

January 2001 Vol I #5



NEWS letter letter letter letter

LIFESTYLES UNLIMITED
The Scientific Connection: Science, Philosophy, Religion, Metaphysics

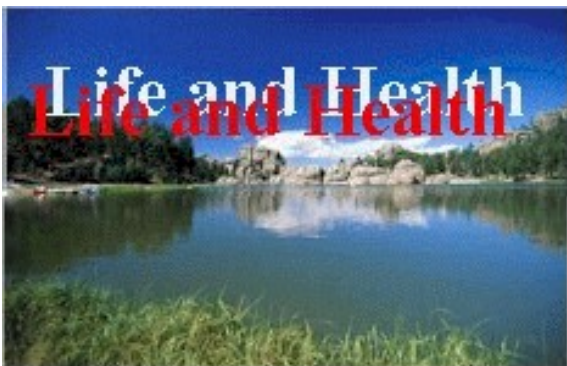
e editorial

a articles

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Will be moving: New email peterjocis@earthlink.net



A DeCatalyst IONS

and RelaxSpa Newsletter



DeCatalyst IONS → **Energy Evolution and Application**
 Internal & External Energy Relationships

DeCatalyst



WILL BE MOVING: NEW ADDRESS FUEL 2000 <http://www.fuel2000.net>



Editor's note: Lifestyles Unlimited newsmagazine enjoyed a brief foray as printed material in the early 90's. It is being revived Online because its roots coincide with the Pathfinding Project -exploring tangible evidence for a renewed Myth, Vision, **that can Sustain** Unlimited Lifestyles and fulfill THE ORIGINAL PROMISE that has always been: "**dominion, (caretaker) over all things, to have life and live it more abundantly**": -Lifestyles Unlimited *The Scientific Connection: Science, Philosophy, Religion, Metaphysics*

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Please bear in mind that this newsmagazine is an open forum for both the professional and nonprofessional. Lifestyles Unlimited welcomes your thoughts as well as challenges to our line of inquiry. As Anthony Robbins says, "we must walk our talk", so this newsmagazine's mission is to network a sufficient data base to validate research at appropriate universities.

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Coming

Expanding the Window.... cont.	ZPE and the Radius of Curvature
For the Kids - Understanding Magic....cont.	Science & Spirit cont.
Without Vision, Jean Houston's "Jump Time", can be Hazardous	Promoting Scientific Advancement WITH Enjoyment, Free Time and Prosperity for All

The Treasure Chest of Freedom

MAKE NO MISTAKE

LIFE LIBERTY HEALTH FREEDOM PROSPERITY SUSTAINABILITY

ARE UP FOR GRABS THROUGH THE DANGERS OF SUBLIME CORPORATE DICTATORSHIP

FROM THE PUBLISHER OF [THE POST CORPORATE WORLD](#) THERE IS A DEEP CHASM between the promises of the new capitalism and the reality of social breakdown, spiritual emptiness, and environmental destruction this economic system is leaving in its wake. In this important book, David Korten makes a compelling and well-documented case that capitalism is actually delivering a fatal blow not only to life but also to democracy and the market.

Visit the following links and confirm for yourself the almost bare and empty TREASURE CHEST OF FREEDOM



[Ralph Nader: Challenging abuses of Corporate Power](#) [Charles Derber: Power In The Highest Degree](#)

FOCUS ON THE CORPORATION

Study Power No More!



[The ALLIANCE for Democracy](#)

CORPORATE WATCH

THE WATCHDOG ON THE WEB



[OVERVIEW: Freedom is NOT FREE.](#)

Note: the above list and links do not even begin to address the environmental and ecological consequences threatening the quality of life, resulting from abuse of corporate power and continued use of fossil fuels. If not we, then who is responsible for the Major Events shaping our future, in a Democracy?

Freedom is earned. This simple principle used to be taught in civic lessons in grammar school. Freedom is not something to be taken for granted. The principles of freedom and democracy were a right that our founding fathers fought for and bestowed in our form of government and Constitution. To assume and take for granted, that these rights will always be there, or that our elected representatives have our interests in heart, is an anal retentive assumption to the Nth degree.

