's Equations." Chapter 4 in "Essays on the Formal Aspects of Electromagnetic Theory, Aklesh Lakhtakia, Ed., World Scientific, New York, 1993 (pages presently elude me).

In fact, the parent book of that paper is a "must" for anyone seriously interested in WHAT OF ALL THIS the present electrodynamicists know and use, and what of it they do not. Cornille, e.g., clearly shows that Maxwell's equations are directly created by scalar potential interferometry. As he states, this means that EM force field waves are created by the interference of SOUND-type scalar potential waves, or "sound creates light". This strongly supports Tesla's original statement that EM waves in the vacuum are actually EM sound waves -- much like sound waves in a gas. It also validates my own long-standing assertions of scalar potential interferometry (based on the SWZ work) and its ability to create ordinary EM fields and waves at a distance.

To properly address the "advanced and retarded" solutions, I recommend a very fine paper: Milo Wolff, *"Beyond the point particle -- a wave structure for the electron."* GALILEAN ELECTRODYNAMICS, Sept/Oct 1995, p. 83-91. Wolff gives the background of the advanced and retarded wave solutions, starting from Wheeler and Feynman's exposition. Wolff cites three of his own papers which formulated the results summarized in his paper. He arrives at the notion of two worlds within our universe: (1) the familiar 3-D environment, governed by the natural laws and observed by us using our 5 senses and their extensions as laboratory instruments. This is the world of energy-exchange;

and (2) a second world of scalar waves, which form the structures of the basic particles -- electron, proton, and neutron -- which compose the material objects and the space (ether) of our world of energy exchange. This unseen scalar world is basic and DETERMINES THE REAL ACTION in both worlds.

Quoting Wolff, p. 84:

"...an Energy Exchange Mechanism can be seen to underlie the force laws and even special relativity, the deBroglie wavelength, and Conservation of Energy. For example, the force laws describe force as the change in energy over distance, F = dE/dr. Therefore, whatever motivates the change in energy generates what we observe as force. The coulomb and gravity force laws do not describe what creates these forces because they are only formulas to calculate force. That is, they do not imply any particular energy exchange mechanism."

Wolff then formulates this mechanism for the electron wherein it depends on the existence of other matter in the universe. This is a very insightful article! Wolff discusses the requirement that particle properties require perception-communication between particles, that measurement of time requires a cosmological clock, the role of space, Mach's principle, and his theory of the new electron. I wrote a long letter to Wolff, giving him the Stoney/Whittaker/Ziolkowski background of the "inner EM" etc., profusely referenced. Received a nice letter back from him.

Now, of course, one can take Equation [1] above and apply Whittaker 1903 to it, and mathematically decompose the PHI-sub-q term into a set of hidden bidirectional EM wavepairs in a harmonic sequence. So now one can clearly show that the mass-less electrical charge **PHI-sub-q** of any "charged mass" **q**, can and does have an internal, hidden, bi-directional EM wave structure. The homeopathic researchers should eventually incorporate that one, as we stated above because it is rigorous theoretically, and it can be experimentally dealt with as well.

Stoney and Whittaker showed the SUM set of internal bidirectional EM waves that comprise a scalar potential PHI. Later, circa 1985 Ziolkowski independently rediscovered the internal bi-wave set comprising the potential and also added the PRODUCT set. Since the product of EM waves is technically MODULATION, then Ziolkowski laid the groundwork for "hidden" EM communications "inside" the scalar EM potential.

Further, the inner signal EM (i.e., modulations on several of the internal SWZ waves inside a DC potential) is not necessarily restricted to the speed-of-light. Bulk gradients in the entire vacuum potential -- i.e., the so- called "EM force field" waves -- are limited to the speed-of-light. But they require changing the amplitudes of each and every single one of the SWZ wavepairs in the local ambient vacuum potential! Well, since each of those hidden SWZ wavepairs is a bidirectional thing, different rules may apply for only one-or-two of them.

In fact, it appears that a single hidden SWZ wavepair moves in the COULOMB GAUGE (see Jackson, CLASSICAL ELECTRODYNAMICS, 2nd edn., 1975, p. 22-23 for a discussion of Coulomb gauge, which is regarded as just applying to the "near field".) Quoting, p. 222:

"...transverse radiation fields are given [in the Coulomb or transverse gauge] by the vector potential alone, the instantaneous Coulomb potential contributing only to the near fields. This gauge is particularly useful in Quantum Electrodynamics. A quantum-mechanical description of photons necessitates quantization of only the vector potential."

Hey! Suddenly only a PART of EM (half of it, the vector potential in the conventional PHI & A potential formulation) is quantized! But we continue. Quoting p. 223:

> *"[In the Coulomb gauge] the scalar potential 'propagates' instantly everywhere in space. The vector potential, on the other hand, satisfies the wave equation... with its implied finite speed pf propagation c."*

Further quoting, p. 223:

> *"...the transverse current... extends over all space, even if J is localized."*

Now isn't that a real blast!   Here we have a definitive statement by one of the greatest electrodynamicists that the scalar potential part of EM -- when freed from the vector potential -- can move at infinite velocity in the near field, and only the presence of the vector potential limits the normal EM wave to the speed-of-light. So if we want to do superluminal transmission, we have to eliminate that vector potential and use only the scalar potential. However, we cannot make bulk gradients of that scalar potential for that would make **E**-fields (in the conventional theory where **E = -del PHI**). Well, if we impress deterministic changes (signals) upon the **-del PHI's**, then we make magnetic fields and magnetic vector potential, because of the changing **E**-fields. Bummer! It means that we have to use a DC potential. ie., the scalar potential must not allow bulk gradients to form. That means we have to put the modulations (the "signal intelligence") inside a fixed DC potential upon one or a few of its composite hidden SWZ EM wave pairs. That can and has been done.

For example, suppose we "bury up" our modulations/signals/communications inside a DC potential, on some of those "hidden internal wave pairs" that SWZ shows us. In other words, we "Z-modulate" [[Z for Ziolkowski. --R.A.]] 2-or-3 of the internal Stoney/Whittaker wavepairs. But we do not make any BULK **del-PHI** in our overall DC potential PHI. Hummer! A priori, the DC scalar potential "carrying" the internal signal STARTS OUT in the "near field" in the Coulomb gauge. We now have no vector potential associated with this thing. That's been eliminated. Macroscopically, it's seemingly just an old DC potential -- just pure PHI. *Voila!* No "vector potential to limit us to speed **c**" ever arises. So if we regard the vector potential as the "breaker" that ends the "near field region", then we never get out of the "near field region" because that now extends everywhere. The end result is that the darn "hidden" signal now moves in the Coulomb gauge -- "inside" the ambient vacuum potential! -- and at infinite velocity. Even with only a pretty good rendition of all this, it moves at a speed way beyond light speed **c**. PERIOD. And it works! It's Fogal's invention.

On the other hand, you've got to be able to "INFOLD" the signal as a modulation on some of the SWZ waves inside the scalar potential on the "transmission" end. On the "receiving" end, you've got to be able to "outfold" the signal into the normal "bulk potential domain" so you can create **E** and **B** fields locally and locally move some electrons for a detection. (All our normal detectors are essentially "electron wiggle" or "electron translation" detectors, so we've got to produce overt EM field signals (bulk potential gradients) in the receiver. And Fogal's invention can do those 2 functions: the infolding and the outfolding. Note we are not communicating with OVERT EM fields and waves. Those are limited to lightspeed, as is well- known. Instead, we are communicating with COVERT EM fields (the SWZ internal EM fields and waves). Those are <u>NOT</u> limited to lightspeed at all.

Shortly Fogal will be filing a most formidable patent application on that system -- the World's first demonstrable superluminal communication system and the "subspace" (internal EM) communication system so touted on Star Trek. Obviously such a patent will never be granted unless it can be proven. Fogal can prove it by actual prototype demonstration.

So as not to interfere with Fogal's filing of his patent application, I request that you not place this material on any computer net prior to 10 days from the time you receive this response. After then, I

request that you place it on the KeelyNet, and that those boys or you make the necessary arrangements to also have it available on the Internet.

Note that I did not specify HOW the infolding and outfolding was done. That is Fogal's invention and his secret, not mine. I just told WHAT was done so that superluminal communication is not only theoretically possible but do-able. (There's another long related discussion re Mach's principle and what causes it, and how that limits the normal wave speed in vacuum to lightspeed, and how using only a fraction of the "internal" channel escapes Mach's principle and so enables the dramatic reduction of "vacuum medium drag" that is responsible of the ordinary lightspeed limitation. It's just too long for me to go into all that tonight.)

Now to some specific issues. Yes, my insight did keep growing. At first, I took the results of experiments such as by Hooper with opposing "ordinary waves". The effects of the core for the coils were a puzzle. But it seemed that sometimes the "opposing normal waves" would give some G effects, and more often they would not. What I did not realize for some time was that the longitudinal wave can be regarded as a superposed wave/antiwave via a single SWZ wavepair. This agreed with Whittaker, and also now offered a sudden inspiration as to when we got the G effect and when not. We were dealing with 4 waves -- not 2 -- in the opposing ordinary waves. We had 2 opposing normal waves and 2 opposing antiwaves, with the wave/antiwave coupling. Two ordinary waves 180 degrees out of phase would certainly cancel (spatially) their amplitudes (as is well-known in RAM materials and structures) but would not cancel their energies. The 2 antiwaves would do likewise, spatially.

The point then became so what would happen in the time domain? Here we got a shocker. The 2 antiwaves would cancel each other's amplitude SPATIALLY and would add energies. But looking at the action (energy x time) aspect, their energies exist in negative time! Well, this meant that the antiwave ACTION would come out negative and would then cancel the added positive wave ACTION because Sum Ewt + Sum Eaw(-t) = 0.

Therefore the sum of the whole mess was zero! Bummer! We wound up with everything just vanishing, wherein all the action (angular momentum) seemed to vanish. Well, this showed that the notion of simply having waves 180 degrees out-of-phase of itself would not give gravity effects. So that's why mostly the Hooper approach didn't seem to do much. But if one added nonlinear materials to the core, then one broke the linear cancellation. Once in a while if one got it just right, one could get some spooky gravitational effects. So that was a real clue.