There is a principle in Nature, "Nature abhors a Vacuum", that aptly applies to civic responsibility. Over 50% of American people do not vote, while most of the other 50% are now left with only the freedom to pick between the few choices that big money puts on the big brother screen of media. That presents quite a vacuum in our freedom of choice in "how we shall be governed", as provided for in "of the people, by the people, for the people".

When there is a Vacuum in the majority of the people toward the principles of freedom, that vacuum will be filled. Filled and gladly taken from you, with mochas gracias thanks. Look around you. Review the above links. See the traffic nightmare your tax dollars are providing, for your transportation. See the percentage of your tax dollars going to develop clean energy, life threatening environmental cleanup, or far more importantly, developing the socioeconomic system changes necessary for sustainability and prosperity for all..... that percentage of the total budget is how much your life is worth with the looming threat of environmental and ecological disasters forthcoming.

See "Americans Working Together" from the glib phrase of the election debacle conclusion, that even had the supreme courts mystified and confused in the clear cut, ever changing to the highest bidder, uncommon sense Rules Of Law.

See "Americans Working Together"..... quick, there is a deadly winter cold and storm coming, jack up the heating prices triple, quadruple!

See "Americans Working Together"..... quick, there is a medicine that is in great need to save the lives of the elderly, quick jack up the prices, ten, one hundred times more than a dog pays for the same ingredients.

"Americans Working Together" and this holiday season, we have something new - the warm hearts of the Christmas Love, are donating in a Marathon Fundraiser, to feed the hungry this holiday season. These hungry are special. The donations go specifically to the people who work, but do not make enough money to buy food.

"Americans Working Together" ten years ago, I stated Mexico's "starvation wages" are coming to America. Well, they are here. And, we are so Christmassy thoughtful, we will let these working Americans eat one season out of the year. How Christianly Christ like.

Have we lost our marbles? Are we afraid to address the CAUSE?

Imagine if every employee in a job that did not support a living wage of both food and rent, including health insurance, quit? Would there be a business left in America?

Freedom is responsibility, won daily, and equates to survival. Ignorance is no excuse for irresponsibility to the Constitution, a decidedly Un-American Activity, and an outright slander to the great men and women who suffered and died to bring us democracy.....and last but not least, a shame, a disgrace, a death sentence not only upon our children and their future, but now also, our own near term future is threatened.

When we build, let us remember John Ruskin's words "let us think that we build forever. Let it not be for present delight nor present use alone. Let it be such work that our descendants will thank us for".

For you may never know, in a world of many undiscovered possibilities, who some of those descendants may be.

If our desire is to maintain and evolve a complex, healthy, prosperous, sustainable and free civilization, we must address three issues:

- **our outmoded energy base** posing an immediate threat to our environment and a sustainable future, with intensifying & epic ecological disasters looming; along with the secrecy surrounding clean, cheap, unlimited energy systems.
- **the illusion of freedom** - the reality: one dollar, one vote. The real threat to survival may well be the non-accountability & power syndrome of Corporations and Government, with a system failure (Constitutional) in "We the People, by the People" - comparatively, all else appears trivial, and may be "look yonder" over-hyped ploys.
- **Revisiting, Redesigning the Systems surrounding: Short term and Long Term Investment and Profitability Standards** - Dr. Bockris states it quite clearly:"..... the separation of science and engineering from economics, and then from politics and sociology, is not possible. The questions to which this gives rise are very wide indeed. The International Corporations are the essence and the bastions of capitalism. But they are geared to short-term considerations of profitability. Will it be possible for them to work to develop an energy economy with considerations fifteen, twenty five or fifty years ahead? Is it possible for a corporation to hold back the maximization of yearly profit so that it can exist healthily one to two generations ahead? Would any shareholder ever vote to reduce their income, or even to avoid it, for a future generation? Capital is invested in the present technology. Will

its owners bring obsolescence to that technology, and so devalue their capital for the sake of long term environmental considerations? What of the effect of these concepts on the likelihood of the funding of new bases to the energy economy which do not use the machinery in which the capital is invested? Is massive research funding of new energy sources in the U.S. economy, which is so accountable to, and so affected by, corporate thinking, conceivable?

If anyone has walked the Halls of Power, of a multinational Corporation and seen the complex matrix intertwined with Governments, the World Bank, Defense Complex, "legitimate" businesses of the Mafia, to the misty Trilateral Commission and Bilderbergers, you would understand it is not our "prayers" that are shaping how, and under what constrictions, we live.

It is also not our "prayers" that are shaping how, and under what constrictions the direction Science & Technology is being steered through funding at major Universities.

To never know, what is transpiring beneath the Halls of Top Secret, where we have no need to know.

Imagine, a free American, much more, a free Spirit of the Universe, has No Need To Know why he lives!

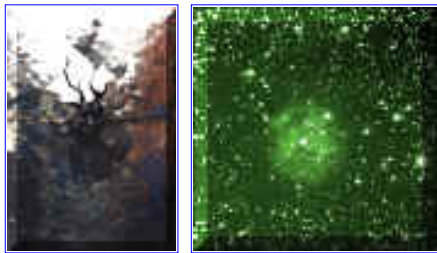
Except as a restricted, overtaxed, stuck-in-traffic, workaholic, and price gouged consumer, keeping tabs and eyes glued on the modern day Christian Lion scores of the sports Arenas.

A Government Of, By, And For The People.....Not Monied Interests, is a reminder for all the desperately seeking Susans, who are pretending all is well as things fall apart..... rather than standing up to the principles of freedom and democracy, health, abundance, leisure time, joy, happiness, prosperity and sustainability..... that once were our heritage; principles that the Rules of Law have eroded for the self serving interests of the elite.

A Government Of, By, And For The People.....Not Monied Interests

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Editorial **Butterfly's chances in a steel cocoon**



As I reflect back at my previous editorial (for the full version, see "Back Issues"), I come face to face with a term from Physics - Momentum.

....."Observing world events that consistently touch the sensitive nerve of our outdated energy base, I get the uncanny, yet secure feeling that Nature (Gaia hypothesis) somehow has an inbuilt tendency which implores us to expand our limits. Whether this survival slant is attained by "conscious choice" or by **default**, each with their unique consequences, appears not to deter in the least, the Gaia "system's" undeviating parameters propelling life forward toward evolutionary (sustainable and balanced) growth....."

That editorial was actually a reprint of the original LifeStyles Unlimited issue #2, written in early 1990, before the bombing of Iraq.

Well, it has been a trip, and a far cry from 'sustainable and balanced', these last ten years. No need to go into detail here, except to assure you, the Gaia "system's" undeviating parameters propelling life forward toward evolutionary growth is on course, with the **default mode** in full swing, at full throttle. For those curious, the default mode is not a growth process an intelligent being would choose voluntarily. However, each individual will determine that for

themselves, and there is sufficient evidence in the news science media, for a good 'heads up' stance.

Momentum. The larger the mass, the greater the energy required for course correction. Makes a person wonder, how much mass is in Microsoft, BP Petroleum, the U.S. Government, the World Bank to name just one tip of many huge icebergs? Not just in terms of centralized power and money, but in all the supporting peripherals - employees, consumers, subcontractors, taxpayers, buyers, government, etc. Top that with the fact that the 'mass/systems' are now creating their own laws for the last 40 years minimum, course corrections are even harder to come by. With the Media, Law, Government, even Science and University R&D direction, under Corporate influence, public outcry and media attention no longer has much of an effect.

Public outcry has been demolished. I note that even the more intelligent are bluffed by the mass media corporate campaigns of double speak and forked tongue. For 50 years, each new individual, group, or alliance, consulting corporations on ethics and spirituality, believe, like desperately seeking susans, that progress is being made, and they point to the COMMERCIAL. "I CARE FOR YOU, WORKING FOR YOU! ETCETERA. Not the Real World. In 50 years, there should have been some movement, change in momentum in a large mass. That is not the case. System structure, short term thinking, ME ONLY, does not permit course correction and change..