Then we took the known (by General Relativity) facts that (i) all trapped energy is gravitational (it is the trapped energy in mass that is gravitational, not mass per se), and (ii) all potentials are gravitational anyway since they contain trapped energy.

So now the question became, "How-the-devil does one trap EM energy at a point in space when to exist as EM energy in space, it must be going at lightspeed by Einstein's postulate?" Bummer! How can something be moving and not moving simultaneously? Did a lot of thinking in terms of my fourth law of logic, since that obviously was what was required. Looked at Spencer Brown's law of form a little bit more. Scratched my head a lot.

Then it hit me. The potential is already accepted as "trapped EM energy". So it contains the secret of "trapping EM energy, which must be moving and static simultaneously". But it's regarded as "static". Well if it's static, then how does it "flow" down a wire? It ought to "stay in place". So it cannot BE "static" because it FLOWS. That's called mass-less displacement current **d-PHI/dt**. And that notion gets all confused with several other kinds of currents including dD/dt, dV/dt, j, i, etc. Yet its MAGNITUDE at any spatial point is indeed fixed (we are discussing electrostatics here).

Scratched my head some more. Then thought of it this way: Suppose you have a flowing river. Suppose it's very calm on the surface but just flowing along. Now at each-and-every point on the surface, there is a fixed "value" or "number" that will represent the FIXED MAGNITUDE of the vertical depth of the river at that point. The set of all these scalar numbers then represents the "scalar depth field" or the "field of the scalar magnitude of the depth of the river". But no one in his right mind would define the river itself as just its "depth magnitude" scalar field. That is, the MAGNITUDE FIELD would be scalar, but the river itself is darn sure vectorial because it has both direction and magnitude.

The same is true of a scalar EM potential. The "scalar" function is the field of "spatial energy density" at each spatial point where the potential has a nonzero magnitude. But something can be flowing "under" or within that "scalar field" and be totally vectorial, so long as the vectorial aspects sum <u>vectorially</u> to zero. So here was my old idea of the zero vector sum of two-or-more nonzero vectors being a scalar potential or a scalar stress potential.

Bringing in Stoney and Whittaker, they had already shown that ANY scalar potential (which physicists routinely and **<u>erroneously</u>** regard as just a SCALAR MAGNITUDE field) is already composed of bi-directional EM wave pairs. In other words, it's the MAGNITUDE OF THE LOCALLY TRAPPED EM ENERGY DENSITY OF ALL THOSES HIDDEN INTERNAL BIDIRECTIONAL WAVES AT EACH SPATIAL POINT that is externally "scalar" in nature. But the internal part of this "entity" that we fragmentedly refer to as the "scalar potential" is quite vectorial. So each Whittaker wave pair (each major component) is the key: (i) it has to be gravitational, because the potential is already known to be gravitational. So each PRIMARY COMPONENT must be gravitational. (ii) it therefore must already contain the magic "EM energy trapping mechanism." *Voila!* There it is.

Well, each wave pair is A PRIORI a standing gravitational wave. And since it is comprised totally of EM waves, that particular manner of coupling must A PRIORI turn EM field energy into G field energy! Also, it contains the EM trapping mechanism. That was a wave and its true time-reversed twin -- i.e., its "antiwave" twin. Here nonlinear phase-conjugate optics can be applied. It's already well-known that a phase-conjugate wave replica superposes precisely with its wave twin SPATIALLY. THE AMPLITUDES OF THE WAVE AND ITS SUPERPOSED ANTIWAVE DO NOT SPATIALLY ADD, AS THEY DO IN ANY "NORMAL" EM STANDING WAVE! It's also known that the phase conjugate replica wave is truly time-reversed (e.g., see Wheeler's delayed choice experiments, and several others which demonstrate this fact rather conclusively.)

But we cannot see time (it's lost in the observation process when the photon is emitted again after being absorbed by mass to create masstime.) Photon emission tears away the time tail, disconnecting the mass from the "stitch" in the timestream. It leaves behind a completely 3-space object. That's why all light observation -- which just uses the photon/mass absorption and emission mechanism -- it well-known to be SPATIAL, not SPATIOTEMPORAL. There is no such thing as direct measurement of time, and there has never really been a "time-measuring clock". This is well-known. But think of it a bit. You INFER time from a change in spatial positioning of the hands of a clock. The clock does not directly MEASURE time, which in QM is already known to be just a parameter and NOT an observable. Note that in our time flow generating mechanism above, we explained why observables were spatial and not spatiotemporal.

So now we rather much have it all. For EM force field effects to observably exist (i.e., to cause detectable changes or perturbations), they must exist for a finite time -- else no acceleration occurs. Use the E-field as an example. In the SPATIALLY superposed wave/antiwave pair, we have the EM forces SPATIALLY existing, which we can represent as in the expression $[E \times t] + [E \times (-t)]$. That means that the EM FORCE FIELDS sum to a vector zero. But the scalar energies add SPATIALLY, when the times

disappear. So the wave/antiwave pair is devoid of net EM force action, which must exist in time, but the spatial energy densities at the point add because they are both positive. Further, since time does not exist in 3-space, we now have the familiar 3-space disposition of the "trapped EM energy" in the potential field.

So the trapping mechanism turned out to be this: Eliminate the EM impulse ('force' times 'time') effects by "timewise" cancellation while leaving the spatial addition of the energies. You do that when you couple a phase conjugate replica wave to its normal wave twin. That makes a true **electrogravitational** wave. A _new_ kind of standing wave. (You can make lots of other kinds of "scalar waves", but that is the simplest.)

Anyway, that's a sort of digest of the thinking that I went through as the concept evolved. That's about where I am today, except now we use jillions of internal timestreams as "time strings" comprising a "time rope" that is Macrotime flow.

You see, we still have the "vector sum zero" in there. But we just treated the time dimension as a sort of length, and the time-vectors cancelled. In other words, we looked at the 4-vectors, with the addition that killing the time destroyed any EM force change, which a priori require some time in which to occur. It also yields the cause of the mysterious quantum mechanical "collapse of the wave function". No wave can exist if the time it exists in suddenly ceases. You only have 3-space when the 4th dimension fractures and ceases momentarily.

And you are quite right that the word "opposing" now takes on more than one sense. It does not necessarily mean just "spatially" opposing.

It gets even more confusing when one realizes that we cannot see "time reversed" things properly because of the electrons around the atoms of matter making up our bodies and instruments. A PRIORI, we look through a "time-forward-only" filter. So we see true time-reversed things totally spatially; we see them "spatially and velocity-wise" reversed. Therein lies the difficulty in this word "opposing!"

The difference is the true time-reversed wave (the PCR wave) will precisely backtrack and spatially superpose with its stimulus wave, even if that stimulus wave no longer exists and even though the 2 waves are anti-parallel in the time dimension! The PCR wave (in the simplest case -- it can be directionally tricked by various means) will return precisely back over the spatial path PREVIOUSLY taken by its twin, even if that path is rather torturous as shown by Pepper and others. That is not at all true of a normal wave! A normal wave will spread and scatter in many media, in which the true time-reversed wave will precisely orient back through that same nonlinear medium along the original track. As Pepper showed, you can do marvelous correction of distorted images this way. Such things noticed early-on are why the (poorly-named!) distortion correction theorem was so-named. This also makes SELF-TARGETING (iterative mutual phase conjugation) between 2 separated objects acting as phase-conjugate mirrors a real hummer!

But the PCR wave is truly time-reversed. And because of its reconvergence (order restoring, negentropy), it can produce cooling instead of heating. E.g., in the Sweet vacuum triode, the phase-conjugate replicas were directed out into the external circuitry to power the load. If one directly shorted out the ends, there would be a brilliant flash of light and the ends would INSTANTLY ICE OVER as if you had dipped the wires into liquid helium or some such. This is very different from shorting out the ends of a normal circuit with normal time-forward wave power. There you get marvelous heating and wire melting. Here you get wire freezing and no heating at all. Further, on one occasion Sweet got himself directly into the short out of the circuit with quite a bit of power going through it. The most conductive parts of his lower arm and hand-- the nerves-- were flash frozen! He required medical

treatment for that for some little time, and the condition only gradually improved and finally healed in about a year.

The beautiful part of this nonlinear "optical" function is the fact that it occurs easily for the lower frequencies as well, in the inner channel. That yields the "self-targeting" mechanism that creates a self-ordering and a quantum potential (QP). I have previously given examples of the inadvertent creation of a quantum potential, though unrecognized by the participants/ experimenters.   Refer to GRAVITOBIOLOGY, to my description of how a QP is formed, and to the description of the U.S. air attack on Libya in 1986.   Also refer to the Lawandy experiments (see Nabil M. Lawandy; R.M. Balachandran, A.S.L. Gomes and E. Sauvain, "Laser action in strongly scattering media."

NATURE, Letters, 368(6470), Mar. 31, 1994, p. 436-438.   Researchers of Brown University, Providence, R.I. discovered that tiny particles of titanium dioxide (a key ingredient of white paint), although randomly distributed, act together to amplify light emitted by dye molecules that are excited by a laser or some other external energy source).

This (quantum potential produced by mutual self-targeting between separated components or systems) is also part of the hidden mechanism that Patterson evokes in the Patterson cell, and that gives self-organizing and increases energy collection. The reason his spheres have to be so round is to get sufficient self-targeting that energy collection is increased to give good over-unity gain. In other words, there is a threshold at which scattering increases and limits the "self-organizing" due to the QP mechanism I showed in GRAVITOBIOLOGY.

In the future if I can get some time, hopefully I will be able to write an article giving the exact mechanism of the Patterson cell. I think his invention is magnificent! As I covered in a recent article on WWW.HSV.COM, only a tiny fraction (nominally some 10^{-13} or so) of the Poynting energy flow $\mathbf{S} = \mathbf{E} \times \mathbf{H}$ that our normal electrical circuits and devices evoke is collected on the carrier electrons and transported as the Slepian vector j-PHI to the load, and dissipated therein to power it. By forming a quantum potential, the collection percentage is increased (this is easily shown). Patterson's approach seems to yield a collection increase of some 200 times.