With the commercial PUSH toward reinforcing pre-kindergarten behavior EVERYWHERE, neither the adults nor the children, under constant bombardment and influence, will achieve the high spiritual breakthroughs required to change the current momentum and direction of modern Rome.

But there is a Route, a Way, that almost cannot fail. A way for the butterfly to transmute the hardened steel cocoon shackles, and Fly.

But there is a Route, a Way, that almost cannot fail. A way for the butterfly to transmute the hardened steel cocoon shackles, and Fly.

The evolution of our Energy Systems is the Key. The key, the link, that will bridge the spectrum from science to metaphysics, change the momentum direction, provide sustainability, and bring about common sense, self aware morals clearly linked both to healthy Survival and the underlying theme running through all religions.

There are always a few daredevils who believe in, using the common trendy contemporary term for change, in the 100th monkey syndrome. This newsletter is for us. Those who will not accept defeat against overwhelming odds. Those that will not accept a lower degree of freedom, that states change will only come through decline, degradation, destruction in the cyclical rise and fall of civilization.

*This newsletter is about alternatives to self imposed limits. It will describe where the major barriers lies and explore those barriers, until we break free: This newsletter will expose the misperception that lies in our "flat land" understanding of Space, Time, Mass, Matter, Energy, Gravity and their Relationship to each other along **The Radius of Curvature of Natural Law - a concept that will take each point of view to a viewing point, so that all can see the move from flatland, to round world, to human evolution, to movement from one point to another without going through all points in between** (as has been demonstrated in the quantum world of microland).*

Flatlanders, it is now time to move forward, the 'flat stage' no longer suffices, and the restrictions are now threatening our survival.

Hopefully, we will stimulate a revisit into the Myth of Creation, buried in the sands of time, with a scientific front free from the shackles of false foundation assumptions, **reinterpret the math that has always been correct**, and once again Soar as the Eagle, as our spirits are meant to do.

Many are already questioning the Science and Spiritual link and the countless facts that do not fit the mold of contemporary science. Of the more current, Michael Murphy's "Future of the Body" presents a good documentary. Maharaja Krishen Kaw, Education Secretary, Ministry of Human Resource Development, Government of India, stresses a link to science and spirituality. David Bohm, Brian Swimme, Roger Penrose, Alan Wolf, Dana Zohar,

Fritjof Capra, to name just a few questioning the odd results of Quantum Mechanics statistical accuracy and connection to measurement and the consciousness of the observer. Amit Goswami, Ph.D., professor of Physics, now with Noetic Science, also attempts to join science and consciousness in a revised order, although he does not proceed beyond a statistical interpretation.

Statistics are highly accurate, but they do not tell the whole story.

It is time to clear the overused, oversimplified, trendy, fashionable, misunderstood, quantum phrase, "we, our consciousness collapses the wave function and creates reality". The parameters missing from accepted quantum mechanics, both as a covering theory, and formal correspondence (see Expanding the Window 1), including a "radius of curvature of natural law inclusion, are giving rise to interpretations having no bounds to 'fantasy and uncommon sense'.

Yes, Consciousness does create Reality, but far more profoundly and beautifully than is characterized by a half baked statistical theory that works only statistically.

It is time to provide a handle and a viewing lens to our Science and Engineering that will allow us to break out of the steel cocoon, our self imposed limits of light speed and human dimension, and bring about vast, wonderful improvements in our lives. We should all experience the feeling that Deepak Chopra described with the words " there is no more beautiful experience than when the world expands beyond its accustomed limits. These are moments when reality takes on splendor".

A brief pictorial view shows evolution's march, the two major scientific criteria resulting from false assumptions with unfounded fundamental bases (light speed barrier, and gravitational disability); the stop signs to further progress in both human evolution, energy evolution (field propulsion), and the backward retreat to trivia clothed in the most sophisticated, tiny, technological marvels possible.



LEFT WITH GLORIFYING TRIVIA: MAKING DUE WITH WHAT LITTLE THERE IS FOR A GROWING NUMBER slower than a monkey in a swamp without trees on our superhighways; gasping for breath in pollution and spreading diseases worldwide; ethic standards based on # of dollars, ME winning is Everything; our highest offices and courts in the land can no longer determine what is real, what is true, what is law; kids killing for kicks with sticks; while adults work more for less and watch football; and all shop till they drop - steered by the most base, infantile, idiotic Commercials that fuel the primitive anal retentive emotions from pre-kindergarten; while a majority of the world lives in poverty and starvation, raped of their resources.

That last paragraph is not the way some of us want to go folks.

Let us continue with our exploration and discovery.

Please bear in mind that this newsmagazine is an open forum for both the professional and nonprofessional. Lifestyles Unlimited welcomes your thoughts as well as challenges to our line of inquiry. As Anthony Robbins says, "we must walk our talk", so this newsmagazine's mission is to network a sufficient data base to validate research at appropriate universities.

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Expanding the Window to Reality I

A Viewing Point of $E=MC^2$



Expanding the Window to Reality will be an ongoing column of thought provoking, unresolved issues remaining dormant in contemporary science's fragmented perspective of Reality. We intend to prove concisely where unfounded, unproven fundamental assumptions, along with the denial of the existence of numerous non-conforming hard evidence, is hindering progress towards the conclusion of the Unified Field Theory. We intend to show, that while biased, and skewed evidence may work well in some segmented micro or macro realities, common sense is lost, hidden variables scream foul, and theories from the resulting tangents of reality border on the absurd. To date, significant breakthroughs into energy evolution, overcoming the gravitational obstacle and the speed of light barrier, remain a far distant, imaginative fantasy, traversing faster than the speed of light away from common sense.

Perhaps we fail to take into account the reason why we have not advanced past this primitive propulsion concept may have something to do with a restricted viewing field

It is difficult to comprehend modern sophisticated scientists, still employing the 4000 year old Chinese rocket propulsion concept. Perhaps we fail to take into account the reason why we have not advanced past this primitive propulsion concept may have something to do with a restricted viewing field - i.e., when measuring the dimensions of your back yard, the curvature of the earth need not be taken into account; when measuring the physical dimensions a state, continent, or planet, the curvature of such body may have to be considered, depending upon the type of measurement to be taken.

On a larger scale, when we take measurements into the micro (nuclear) or macro (stars, galactic) from our position at the local, Newtonian, classical everyday world we live in, there definitely exists a radius of curvature

that must be considered after the mathematics are completed, to interpret the results. Otherwise, we remain 'flatlanders', still proclaiming the world is flat in the realms of quantum mechanics and relativity, with nary a common sense link to Consciousness and the Metaphysical portion of the spectrum.

Science and Metaphysics may be viewed as riding the same spectrum, one beginning at one end, the other commencing at the other end. It may be seen and understood with the Radius of Curvature concept, a viewing point akin to that which permitted a "flatlander perception move to three dimensions or a round world". Hopefully, we can at least begin to admit, our expanding viewing point did not stop at the 'round world' status.

We must, and will recognize, that while our contemporary mathematics describing the natural laws appear to be linear - linear in the micro (quantum) realm, linear in the macro (relativity) realm, linear in the classical Newtonian sense of the everyday, here and now, the three sets of laws are connected on a spectrum by a radius of curvature that follows a sine wave nature of positive and negative curves. Only when the factors of space, time, mass, energy, gravity and their interdependent relationships are viewed in their energy differential equivalents will we begin to see the hidden variables and new possibilities. That will also require a new perspective of time and space.

We welcome the reader's ideas. Our prime objective will be to accelerate a conceptual understanding of the nature of the radius of curvature of natural law from the micro world, through to the macro world. We will take flatlanders towards a less restricted dimensional view of reality, which will provide far greater degrees of freedom of both movement and expression. The implications for the advancement of science toward a sustainable, abundant, healthy and prosperous world order will be immeasurable.