As I've stated before, if we can increase the energy collection fraction, then a flashlight battery can power a battleship.   And obviously such "collection-increasing" systems can be close-looped by clamped positive feedback to provide a "self-powering" system. Note that the conservation of energy law and the laws of equilibrium thermodynamics are <u>not</u> violated because the system is an open system receiving, gating, and collecting excess energy from the vacuum, then dissipating this excess energy as the load (in the case of the Patterson cell, as excess heat).   The second law of EQUILIBRIUM thermodynamics does <u>not</u> apply to such a system, as is well-known. Non-equilibrium thermodynamics (as per Prigogine et al) does indeed permit such over-unity systems. Else you could not run a water wheel or a windmill or a solar cell. COP>1.0 is absolutely permissible for such systems. Any scientist who objects to it on EQUILIBRIUM thermodynamics grounds should simply go read the literature.

And perhaps you will find my explanation of the Johnson gate, the Takahashi engine, and the Kawai engine of interest in the same paper on the same Internet node. REGAUGING via a free change of system potential -- and hence of the system's stored EM energy -- is the master secret of over-unity. It has long been ARBITRARILY ASSUMED AWAY by the conventional electrodynamicists when they apply the classical EM. They first simply ASSUME away the "residue" or "leftover" scalar potentials (the gauge potentials) in the actual Heaviside/Maxwell force field formulation. Actually, you can use that gauge potential term and cause the system to CHANGE IT AT WILL -- i.e., REGAUGE ITSELF AT WILL -- thus freely refueling an electromagnetic engine directly from the vacuum as an open system receiving excess energy from an external source. The Heaviside/Maxwell equations in their form before

the ARTIFICIAL and tidying assumption of zero residue gauge potentials will agree fully with you! Ain't that a whale of a blast! Regauging (free refueling the system with stored EM energy!) has been there in the "unaltered" and "untidy" Heaviside/Maxwell equations all along. The electrodynamicists just got too tidy, and the circuit and engine boys never asked what the electrodynamicists had done and why they had done it.

Anyway, I just wanted to share my thinking along these lines with you, even though I am sorely pressed for the next several months. I very much appreciate your arduous efforts in going through the material, and the hours you have spent on reading the references. Please feel free to continue to critique, correct, adapt, and utilize my concepts as you wish. THAT'S WHAT ALL THIS EFFORT IS ABOUT! These notions, viewpoints, findings, etc. simply must be transferred to younger, more vigorous, better qualified theoreticians and experimenters than I am or will ever be. I only get disgruntled at persons who (i) will not read the references or try to comprehend what the references say; (ii) simply want to argue normal theory (I'm not using the conventional theory, and I have no time or inclination to "argue"); (iii) think that everything electromagnetic is already well-understood and cut and dried (nothing could be further from the truth, as the foundations physicists know full well); or (iv) persons who start in immediately calling me names (such persons, in my view, are only interested in dogfights and have thereby unwittingly revealed their true ancestry.) But then none of those are consistent with the scientific method!

I am VERY pleased when the negations of the above are apparent. And also when someone serious questions my work in a gentlemanly fashion or when someone CORRECTS something I have advanced, showing it to be in error. I learn from that also! Years ago in teaching a class, I had a sharp young student correct my written expression for the fourth law of logic the instant she saw it on the board the first time! That impressed me mightily, and I quickly admitted the error and corrected it forthwith. That student saw immediately an error in my work that I had not uncovered in several years of dealing with it. Darn right I was impressed! And I said so then and there!

My job, you see, is not to build a pretty doorway in all this conceptual modeling with nice framing and beautiful paint and fine decorations. My job is to be a stick of dynamite and blow a gaping hole in the brick wall. Then it must be left up to the master craftsmen (such as the Barretts, Ziolkowskis, Wolffs, and Cornilles) to make a finished, beautiful doorway. If that can happen -- even though much of what I have done has to be adjusted, adapted, and corrected in the doing -- then we will have a new physics and these 30-odd years of arduous effort will not have been in vain.

Sincerely and best wishes,

Tom Bearden

M. [Amplitude Modulation & Phase Conjugation-- a Correlation](#) (1996)

(On KeelyNet as AM.ASC, 2/24/96 by Rick Andersen)

This file presents some background on AM/sideband radio communications methods and then proceeds to show some interesting extensions and correlations to Phase Conjugation, which has been the topic of increasing interest to the scientific community and especially to many of us KeelyNetters who have been following Tom Bearden's theories regarding **Phase Conjugate/Time Reversed Waves**.

The purpose of the comparison is to stimulate creative thinking on the subject:

Can we apply the esoterics of PC generation to more mundane electronic circuitry that we already understand and use?

Is the technology already under our noses if we can only look at it from a new viewpoint?

Here are some ideas to chew on.

REVIEW OF AM RADIO THEORY

Let's take a short visit to "Communications 101" class at our local "electronics vocational school" and do a little review of AM radio modulation theory.

We find out early on that we can't directly "broadcast" information very far at audio frequencies, but that higher frequencies (Radio Frequencies) will radiate. So we start with a "carrier" wave having a frequency of 1 MHz.

It travels out from our transmitter antenna very well at that frequency but isn't carrying any information until we mix it in a special way with some information. So we choose a 1 KHz audio tone as our "information" (in broadcast radio, the "information" would be voice, music, etc.). Our goal is to transmit the 1 KHz tone from a transmitter to a receiver some miles away.

AMPLITUDE MODULATION

Early in the 20th Century it was discovered that you can mix the audio wave with the carrier wave in a MODULATOR circuit which mixes the 2 frequencies nonlinearly. The result is a 1 MHz carrier whose peak-to-peak AMPLITUDE varies at the slower, 1 KHz audio RATE. That's the TIME DOMAIN description of Amplitude Modulation of an RF carrier wave, and it's what you'd see on an oscilloscope screen when examining the output of an AM transmitter.

On the 'scope it looks like a solid green "envelope" whose "height" is varying (equally varying, up-and-down from the "zero" line horizontally bisecting the screen, in a "double-sine-wave envelope" shape). It looks "solid" because in order to see a few cycles' worth of the 1 KHz amplitude envelope variation, we had to turn the scope's horizontal sweep down to say, .5 ms/box … and there are many more cycles of the 1 MHz RF carrier "squashed" into the same area on screen that it takes to show only a few cycles of the 1 KHz audio modulation.

FREQUENCY DOMAIN vs. TIME DOMAIN

Nowadays it's becoming more fashionable to talk about the above from the FREQUENCY DOMAIN standpoint. That's what a SPECTRUM ANALYZER shows you as opposed to an oscilloscope. In the frequency domain, we see that the amplitude-modulated carrier is actually composed of FOUR waves:

    #1) the original 1 MHz carrier
    #2) the original 1 KHz audio
    #3) the SUM of the above two frequencies, which is 1.001 MHz   and
    #4) their DIFFERENCE, which is .999 MHz.

What we call "AM" is a MULTIPLICATION of instantaneous AMPLITUDES in the TIME DOMAIN (the modulator multiplies the 2 waves together). But it's also ADDITION and SUBTRACTION of FREQUENCIES in the FREQUENCY DOMAIN. Thus, amplitude modulation is a

kind of FREQUENCY-SHIFTING (similar to but not to be confused with FM, which is Frequency Modulation).

The original carrier "splits" into 2 new frequencies in addition to itself. The upper one (upper sideband) shifts UP the spectrum by an amount equal to the modulating frequency (1 KHz) and the lower sideband shifts DOWN by the same amount.

[If you've read my files PHASCONJ.ASC or ANDERSEN.ASC you may remember that a similar "frequency splitting" occurs in the phenomenon of "Stimulated Brillouin Scattering", which is one method used to produce Phase Conjugate waves -- one of those "thought-seeds" that led to the writing of this file.]

In practice, the 1 KHz audio frequency (#2, in the list above) is filtered out (discarded) and the remaining three (#1, #3, and #4) are transmitted as a group out the antenna.

3 frequencies are broadcast simultaneously from a single transmitter? Yes. But in the time domain, their instantaneous phases add up (interfere) in such a way as to produce the appearance of a SINGLE amplitude modulated 1 MHZ carrier on the oscilloscope.

Viewed again via a spectrum analyzer (frequency domain), we see 3 distinct "blips" or lines on the screen: the 1 MHz carrier, the .999 MHz line to the left of the carrier, and the 1.001 MHz line to the right of the carrier. We call the .999 MHz frequency the LOWER SIDEBAND (LSB), and the 1.001 MHz frequency the UPPER SIDEBAND (USB).

All of the above is standard radio theory. It works and has been in practice since the 1920s in commercial AM radio. In the 1950s the Amateur Radio "Ham" operators began switching over to SINGLE SIDEBAND transmission or SSB) following the military's lead. SSB turns out to be more efficient than AM. AM is actually wasteful of both transmitter power and frequency spectrum space because:

1) Since the lower and upper sidebands are "mirror-images" of one another, they're both carrying the same information -- a redundant waste of transmitter power

2) The carrier itself -- when viewed in the frequency domain -- carries NO information. That may sound surprising, but the intelligence or information is all contained in the sidebands! But the carrier does "hog" power while not doing anything to earn its living.

(Note that we THOUGHT it DID, but that's how it SEEMED when we viewed it in the time domain on the oscilloscope. So your instruments can mislead you into seeing what you think you OUGHT to see. Free Energy researchers, take note!!)

Well, if the carrier is a waste of power and spectrum space and the sidebands are redundant mirror-images of the information, why not just throw the carrier and a sideband out and devote all our power to the transmission of just ONE of the sidebands? That's "Single-Sideband" (SSB).

The only (minor) drawback is that you have to re-insert a "substitute" carrier at the RECEIVER -- easily done -- to DEMODULATE the SSB signal and recover the original 1 KHz audio information.