The major precepts will be:

- **TO STIMULATE AND EXPEDITE:** A major Transformation of our concepts of Space, Time, Mass/Matter, Energy, Gravity and Altered States of Consciousness; a perceptual enlargement as crucial and profound as our historical heritage counterpart -the perceptual move from a flat world limitation to a round world horizon of our past.
- **TO RECOGNIZE:** that this perceptual move from a point of view to a viewing point is 'continuous'. Once reached, the viewing point itself becomes a point of view and the evolutionary process continues. It is a time of a new metamorphosis; A time of stepping out of another cocoon; A time for all of us, in our striving for elegance in excellence, to help each other come out of Plato's Allegorical Cave of shadows.
- **TO IDENTIFY THE MULTI-DIMENSIONAL PERCEPTUAL DUALISM paradoxes:** in almost every field of endeavor which result in the inability to see 'both', as the analogy goes "the forest and the trees", or multi-dimensionally "the one and the many", (where One is both individuality and universal wholeness, unity, simultaneously).....example: from physics - the principle of complimentarity/uncertainty "light is either a particle or a wave...." the underlying issue of illusion may be better grasped through the concept "it is either a forest or a tree, it can never be both, it depends upon the observer's way of looking at it through the curvature of natural law" (i.e. 'positional/perceptual' point of view referencing Space/Time/Energy/Mass/Gravitational differentials).
- **TO DETERMINE:** the radius of curvature of natural law that 'binds the complete and total interdependence' of mass/matter, energy, space, time, and gravity differentials (a viewing point of $E=MC^2$). And humbly concede that previous civilizations were familiar with the sine wave characteristics of natural law through the symbol passed down to us from them: the circle with the sine wave passing through its center. The circle, being without beginning or end, symbolizing the infinite nature of the Universe itself and the sine wave passing through it symbolizing the curved but finite nature of the laws which operate within the infinite whole.
- **TO UNDERSTAND THE ROLE:** perception and the radius of curvature of natural law plays when dealing with the macro and micro universe at degrees where $E=MC^2$ begins to affect our observation, our

measurement, and our reference points. 'We cannot begin to see or measure faster than light energy differentials except in redefined terms'.

- **TO GRADUALLY come to understand:** how consciousness, gravitational mass, and frequency interact as theorized by some quantum models.
- **TO GRASP the "simultaneity of events"** factor through the radius of curvature of natural law, the pivotal point about which the natural laws become manifest, so as to move from a unidimensional concept of time to a concept of time which includes more than one dimension mathematically (without the preposterous assumption that one can physically move backwards or forwards in time).
- **TO TEST THE PREMISE:** Our ordinary physical laws do not hold true when carried to an extent which permits the error to be measured, because they do not follow a straight line to infinity, but a curve of finite radii. In a timeless universe, this curve would be represented by a circle, but since the laws operate through time as well as space, the curve is more readily understood if depicted as a "sine wave". In this case the base line of the wave represents zero, and the portions above and below the line represent the positive and negative aspects of the law. Thus we see that there are points and conditions in which the natural laws reach zero value with respect to a given reference point, and that beyond these points the laws become negative, reversing their effect with respect to the observer.
- **THE PIVOTAL POINT: IS THE RADIUS OF CURVATURE** of natural law, represented on the sine wave by a constant, an energy differential equal to the quantity C (velocity of light), a pivotal point? Not only of the Wave/Particle - Inertial Mass/Mass - Matter/Energy Duality, but also exhibiting negative gravitation at precise energy differential relationships that exceed VC between two reference points? Can this energy differential exist other than as a rate of increase/decrease in the spatial separation (velocity)? May it also exist as a frequency by the mathematical rule $E=Fh$, where F becomes the constant 9×10^{20} ergs/gram? 'How may this be tested to demonstrate the reverse effect of a natural law with respect to the observer (specifically of gravity)'?
- **TO EXPLORE THE CONCEPTS:**
 - **The "Limitations of Relativity":** The "limitations of relativity" will always precede us at a distance equal to the radius of curvature of natural law. We need not fear that we will ever overtake or be hampered in any way by those limitations, since our 'reference point' (of a true coordinate system) will always go along with us. The value of the gravitational field at any given point is controlled by the values of the other factors of nature at that point.
 - **Modulating the Gravitational Curve:** The electric charges within the atom are a factor which modulates the shape of the gravitational curve of the nucleus.
 - **Magnetic and Electronic Resonance:** Any magnetic field which is changing in intensity, will create an electric field, which, at any given instant is equal in amplitude, opposite in sign, and perpendicular to the magnetic field. If the two fields become mutually resonant, a vector force will be generated. The effect is similar to, and in fact identical with a gravitational field.
 - **Frank Znidarsic** <http://members.aol.com/fznidarsic/index.html> **Force and Gravity** - a symmetry exists between force and gravity – as a changing magnetic field induces an electric field, a changing momentum (a force) induces a gravitational field – unbalanced forces localize the zero point energy of matter .(vol 4, Issue 22 – 1998 Infinite Energy)
 - **What Factors this Division Point of Nuclear Radiation/Absorption in Fusion?** The fusion of nuclear particles may occur in a number of ways, but in every case where the resultant nucleus has a mass smaller than the mass of the atom of silver, large quantities of heat will be released as a result of the combination. When the mass of the resultant nucleus is greater than the mass of an atom of silver, a large quantity of energy is absorbed rather than radiated.
 - **Neutron Formation by Electron Penetration of the Nucleus:** Dr Thomas E. Phipps, Jr. (IE vol 5 issue 26 1999) "Generalization of Quantum Mechanics via a "Covering Theory":

parameters are missing from accepted quantum mechanics that are present in the corresponding classical theory. (parameters which in classical theory allow description not only of classes of motion –general, but also specific ones.) Formal Correspondence: as we proceed downward on the scale of physical size, considering first stars and planets, next billiard balls, then grains of sand, etc., there exists no abrupt physical discontinuity, no particular place or boundary at which one can say: on this side this set of descriptive equations applies, and on the other side that other set applies. Nature builds smoothly; she does not erect discontinuous walls in the midst of her machinations. Clearly, Phipps, in this article notes the problem of scale invariance, and ‘point-like’ localizations which can readily be seen as the ‘zero point’ on the sine wave of the Radius of Curvature of Natural Law. (ESJ – Hertz’ equations of electrodynamics issue 22 1997)

- **A Testable Unification of Electrodynamics, General Relativity, and Quantum Mechanics** – Whittaker’s 1903 paper – in short, shows how to turn electromagnetics into gravitational potential. Unknowingly, Whittaker has already shown the correct engineering way to unify EM and G fields, and already falsified one of Einstein’s later primary GR assumptions – that the local space-time is never curved. USPA journal #6 1993
- **Master Principle of EM Overunity:** T. E. Beardon: (and Japanese Overunity Engines). Overunity system operation via work free **asymmetrical** regauging has been inherent in the Heaveside/Maxwell equations for a century, but just conveniently and arbitrarily assumed away by limiting the theory to **NET Symmetrical** regauging. Regauging by means of scalar potentials only, changes the local energy of a system and its local reference point to a new reference point, refueling itself from the vacuum potential. **Note equivalency to Radius of Curvature example by changing your reference point to the same higher energy value.** *Electromagnetic scalar potentials and gravitational potentials: Suppose the potential is multivalued (all space, time, mass, matter, energy are varying degrees of energy differentials) from point D to A – a strange phenomena occurs When the system has reached point D in its cycle of operation from point A, the potential value itself at D suddenly is altered and regauged back to its original value at point A.* Poynting and Heaveside developed the energy-flow theory in EM in parallel, after Maxwell was dead. Modern power engineers do not track the energy flow in an electrical circuit, only the power and work flow... i.e., a river may have a static depth magnitude corresponding to any given point on its surface, or a static pressure magnitude at any interior point of the river – but no one would say the river is static.
- **Elio Conte – Biquaternion Quantum Mechanics** – the sets of axioms of Minkowski space-time, of Maxwell’s equations, of electromagnetic fields were erroneously considered to be mutually independent; instead, they are manifestations of a single entity based on the set of axioms of biquaternions. (profound differences between Hadronic mechanics and BQM)
- **The Speed of Gravity – faster than light?** Meta Research Bulletin <http://www.metaresearch.org> **Dr. Tom Van Flandern** tvf@mind-spring.com Astrodynamics and Celestial Mechanics – formerly with the U.S. Naval Observatory The Speed of Gravity – faster than light? LR or SR, principal difference is equivalence of all inertial frames in SR, and the existence of a preferred frame in LR (special/Lorentzian relativity) Apeiron <http://www.redshift.vi.com> Galilean Electrodynamics <http://www.msx2.phajhu.edu~dring/gehtmls/gehome.html> **Deuterium-based radiationless cold fusion** – band state atom systems are similar to Bose-Einstein condensate systems – standing wave, periodic order dominates – no high energy fragments, no radiation, no neutrons: **Dr. Scott Chubb** chubb@cff.nrl.navy.mil and **Dr. Talbot Chubb** tchubb@aol.com
- **Dr. Ruggero Maria Santilli – The Institute for Basic Research – Palm Harbor, FL** ibr@gte.net <http://home1.gte.net/ibr> new address <http://www.i-b-r.org/> Hadronic Mechanics consistent completion of QM precisely along the historical E-P-R argument – detailed inconsistencies of QM GR SR, gravitation, chemistry, superconductivity, particle physics (Einstein,. Podolsky and Rosen) “*the suppression of the approximate character of quantum mechanics and related basic symmetries in nuclear physics by the academic establishment implies the suppression of new energies, new forms of recycling nuclear wastes, etc constituting ‘damage against society’ a crime, including deception under public funding – a violation of the U.S. Criminal Code of Law. (vol 4, Issue 22 – 1998 IE)*