Voila! We've successfully transmitted an audio tone out over many miles by FREQUENCY-SHIFTING it up the spectrum so that it was translated into a 1.001 MHz RF wave (using the upper sideband in this example). Then we re-mixed it with a 1 MHz "fake" carrier at the receiving end, and

the DIFFERENCE frequency from that demodulation process popped out as our original 1 KHz audio tone.

DEEPER THINKING ON AM/SB SIGNALS

In my ongoing ruminations about Phase Conjugation Theory -- sparked of course by Tom Bearden's books and papers on its application to Scalar Electromagnetics -- I came across some interesting diagrams in such places as the A.R.R.L's Handbook for Radio Amateurs, books on Fourier Transform (Spectral Analysis) Theory, Digital Sampling Theory, Spread Spectrum Communications Theory, etc.

Getting to the point, these references -- in explaining modulation as I have previously done above -- contain diagrams showing how the spectrum or sidebands are produced/shifted via a given modulation method. **What caught my eye was that several of these sources place "0 Hz" -- zero frequency, DC -- in the <u>MIDDLE</u> of their spectral diagrams.** Not at the left end as one might expect, since you "can't go any lower than zero cycles per second!"

Or can you?

If you could, what would that mean? It would mean you'd have a <u>NEGATIVE</u> <u>frequency</u>. Since frequency is the reciprocal of time (t=1/f, f=1/t), we're talking about negative time -- TIME REVERSAL -- when we go below 0 Hz.

While most "vocational school", technician-level textbooks would place 0 Hz at the left-most end of their spectrum diagrams with higher frequencies as you move to the right, several of the "engineer-level" texts mentioned above put 0 Hz in the CENTER and express negative frequencies on a "dashed" (not solid) line extending to the left -- as if these are "imaginary" frequencies -- because everybody knows you can't have less than zero! (Except in your checking account, between paydays; my bank charges me "negative deposits" in the amount of $20 per pop.)

Well after years of psychotherapy, we've all been adjusting our "reality goggles" to another, related culture-shock since we took algebra and trigonometry in high school: Remember when they sprang the "square root of -1" on you? Can't be done!

Or can it?

Yeah it can if you're willing to give it a new name like "i" ("j" in electronics) and reckon it as existing on an "axis rotated 90 degrees away from the REAL numbers" that we've come to know and love so well.

We call numbers like the square root of (-1) "Imaginary Numbers" and manage to use this mathematical curiosity to pass our trig tests as well as our AC circuit analysis tests in "Electronics 101". Turns out that we can stick real numbers on the X-axis of a graph, imaginary numbers on the Y-axis, and plot all kinds of otherwise indescribable stuff like Minkowski did when he interpreted Einstein's Relativity for the rest of us commonfolk.

Well, my point is that like imaginary numbers in AC analysis, we do use or infer negative frequencies in spectrum analysis and modulation. But we treat them as a sort of bothersome mathematical "artifact", a nuisance that doesn't deserve solid lines on our less-than-zero frequency axis, but only dashed ones -- assigning them a sort of "unreal", "imaginary" status. But we like to flirt with them anyway, don't we?

Just like the "time-reversed", negative, "advanced-wave", mirror-image solution to Maxwell's electromagnetic wave equation, for example.

Noted as far back as the (last) turn of the Century by Carl Barus, Stoney, and later treated by Wheeler/Feynman in their 'Advanced vs. Retarded Wave' "Absorber" theory (see my previous file ANDERSEN.ASC), the math works both ways -- forward and backward -- and, suffice it to say, the common man is told to be content with the "forward" solution unless, like me, you're used to having a chronically-overdrawn bank account.

The 'party line' is we live in forward time, we can't prove there's such a thing as "backward time-flow" so the "backward" solution is just a figment of the math -- a symmetry -- and why don't you weird-science nuts just leave it at that.

DIGITAL SIGNAL PROCESSING

The hottest new thing since audio cassette tapes is the CD player. In Ham radio, the hottest new toy is the DSP filter, which magically nulls out interference that was impossible to get rid of up to now. Both of these devices use IC chips based on the newly-emerged field of Digital Signal Processing, which springs from a cross-breeding of Fourier Analysis theory, digital information-sampling theory, analog filter theory, and radio modulation (heterodyne) theory.

They've got IC chips now that are selling like hotcakes (and getting cheaper, too) that enable you to build electronic echo/reverb boxes, digital audio filters, speech synthesizers, Fourier spectrum analyzers, frequency/pitch/spectrum shifters (so you can sound like God doing the weather report if you're a DJ looking for ratings) -- the list goes on-and-on. The technical literature behind these toys -- with all the math and nitty-gritty -- provides the basis for our "time reversal" discussion.

According to what's known as the "Nyquist Theorem" in information sampling theory, if you're a digital audio engineer and you want to produce a CD with crisp frequency response right up to 20 KHz (the upper extreme of the range of human hearing), you must digitally "sample" or convert your audio source (music, etc.) to digital "slices" at no less than TWICE the highest frequency of interest -- i.e., 40 KHz sampling rate to faithfully reproduce 20 KHz audio tones.

In simplest terms, the reason is because you want to get a "snapshot" of BOTH the (+) and (-) excursion of the 20 KHz sine wave -- which requires 2 snapshots or "samples" per cycle -- which equates to twice as many samples as "Hz" in the wave, or 40 KHz for a 20 KHz tone.

Well, what if you DON'T sample at the Nyquist frequency? What if you sample at, say, 37 KHz instead of 40? What will happen?

What happens is that the 20 KHz audio tone is not always "snapped" at the same points per cycle as time goes by. And an imperfect "mix" occurs between sampling frequency and sampled frequency. The net result somewhat resembles mixing 2 frequencies in an AM modulator as we described at the beginning of this file. We get HETERODYNING or nonlinear mixing effects, which creates spurious sidebands and shifts the frequencies down the spectrum, usually in some undesirable, dissonant-sounding way, musically-speaking. The audio buff hears strange "wrong-pitch" tones and distortion in the music. These spurious pitches are called "alias frequencies".

The sampling frequency acts as a sort of "ceiling" that "reflects" any frequency higher than "Fsampling/2" DOWN the spectrum, manifesting as alias frequencies.

Now down at the other (low) end of the frequency spectrum in a similar way, any tones which by "AM differencing" end up BELOW ZERO HERTZ get "folded" or reflected back UP the spectrum from 0 Hz, which is like a "floor" or barrier that reflects frequencies UPWARDS.

And why would 0 Hz "reflect frequencies"?

The time-forward engineer will tell you that it's because *"Thou shalt not have Negative Frequencies, lest there be Time-Reversal".* (Oh, all right-- those were my words.) And he feels secure in his time-forward world because he sees that "up-folding" as proof that even if you wanted to produce negative frequencies, you couldn't. Nature prevents them by reflecting them back up into the positive spectrum as alias frequencies that are a nuisance to digital audiophiles.

(If you want to try this out for yourself, Radio Shack sells an electronic Reverb/Echo box for about $40 that uses a "bucket-brigade" IC to sample and delay an audio signal. Set the 'Delay' slide-pot to maximum (longest echo) and you'll clearly hear weird, chime-like alias tones in the higher frequencies of your music.)

THE PHASE CONJUGATE CONNECTION

Now for the correlation. I'm asserting here that the spectrum-folding phenomenon in digital sampling theory -- which keeps "negative" frequencies safely bounced back up into the positive-frequency region -- is the **ANALOG OF A PHASE CONJUGATE MIRROR** currently used at optical frequencies by mainstream Science!

In optical labs, they're using barium titanate crystals, methane gas under pressure, etc., to serve as a nonlinear medium which produces a phase conjugated, time-reversed reflection when properly "pumped" with enough energy to get their index of refraction to vary in step with the incoming energy (something like the way a silicon DIODE or TRANSISTOR can be described as a NONLINEAR RESISTOR whose resistance varies according to the "pressure" of the voltage across it (= the current through it)... its "breakdown" threshold is around 0.6 volts).

I'm saying that in digital sampling, ZERO HERTZ is the BARRIER corresponding to the phase conjugate MIRROR. It produces the REFLECTIONS (aliases) that appear SPATIALLY REVERSED (spectrally-reversed) to us time-forward observers. But it's BECAUSE they're reflected back up into the "positive" that we know they're actually NEGATIVE FREQUENCIES.

In the same way that we would see a "time-reversed" action as a "movie running backwards" in our positive time flow, so we see that the direction of PHASE ROTATION of the reflected alias wave has been reversed so that it now COINCIDES with the forward-time/positive spectrum waves.

A RADIO RECEIVER ANALOGY

For you Hams out there, have you ever build a Direct Conversion receiver? You pull in your RF signals at the front end; mix them with a Variable Frequency Oscillator (VFO) tuned to almost the same frequency; and thereby convert the modulation directly down to baseband (audio) without going through an I.F. conversion first. It's simple and works adequately except for the fact that it does not provide "single-signal" reception like a superheterodyne radio does. Because in a Direct Conversion receiver, you "zero-beat" the VFO against the carrier (or suppressed carrier in SSB), bringing your difference-frequency "carrier" down to 0 HZ! This pushes the LOWER SIDEBAND (which was lower in frequency than the carrier to begin with) BELOW ZERO HERTZ by an equal amount as the upper sideband is ABOVE the carrier (0 Hz).

The lower sideband gets "folded" (reflected) back up by an equal amount of Hz ABOVE zero Hz so that now it OVERLAPS the upper sideband information.

If the original signal coming in was an AM signal, the above scenario works fine since there's mirror-redundancy between the sidebands anyhow. They're both carrying the same information but in opposite phase to one another. Well then, why don't they cancel each other out when the lower gets reflected up on top of the upper? Because when negative frequencies are reflected into the positive-time spectrum, the direction of phase rotation is reversed.

Now BOTH the upper and lower sidebands are at an identical frequency. And on top of that, their phases are rotating TOGETHER and not against one another. So they add constructively at all times -- JUST LIKE A SPATIALLY-IN-PHASE "WAVE/ANTIWAVE" pair as described by Wheeler and Feynman and (I think, but am not sure) by Tom Bearden.

If on the other hand, the original signal desired was an SSB transmission, the Direct Conversion receiver creates the problem of "double-signal" reception.

Since SSB gives Hams twice as much spectrum space in the band, therefore there are now twice as many "channels" to use. Accordingly, where there used to be room for 1 AM transmission with its 2 sidebands, now there's room for 2 SEPARATE SINGLE-SIDEBAND transmitters. So each guy chats away in his own conversation -- separately-- while the unfortunate listener using the D.C. receiver hears BOTH. But the "interfering" signal is unintelligible, scrambled, "Donald Duck"-sounding gibberish because it is SPECTRUM-INVERTED.

The user of a better receiver -- such as a superhet -- never hears the lower sideband since it's filtered out up at the Intermediate Frequency (I.F.) such as the 455 KHz I.F. most often used in AM radio.

BICYCLE WHEELS and AUTOMOBILE TIMING LIGHTS

Let's digress here for a few minutes. My behind is getting sore from sitting at this computer and writing. Let's go bike riding!

We hop on our bicycles and tool on down the road to the park where we come upon three other cyclists up ahead. We ride up behind them and then maintain a constant speed behind them, so that we keep a stable observation point from which we can see all three.

As we observe them, we note that the guy on the left must be in 3rd gear since he's pedaling slowly. The guy in the middle seems to be pedaling "normally" so we assume he's in 2nd gear. The guy on the right is pedaling rather fast and furiously, so he must be in 1st gear for whatever reason. But they're all keeping abreast of one another.

Well, little did we realize that it was getting so late; the Sun has set and it's getting dark. But these Olympic champs want to keep on riding! So we hang in there with them a little bit longer, noticing that the road is becoming darker and the streetlights are few and far between.

As luck would have it, there's a guy up ahead using an ignition timing light to tune up his car, which is parked by the curb. Promising in an apologetic tone that "I'll be right back with his light", I swoop by and grab it from his car hood. Lo and behold! it's a portable model that can be triggered -- like a strobe light -- by an internal pulse generator as well as by the engine ignition. So I switch it to "internal trigger" and -- speeding up -- I ride up behind and to the left of the 3 cyclists so that I can get a sort of

diagonal side-view of their bicycle wheels. I now switch on the timing light and adjust the strobe flash rate until it is just a bit SLOWER than the pedaling speed of the first guy (on the left, closest to me) who's in 3rd gear. You move up alongside me and we both watch the 3 cyclists by the light of a silvery strobe.

What do we observe?

Since the strobe light is the only light source on the now-dark street, we see only momentary flashes of the action. We see the same relative pedaling -- direction at each bicycle that we noticed when it was still daylight -- only now it looks like an old movie, flickering, because we're just "sampling" the action as they pedal.

Next, I carefully SYNCHRONIZE the strobe with the first rider's pedaling so that it flashes ONLY when his left foot reaches "12-o'clock" on each pedaling cycle. We notice that Rider-1's pedaling has now appeared to come to a STOP. We've "frozen" the action because we take only one "snapshot" of it per cycle. We also notice that the guy in 2nd gear appears to be pedaling quite a bit more slowly. The 3rd guy is also slower but still faster than the 2nd guy.

Now you suggest to me that I should increase the strobe light's flash rate some more PAST the left-most rider's pedaling speed. Which I do. What do we observe now? We see the old "wagon-wheel" effect from the movies -- the first rider now appears to be pedaling BACKWARD from our perspective, because our rate of perception (strobe light illumination) is just slightly greater than his pedaling rate.

Getting excited, you now have me adjust the strobe to be in sync with the 2nd guy -- the guy who was originally seen to be pedalling in 2nd gear. We see HIS feet "frozen" and not pedaling, while the first guy is now pedaling backward even faster while the last guy (1st gear) -- to the right -- is still pedaling forward, but much more slowly.

Finally, we sweep our strobe rate up to the rate of the 3rd guy. He freezes his pedaling, and we see the first two pedaling backwards, faster yet.

As an encore, we increase the strobe flash a little more, and all three appear to be pedaling backwards.

We marvel at how "relative" perceptions can be and apologize to the man from whom we stole the timing light. (The 3 cyclists are last seen making a right turn at Albuquerque.)

THE MORAL OF OUR STORY

The illustration above shouldn't be hard to visualize, especially if you've ever watched a wagon wheel turning backward in the movies or if you remember not so long ago when your hi-tech record (phonograph) turntable had black and white stripes along its perimeter which appeared to "stand still" in the light of a mini-strobe when you had the record speed adjusted just right.

The bicycle-wheel illustration above refers to a carrier wave and its sidebands. From a reference point of zero Hertz, they're all rotating their phases in one direction -- the upper sideband turns the fastest, the lower the slowest, and the carrier halfway between.

If we now SHIFT OUR REFERENCE POINT -- or frequency -- up to that of the carrier (which we modeled as our "middle" guy in 2nd gear), we see the sidebands' phasors rotating equally in speed

(frequency with respect to the carrier and us) but in OPPOSITE DIRECTIONS while the carrier itself appears to be "stopped" (or at 0 Hz).

Alternately, we can shift the three of them -- as a group -- DOWN the spectrum until the carrier is at 0 Hz. Then the lower sideband will be at a NEGATIVE frequency, still rotating "counter" to the upper sideband because THE TWO SIDEBANDS ARE CONJUGATES OF EACH OTHER -- once you agree to call the carrier the "zero" reference! But since the lower sideband is reflected back up off the zero Hz "floor" (the "phase conjugate mirror"), the lower sideband now ends up superposing 'on top of' the upper, and is now rotating together with it in the SAME direction! ("Spatially in phase, out of phase in the Time dimension"...)

We now have an illustration or a correlation between the Wheeler/Feynman (and probably Bearden) "Wave/AntiWave Pair" and the commonly-used techniques of modulation and spectrum shifting as is now quite easily done in radio and audio systems.

OUR REALITY'S "ZERO-TIME REFERENCE"

A couple of years back, **Preston Nichols** published some books about the so-called *Montauk Project* -- an alleged coverup-type series of experiments said to have taken place in the 1970s and '80s using the old SAGE radar at the defunct Montauk Point, Long Island radar base. In his first Montauk book, Nichols (and Al Bielek, indirectly) makes reference to a device called a **"Zero-Time Reference Generator"**, described as an electro-mechanical device in a large box -- allegedly developed by **Nikola Tesla**. The device was supposed to have been the inertial "time reference" for the pulsing of the large degaussing coils aboard the *USS.Eldridge* (in the infamous "**Philadelphia Experiment**").

While the "PX" has long been an interest of mine, I found most of Nichols' allegations fairly unbelievable. But notice how the concept of a pulsing electromagnetic-inertial "reference" ties in with my "strobe light" story.

It seems that our "time" is bordered by 0 Hz at one end of the spectrum. Everything below that gets reflected back "up" as a length/time/spectrum reversed copy.

At the upper end of a somewhat different but related scale (speed, which is equal to Space [distance] / Time), we have another "barrier", the speed-of-light "*c*".

Any wave that might "try" to "run up against" that barrier would seem to get DOPPLER SHIFTED. Its WAVELENGTH is compressed, but its (group) velocity stays at *c*.

If an optical phase conjugate mirror is a variable refraction or "phase" grating (as it's called in the literature) and if the PCM produces "phonons" or SOUND waves at light frequencies, then those waves are LONGITUDINAL variations in the energy density at the mirror, just as Bearden has been telling us. Thus it would seem that an incoming EM wave would encounter a VARYING-DENSITY BARRIER which would produce alternate up and down DOPPLER SHIFTS (almost like FM, but in BOTH frequency directions like AM sidebands).

And there we have it. The spectrum splitting (line-broadening) as described by researchers of Stimulated Brillouin Scattering phenomena.

Maybe "Zero Hertz" is not absolute like Einstein said Newton's Absolute Time is not absolute. Maybe time flow -- or at least the perception of it -- depends on whether you're "in sync" with the "reference" defining the local reality.

Maybe we can build an electro-magnetic-gravitational "strobe light" that detaches us from the "local" time and allows some "sync shift". If I were to shift my reference to, say, -2 KHz, then I'd see (-1) KHz as "forward-time" while you'd swear it was "time-reversed" and that I was, too...

(Bearden's 1970s "Quiton Perceptron" paper; Nichols' and Bielek's "Zero-Time Reference Generator"???)

CONCLUSIONS

I hope you've gotten some brain buzz from some of these ideas. They've been coalescing in my mind for a while now, having been helped along by many of the interesting comments made by Bearden and several of the KeelyNetters.

I think the "circular polarization" topic recently brought up by Terry Bastian has some real relevance here. My thoughts are that we're hampered by our continual visualizing of EM waves as 2-D plane waves. 2-D waves are probably only "flat", inadequate projections of a richer 3-or-more dimensional EM wave. Direction of phasor rotation most likely plays a major role when understood in conjunction with propagation direction.

Another possible avenue for exploration might be to do a detailed study of reflections on transmission lines, in the context of this file. The standing waves caused by either open or shorted RF transmission lines produce "conjugate" reflections of voltage or current, causing the formation of what we call "normal" standing waves. (That's what the Hams and CBers call "SWR" and want to minimize in their setups; KeelyNetters might want to MAXIMIZE it!)

Are these "conjugates" the same as the phase conjugates (time-reversed) that Bearden writes about? Or are they what he calls "pseudo-conjugates"?

I'll have to leave that topic for another file.

Happy Zero-beating!

N. [Has Bearden abandoned Phase Conjugation?](#) (1994)

O. [Scalar EM and Polarization -- head-to-head with Bearden over the phone](#) (1993)

by Rick Andersen, April 5, 1993 (slightly revised 7/3/97)

This file is an account of some of my investigations into what is popularly known as "Scalar Electromagnetics" -- specifically as conceptualized by Lt. Col. Thomas E. Bearden (ret.), Huntsville, Alabama. This file assumes that you are already familiar with Bearden's works as published by Tesla Book Company and as listed on many of the BBS's. But a brief synopsis of his views are presented for the benefit of those who are not familiar with Bearden's writings.

Tom Bearden's version of electromagnetics is a direct challenge to the electromagnetics that physicists and electronics engineers are taught.

His understanding of EM -- if correct -- would open up a vast new physics in which reality itself could be manipulated in ways that we in this last decade of the 20th Century can still only call *"magical"*.

As an electronics tech with a broad interest in "fringe science" in general and in such things as the Philadelphia Experiment in particular, I have had to familiarize myself with several "unconventional" ideas and hypotheses.

Tom Bearden's Scalar Electromagnetics could explain many "paranormal" mysteries in terms of a scientific model. We need to evaluate his work.

TOM BEARDEN'S SCALAR ELECTROMAGNETICS

Very briefly, Bearden's main points of disagreement with classical EM are these:

● Quantum physicists consider the Potentials in the vacuum to be the primary causal agents. Force fields (**E** and **B** fields) are EFFECTS of the interference of potentials. Classical EM has it the other way around.

Force fields CAUSE and potentials are the (abstract) EFFECTS. It may seem to be an "Ivory Tower" semantics game, but if Bearden and Quantum Physics are right, the implications are tremendous.

● Classical EM fails to distinguish between CHARGE and CHARGED MASS. The classical EM man says "Show me some 'charge' without some mass to contain that charge!" Bearden replies, "Define for me what charge is!. You can't. You confuse charged mass with charge itself. Ditto with most other fundamental definitions in Physics such as Vector, Energy, Mass, Vacuum, etc." Bearden EQUATES Massless Charge, Potential, Vacuum, Spacetime, 'aether', Virtual Photon Flux.

● Classical EM describes the Electric and Magnetic "fields" in terms of Vectors and Scalars. On the simplest level, a "vector" is an abstract way of describing something in terms of its MAGNITUDE and DIRECTION. Like "one mile due North". A scalar is described by MAGNITUDE ONLY -- like the temperature of the air in your living room or the pressure of a gas inside a flask. Of course, Bearden expands on these definitions considerably.

Bearden claims that History has pulled a fast one on us:

What we call 'Maxwell's Equations' are in fact not his equations at all! Maxwell -- says Bearden -- wrote his equations in QUATERNIONS. It is a complex number system devised by the mathematician Hamilton which involved "multi-dimensional" math. On this basis, Maxwell's ORIGINAL EM theory is said to have had implications for more than our 3 spatial dimensions. TIME as the supposed FOURTH dimension would enter the equations and -- as Bearden claims -- had the original quaternion theory been left intact, Einstein might have found his long sought-after Unification of EM with Gravitation.

Bearden says of quaternions what Italians say about Prego spaghetti sauce: "IT'S IN THERE!!" What is "in there" is the mathematical basis for all of the magic things we fringe science aficcionados have always wanted proof of: the means to produce **antigravity**, **time-travel**, **teleportation**, **age and disease regression**, etc.

● All of these possibilities, says Bearden, were aborted because Oliver Heaviside -- and to some extent Willard Gibbs, late 19th-century electrical physicists -- did not understand Maxwell's quaternion theory. And so Heaviside 'cleaned up' the theory, condensing the pesky quaternions into an abbreviated and emaciated "vector" theory which still contains a scalar component, but which component is largely de-emphasized.

And it worked! EM until now has functioned very well on the technological level using the deficient Vector theory. Toward the latter half of this Century, quantum physicists such as Feynman began to realize that "Maxwell's" EM (Heaviside's) was flawed in several respects at its foundations. Among the phenomena that Physics has discovered that Classical EM apparently fails to account for is the **Aharonov-Bohm effect** which involves "potentials" in a region free of any measurable electric or magnetic force-fields, essentially allowing action and instantaneous intercommunication between widely separated particles in a somewhat mysterious way.

● Bearden points to 2 relatively forgotten papers of mathematician **E.T. Whittaker**, written in 1903 and 1904 just as Albert Einstein was about to publish his famous Relativity theory (1905). Whittaker's math shows how any scalar potential can be analyzed and considered to be composed of a harmonic series of bi-directional waves, flowing into-and-out of the potential. Something like our concept of "standing waves" but with some important differences.

Conversely, Whittaker's other paper shows that any EM wave can be considered to be the effect of interfering 2-or-more scalar potentials in a given area. Since these potentials exist in more than our 3 dimensional world (as we perceive it), if we know how to properly engineer and combine such potentials artificially, we can perform some mighty magical feats such as to transmit EM energy "around" our normal spacetime, to have it appear out of nowhere at a distance from our special transmitter. Much of Bearden's writings go on to describe (speculate on, actually) ominous Soviet scalar weaponry based on this technology. (Since the collapse of the Communist Soviet Union, Bearden's emphasis has shifted toward the extraction of "free" energy from the vacuum and how diseases such as cancer and AIDS may be cured using spinoffs of this Scalar EM.)

● Based on the points mentioned above, Bearden sees an EM wave a bit differently than did Maxwell. Although he faults the World for not going back to the REAL Maxwellian quaternion theory -- and thereby continuing to miss the boat that would finally unify EM with gravitation (which Einstein searched in vain for, supposedly) -- yet Bearden departs from his hero Maxwell on the subject of just what an Electromagnetic wave is. Specifically, whether it propagates TRANSVERSELY or LONGITUDINALLY through the vacuum. Maxwell -- quaternions or not -- assumed a transverse EM wave because, says Bearden, he assumed a MECHANICAL AETHER as did most of the 19th Century physicists.

Nikola Tesla, on the other hand, did not agree. Tesla believed that EM waves propagate LONGITUDINALLY -- as do sound waves in air -- through a GASEOUS aether.

Bearden emphatically states that despite popular opinion, Tesla was right and all of our present physics is wrong on this point.

There are many other points made by Bearden about Scalar Electromagnetics that differ sharply with the present Classical EM. I think I have brought out the main ones here. (See Bearden's works for further detail, especially the file THEORYBE.ASC on the KeelyNet and other BBS's.)

MY OWN COGITATIONS

Now that I'd spent about a year reading and re-reading Bearden's papers and trying to understand just what he was talking about, I was beginning to ask myself, 'Just how DO we know what we think we know' in Classical EM? Are some of our "doctrines" just uncorrected mistakes of history that have achieved sainthood? Probably. After all, Bearden cites many references from Quantum Physics to support his views. Of course, QP is not without problems of its own just as is every other MODEL of reality. Ah, how painful and disappointing it had been for me when I first realized that WE KNOW NOTHING IN THE "ABSOLUTE TRUTH" SENSE.

All we do is spin elaborate yarns that we call "Models", which we try to disprove when we are being true scientists but mostly try to defend fanatically when we revert back to being regular human beings.

And yet, these flawed models have enabled us in one century to conceive and apply a technology that has literally transformed the World. So we like to keep telling ourselves that we're "getting there" little-by-little. Our models may be quite erroneous. But if they work, we use them until somebody comes along with something better.

And this is what Tom Bearden is doing -- offering something better. Except that he is claiming that his model is NOT something new. It has been around for at least 100 years, but we've been too stupid to see it because we allowed Oliver Heaviside and his vector oversimplification to blind us.

Well, I've bought a lot of "snake oil" over the years. And as we all know, the field of speculative science is overflowing with snake oil salesmen. So I try to temper my tendency to rejoice over the promises of magic with the caution that I have had to learn the hard way by having one 'scheme' after another turn out to be "hot air". Scientific method involves testing any new hypothesis rigorously. If the promoter of the idea can't take the heat, he shouldn't jump into the frying pan.

So I found Bearden's telephone number and decided to give him a call. (I've found that writing is too frustrating. Either they're too busy to answer or they just don't. Either way, you end up waiting for weeks.)

To my surprise, Tom Bearden seemed more than happy to talk about his work over the phone. I noticed that he tended to talk so much that it was sometimes hard to get a word in edgewise. But I appreciated his willingness to spend time on the phone and figured he might be able to clarify for me whatever I couldn't understand from his writings.

We talked of the 'primacy of the Potential', about phase-conjugate waves in non-linear materials, about his friend Frank Golden who appears to be a 'silent source' of a lot of his ideas and who has allegedly built several proprietary scalar devices (no, Bearden wouldn't tell me anything of substance about them).

My first call to Bearden was sometime in November 1992 if I recall. And I waited until March '93 to call again, when I had some (I thought) real questions about stuff I couldn't figure out on my own. I didn't want to abuse his phone hospitality by calling more often.

So the 2nd call was in late March. My question was about his latest papers on Free Energy - The Final Secret (see KeelyNet files FREENRG1 & FREENRG2) that had come out around that time.

The bottom line on free energy was that you needed a "**Degenerate Semiconductor**" between your source of potential (battery, etc.) and your switching function. From there on to the load, you could use regular conductive copper wiring. Bearden was saying here that the reason most of the earlier attempts at building "free energy" devices had given inconclusive results was that none of the previous inventors were using this "degenerative semiconductor" material that Bearden had finally figured out was the **'missing link'** after 30 years of intensive research into the subject.

At this point, of course, I was beginning to wonder just what this latest revelation meant as regards all of Bearden's PREVIOUS books announcing free energy inventors and their WORKING devices, happily extracting free energy from the vacuum.

Hadn't Bearden endorsed John Bedini's battery-motor-generator flywheel device, claiming that when the battery electrolyte was pulsed at the resonant frequency of the ions in it, free energy was being 'coupled' into the circuit, and that the battery was recharging itself? There was no mention of any "degenerate semiconductor" material there! Bearden's advice (in the Introduction to the Bedini book, available through Tesla Book Co.) was to "have at it" and build the thing -- all of you eager experimenters out there -- in order to prove once-and-for-all to the "establishment" en masse, which "they" couldn't deny, that free energy extraction is both possible and practical. (Be careful, though. Your battery will explode if you hit it too hard with a voltage spike; the hydrogen gas inside is particular about the magnitude of the charge-pulse. But don't let that stop you. Let's work out the bugs.)

Then there was Floyd Sweet -- the subject of Bearden's 1992 papers. (See SWEET1-4D.ASC on KeelyNet for further details on this device.) Sweet allegedly built a device exploiting the properties of ferromagnetic materials to exhibit non-linear phase-conjugate mirror properties.

This thing was supposed to have actually levitated off the bench during a demonstration. But they stopped it before it blew apart from all that "negative energy" it was producing. No mention of any "degenerate semiconductor" here, either. Just the magic of pumped phase-conjugate mirror theory, integrated into Bearden's earlier explanations of Scalar Electromagnetics as the engineering of spacetime stresses.

Hell, I'd be happy to have PROOF that any one of these earlier devices actually levitated or distorted time or recharged itself forever with no drain on the battery. (How about a demonstration on "20/20" or full schematics for the Sweet device? Oh, that's right -- it's "proprietary"!)

But now Tom Bearden has even better info -- The Final Secret. Golly! When that weird metal called **Nitinol** first came out, eager experimenters could buy it through mail order. Surely I can expect to see someone marketing "Tom Bearden's Old Fashioned Degenerate Semiconductor Elixir" in sample quantities real soon?

My point is that he encourages inventors and tinkerers accross America to stop believing everything they've been taught in Classical EM and to go and build "free energy" motors such as Bedini's because -- as he puts it -- he "cares about that poor little old lady down the block who is being ripped-off by the Power Companies that be". I just want to clarify some details, so I ask questions.

Okay, so now he tells me I'll get erratic results unless I use some genuine "degenerate semiconductor" such as doped copper wire. How does a basement tinkerer like me accomplish this? I know … I'll call and ask. Thus my March phone call.

Bearden's immediate reply was that I needed to "use that mass of gray matter between my ears" and engage a good materials scientist to come up with a degenerate semiconductor for me.

Oh.

I thought I could put the power company out of business just using parts from Radio Shack. So no one had ever BUILT a device based on this doped copper or whatever -- it was simply Bearden's latest CONCEPT which would tend to validate his view of the Potential. Hmmm.

A few days later, I decided to press my luck and call again. This time I had been thinking hard (I thought) on just how and why we traditionally believe in the transverse EM wave whereas Bearden and Tesla say 'no, there is only a longitudinal wave in the vacuum.'

Specifically, I was thinking about POLARIZATION in an EM wave. How does Bearden's Scalar EM account for the OBSERVATION that EM waves can be polarized if polarization is DUE to the ORIENTATION of the **E** field which Bearden denies even exists outside your antenna? I wanted an honest answer to this problem. I was not pursuing this with an ulterior motive such as to disprove Bearden. Not at all. I really wanted to <u>understand</u>. Remember, our Model must satisfactorily account for <u>all</u> observed phenomena. If another model can explain it better, then "more power to it!" But any Ham radio operator can verify the fact that something we call "polarization" does indeed affect the transmission and reception of EM waves.

MAXWELL and TRANSVERSE vs. LONGITUDINAL WAVES

You see, the genius of Maxwell's insight was this:

Maxwell knew that a changing magnetic field around a wire (which we can measure at low frequencies with a compass placed near the wire) will induce a changing electric field (and an electrical current) in another wire nearby. Faraday had explored this phenomenon. It stood to reason that a changing electric field ought to produce a magnetic effect.

Unfortunately, Maxwell could not verify that experimentally. He assumed that the measuring devices of the time lacked the sensitivity required to prove the **SYMMETRY** of induction between electricity and magnetism. However, Maxwell was a mathematician with enough faith in such symmetry that he stuck an <u>extra</u> <u>term</u> into the equations that described this complementary electric-to-magnetic effect which was as yet unproven. This led to the extrapolation of a see-sawing pattern of electricmagnetic-electric-magnetic... etc., one type of effect generating the other, forming an ELECTROMAGNETIC WAVE whose fields would "chase" each other out into the space surrounding the wire in which the AC current flowed back-and-forth to generate these changing fields.

Evidently it was because a magnetic field (as sensed by a compass needle) forms at right angles to a current of electrons in a wire, that it was assumed that this 90-degree relationship continued out into the space surrounding the wire.

So the Transverse EM wave -- according to Classical EM -- consists of an alternating Electric field and Magnetic field at right angles to one another and at 90 degrees to the direction that the waves are moving out toward (the direction of Propagation).

Sound waves, by contrast, are Longitudinal. That is, the air molecules through which sound travels are -- at a given point -- first COMPRESSED, then DECOMPRESSED or RAREFIED, such that the density of the air at any given point varies at the sound frequency. The molecules themselves wiggle back-and-forth in the direction of propagation. First a little bit out and away from the sound source, then

a little bit back in toward the source. Overall, the air doesn't FLOW from the sound source to your ear. Bt the waves of compression and rarefaction are what propagate through the medium from source to ear. You could say that the air "pressure" hitting your ear drum at any given moment is varying, and this is the mechanism by which sound "waves" are transduced into your hearing organs (the ears).

The waves on the surface of a pond also travel out from the disturbing source. But observe closely and you will see that for the most part, the water itself merely bobs up-and-down in one place. The horizontal movement is in the WAVE (the position of one vertical slice through the water relative to the next adjacent slice). Water waves -- as well as the waves in a plucked guitar string -- are Transverse. That is, they move at right angles to the direction of the wave travel itself.

Well, Maxwell's insight was that his postulated Electromagnetic wave -- being composed of two 90-degree separated fields "chasing" each other through space -- would, like water waves, be a Transverse wave. Unlike water -- which only bobs up-and-down -- the EM wave would contain (at least) TWO components (electric and magnetic) at right angles to one another.

If you can visualize a water wave which "waves" not only "up-and-down" but also "side-to-side", then you have some idea of what Maxwell was describing.

Tom Bearden disagrees that there are transverse waves outside of the antenna of your transmitter or receiver. Like Nikola Tesla, he holds to the model of a longitudinal propagation (electrical "sound" waves) of "ripples" in the charge density of the 'aether' or vacuum. He credits Frank Golden -- his engineer/scientist friend -- with pointing this out to him. (Incidentally, Bearden is NOT referring to what he calls a 'scalar' wave only when he holds to a longitudinal-only view. He states emphatically that this applies both to his special "scalar" stress waves per se AND to what we call a normal EM wave, which he considers to be a 'special' subset of a scalar wave.)

Well then, why do our instruments appear to MEASURE these right-angled components if they're not even there?

Bearden invokes the analogy of a gyroscope. Spin a gyroscope, then try to tilt it in a given direction. What happens? The gyroscope PRECESSES and tries to tilt on an axis 90 degrees away from the direction you intended for it.

Bearden says that that's what happens inside a wire. The electrons in a conductor are "free", capable of being knocked down the wire from atom-to-atom as a "current". Physicists refer to them as an "electron gas" in the wire. But one more thing: They're <u>spinning</u> just like little gyroscopes. So when a "force" pushes on them from a certain direction, they precess at right angles, forming "precession waves" whose instantaneous direction or polarity depends on the changing density of the incoming longitudinal wave that caused them to precess.

Invoking the Quantum Mechanics "paradox", if you will, that whenever we MEASURE something, we cannot help but perturb it (and screw up the measurement to that extent). And thus we NEVER ACTUALLY MEASURE ANYTHING in an UNBIASED WAY. Bearden maintains that we are, in fact, measuring ONLY WHAT GOES ON INSIDE OUR INSTRUMENTS AS A REACTION TO WHAT'S GOING ON OUTSIDE OF THE PROBE -- we never measure things directly. So we THINK we see transverse waves in the vacuum when actually all we're doing is seeing the transverse PRECESSION of the electrons in our measuring devices. Interesting, right? Well, is Tom correct? He may well be.

BUT WHAT ABOUT POLARIZATION?

If Bearden is correct -- that there is no electrical "field" going "up-and-down" (using the example of vertical polarization) and there is no magnetic field going "back-and-forth" at 90 degrees to the **E**-field -- both TRANSVERSE or at 90 degrees to the direction of propagation ("out" from the antenna), but that there is ONLY a COMPRESSION/RAREFACTION (longitudinal) action on the density of the 'aether' (spreading out from transmitter to the surrounding space) then my question is:

WHY DOES THE VERTICAL OR HORIZONTAL ORIENTATION OF THE RECEIVING ANTENNA -- WITH RESPECT TO THE ORIENTATION OF THE TRANSMITTING ANTENNA -- AFFECT THE RECEPTION OF THE TRANSMITTED SIGNAL AT ALL?

A longitudinally-oriented wave CONTAINS NO INFORMATION THAT WOULD "TELL" THE RECEIVING ANTENNA THAT IT OUGHT TO BE ORIENTED ONE WAY OR THE OTHER. Yet that is precisely what we find in the real world! Does Tom Bearden deny this?

Let's refresh ourselves quickly on what we mean by Polarization. Simply this: Following the Classical EM model, we define the polarization of a wave by measuring the ORIENTATION OF THE ELECTRIC FIELD COMPONENT at the antenna of the transmitter.

Simply put, if the antenna consists of a horizontal wire parallel to the ground, we have a horizontally polarized wave. Rotating the wire into the vertical makes the wave polarization vertical.

Is this just 'theory', based on Maxwell's transverse concept? No. It is an observable phenomenon in radio and TV transmission/reception. In fact, if you've ever worn a pair of Polaroid sunglasses, you've experienced the effect yourself. Much of the glare outside in the Sun can be cut by wearing these glasses, since they filter out all light waves that are scattered about with different polarizations than the one they're designed to respond to. If you don't mind popping a lens out of your glasses, place it in front of the other lens, look through it, and rotate it. You will find a place where all the light is shut out -- you're looking at a black, opaque lens. Continue turning the popped out lens and you'll begin to see the view through the lenses re-appearing -- first dimly, then back up to normal brightness.

When you had the polarizations of the 2 lenses at 90 degrees apart, your view went black. Light could not penetrate the lens pair.

This same effect happens at radio frequencies (RF, of course, is an EM wave just as light is). When a transmitting antenna is oriented in the vertical direction and the receiving antenna is horizontal, a MINIMUM of energy is received at the receiver. TV stations' antennas are usually horizontally polarized. That's why your home TV antenna is a series of horizontal metal tubes mounted on a boom at right angles to the vertical mast holding it up.

Other services such as AM radio stations use vertical towers (vertical polarization).

It is even possible to produce circularly- and elliptically-polarized EM waves using suitable antennas.

Even more exotic is POLARIZATION MODULATION -- used in some advanced systems -- where the polarization of the carrier wave varies in step with the information just as in AM the Amplitude of the carrier is modulated.

My point is that polarization OCCURS -- like it or not -- and the Transverse Wave Model seems to explain it most satisfactorily, as far as I am aware.

How does Bearden's denial of the transverse wave in vacuum square with this known phenomenon of polarization?

BEARDEN WANTS US TO UNDERSTAND AND BELIEVE … SO I'LL CALL HIM!

Well, my 3rd call was cut short because Mr. Bearden was having a meeting that night and he had no time. Already feeling a bit guilty, I said I'd call back in a few days when he wasn't busy.

About 3 days later and feeling just a little bit like a pest, I dialed Bearden's number again on Sunday evening, April 4th. Bearden answered the phone. As politely as I could, I announced who I was; that I just had one more question that I needed help with; and that I'd promise not to call too often after that. Not that Bearden had indicated that I was becoming a nuisance. Just that I'd talked to him for a half-hour the previous week. And maybe 3 days after that I'd called him again, only to have him tell me he was too busy to talk -- he was in a meeting at the moment. So here I thought I'd try one more time on this fine Sunday evening to ask Tom Bearden how he would reconcile the phenomenon of radio wave polarization with his view of a solely LONGITUDINAL wave propagation through the "vacuum" between a standard radio transmitter and receiver.

Bearden began by asking me if I knew what Newton's Third Law was. I answered that I thought it was the 'action-reaction' law, which he agreed that it was. He then began saying that the present electromagnetics is flawed because it violates that Newtonian law. That we DO detect transverse waves. But only in the electron gas of our antennnas and instrument probes. That 'not one of the equations attributed to Maxwell were actually written by him' etc., etc.

Having read 3 of his books and all of his papers as downloaded from the BBS's, I'd heard these phrases many times before. I understood the phrases. Bearden knew who I was by now and therefore didn't need to keep parroting them every time we talked. What I wanted to know was how does the longitudinal propagation theory account for the KNOWN FACT that EM waves are polarized one way or another, and so your receiving antenna's polarization (or, ORIENTATION) must match that of the transmitter for optimum reception.

That's all I wanted to know. I just wanted Bearden to explain polarization in terms of his longitudinal model.

Evidently I pissed him off.

He told me that I was just regurgitating what "they" had taught me in the standard electromagnetics courses. That I shouldn't believe them. That I should read and re-read his books to get straightened out on these points.

I felt he was evading my question. I was asking about polarization. If he didn't know the answer or if he hadn't considered the question before or even if he didn't feel like talking to me about it, he could have politely told me so. I would have accepted that. Everyone who has a theory is allowed to develop it. Rome wasn't built in a day.

Next, Tom Bearden was attempting to tell me that polarization itself was "a bunch of bullshit"! Trying to get a word in edgewise while trying to remain polite (after all, I was making the phone call, intruding on his time), I reminded him that his books didn't DEAL with polarization. He said he didn't

HAVE to because it was all bullshit. That I needed to 'THINK' (emphasis <u>his</u>) and that if I were really paying attention to what he was saying, I would understand and wouldn't be asking these ILLOGICAL questions!

Still hearing no attempt to answer my question about polarization, I tried to define what I meant by it. I tried to use the illustration of a TV station whose antenna is usually horizontally polarized -- and thus your home TV antenna on your roof is also horizontally polarized.

But Bearden doesn't let you finish most of your sentences. Instead, he is parroting more phrases such as you find throughout his books.

By this point, he was actually telling me that sorry, but when a caller such as myself constantly repeats the same question over-and-over or from a different angle, then he must get tough with the caller and tell him point-blank that his questions are bullshit questions. And that I was "not going to get him to ADMIT" to there being such a thing as wave polarization, as if doing so was to 'surrender' to those people who hold to the Transverse EM wave theory. God forbid!

Now I was beginning to wonder if this guy was paranoid. I thought of ufologist Jacques Vallee who would try-and-try to ask simple, polite but firm questions of people like Bill Cooper or Bob Lazar. When they would begin to squirm, he would press them just a little bit more. Not to be an SOB, just to cut through the fluff and get to see if there was really anything to the whole thing. Vallee recounts how he would sometimes be accused -- afterwards -- of working for the CIA or some other "government" group hated by the UFO 'true believers'.

So now here I was, being informed by Tom Bearden that I was attempting to get him to 'admit' to a 'doctrine' of classical EM which he would not. I was a Roman Catholic Inquisitor trying to get Galileo to recant his position and admit that the heavens do revolve around a stationary earth. Oy vay!

Feeling exasperated, I paused for a moment. Bearden paused, too. I then said, "Mr. Bearden, I am not trying to get you to 'admit' anything. I'm just trying to understand how to fit polarization into your longitudinal view..."

"It's NOT just my view. Nikola Tesla himself held to 'sound waves' in the aether..."

"I didn't mean that it was just YOUR view, Mr. Bearden..."

"It is the CORRECT view..."

Now I was thinking of my boss at work. He never lets me finish what I'm saying, either.

Finally I asked him, "Mr. Bearden, may I make a REQUEST of you then? In your future writings, would you please at least ADDRESS this problem of how polarization is explained in the longitudinal model..."

"No I will NOT!" Bearden said with some conviction. "I get letters all the time from people with 50 questions and who want all their questions answered..."

I interrupted HIM this time. "Yes. And when you go public as you have and write books that challenge the present 'system' and encourage a new generation of bright young physicists to embrace this Scalar EM and thereby 'overturn the present Physics', YOU HAD BETTER EXPECT TO ANSWER

SOME QUESTIONS TO BACK UP YOUR ASSERTIONS when people call or write, asking for more detail..."

He told me once more to read his books again because he would not answer anyone's questions if (like mine) they were repetitions of an ILLOGICAL question to begin with.

There was no more to be gained by pressing this conversation. I said with a sigh, "Thank you for your help, Mr. Bearden" and hung up the phone.

Obviously, I won't be 'pestering' the honorable Mr. Tom Bearden with my silly phone calls again unless he decides to lower himself down to my humble intellectual level and -- in his great mercy -- throw me but a crumb from the table on which sits the bounteous feast of Beardenian Electromagnetics.

[1997 update: Bearden and I have corresponded a couple of times since 1996. He wrote a lengthy and gracious response to my second "ping" file ANDERSEN.ASC, in which I critiqued several of his concepts. That file went onto the KeelyNet and I guess Tom got a copy of it and finally realized that my motives were positive. He has been very good-spirited in his treatment of my "pings" since that time, and I state here-and-now that our phone conversation in 1993 should not be taken as an indicator of his attitude in general. Maybe he was having a bad day; maybe I was too aggressive over the phone. Whatever the case, I respect him highly and my position is one of honest inquirer. That being said, back to the 1993 file!]

I guess since I'm not a member of the Mensa Society as Bearden is, I can only be classified as lower than a "degenerate semiconductor". I suppose it's the slow "drift velocity" at which knowledge propagates through the electron gas in my cerebral cortex. And it keeps precessing sideways instead of sinking in.

Anyway, be it known both to Mr. Tom Bearden and to you, good reader, that I hold nothing against Bearden personally. The man definitely seems to be a genius in many ways even if his table manners could use some polishing up. **[StealthSkater note: The same could be said about Jack Sarfatti as well =>** doc pdf URL **]**

I believe he is on to something real and with big consequences for 21st Century Physics, once we take up his challenge to test his theories in the lab. Just don't call him up with any questions that tend to rock his boat or you may be branded "illogical". He is a rugged Pioneer; we 'young-uns' are going to have to be the ones who bring methodical, point-by-point analysis and proof to bear on this Scalar Electromagnetics.

Pioneers are lone trailblazers who have had to fight off the establishment for all of their pioneering careers. They've got to be committed to their cause -- even to the point of religious dogmatism. The upside of this is that lesser souls have a shining light to follow. The downside is that the pioneer creates a dogma that rivals the one he broke away from and made a career of criticizing. It's human nature, I guess.

It seems to me that even if Bearden (and, yes, Tesla also) is wrong on the mode of propagation -- if EM does have transverse components through the vacuum, and not solely longitudinal -- most of his other gripes with classical EM have the solid support of Quantum Physics behind them and show the classical EM model to be useful, yet quite <u>wrong</u> in many of its fundamentals.

In the meantime, I want to remind those of you who -- like me -- think that Bearden is mostly correct and that the scientific community needs to re-examine the foundations of Electromagnetics. This

"copping an attitude" bullshit as exhibited by Tom Bearden just won't wash with the real world. We need to come up with an electromagnetic theory that properly explains empirical observations, such as the phenomenon of wave polarization. As of this writing April 1993, the Transverse Wave model of Maxwell's Electromagnetics continues to be the best explanation of wave polarization. I was hoping to find out that Bearden's EM theory explains it better. Unfortunately, he refuses to discuss it at all. This is kid stuff and has no place in a respectable scientific theory. As long as honest inquirers keep getting rebuffed the way I did by Bearden, he cannot expect to be taken seriously by anyone.

Can anyone explain wave polarization via Tom Bearden's Scalar EM theory?

I welcome correspondence on this and related subjects. I also promise to treat you politely!

Aside from the many files by Tom Bearden available for download from the BBS's, his books are sold through:

> Tesla Book Company
> P.O. Box 121875
> Chula Vista, CA 91912

If you have comments or other information relating to such topics as this paper covers, please upload to KeelyNet or send to the Vangard Sciences address as listed on the first page. Thank you for your consideration, interest, and support.

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Jerry W. Decker.........Ron Barker...........Chuck Henderson
If we can be of service, you may contact
Jerry at (214) 324-8741 or Ron at (214) 242-9346

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P. [Bearden responds to Noring's questions re Sweet/Whittaker](#) (1992)

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