These are some of the ideas being cast out for discussion and exploration. There are many more unanswered constructs which will be brought forth in future issues. While we generally recognize the mathematical concepts arising from String Theory, the Theory of Everything, and Subquantum Kinetics appear to approach the now famous "elusive" Unified Field Theory of Einstein, there seem to be significant perceptual blocks to their interpretation.

Interestingly enough, this may simply be linked to our sense of sight and our inability to "see" that, which by definition, cannot be seen i.e., velocities faster than light. The interpretation that mass approaches infinity as velocity approaches that of light, may simply be the measure of the kinetic energy differential between the observer and the point he is observing.

The interpretation that mass approaches infinity as velocity approaches that of light, may simply be the measure of the kinetic energy differential between the observer and the point he is observing.

In the light of state of the art advances in particle physics, it may prove quite rewarding to rethink the fundamental roles played by four of the primary factors of the universe: Gravity, Space, Time, and Energy. That these four factors may not be absolute and independent entities, but rather variable factors, each having a value which depended upon the value of the others, could lead to a re-examination of the Special and General Theory of Relativity.

Crucial to this re-examination may be the identification of the variance of these four factors simultaneously on two levels one - measurement differentiation at the microcosmic to the macrocosmic scale two - at significantly different energy levels, velocities or acceleration (approaching and exceeding the velocity of light or quantity C). In addition, we may reconsider the forward with which Einstein prefaced his mathematics: that none of the basic factors of nature have any reality or significance except when considered from a specified position or condition.

Ultimately, this investigation should extract the true nature of the universal constant, the quantity C, as the radius of curvature of natural law with sine-wave characteristics. This may identify the quantity C as the kinetic energy equivalent of the mass energy of matter, an energy equivalency which may exist both as a velocity and a frequency.

The relationship between two given reference points should then become clear: that the velocity of light is an absolute limiting factor only between two preconditioned reference points, and that this limit pertains solely to the perceptual (visual) measurement capacity between a reference point in matter and a reference point in energy.

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Conservation Mania and the Brain Drain



beating the brain drain

Tremendous advances in science and individual excellence surpassing the average imagination has become an accepted norm today. The 21st century is, in many ways, a marvel to behold. At the other end of the spectrum, the statistical count of human lack, suffering and misery far surpasses the marvels.

What is going on?

Today, ABC News still reports 'U.S. Students are Mediocre on World Scale'. Statistically speaking, using a rough estimate of only United States educational norms of a 40% - 60% dropout rate, with the remaining students completing high school, 66% at the bottom quartile grade level achievement, it would behoove us to request an assessment and damage report. We already note studies correlating lack and poverty to inadequate educational levels, regardless if the cause is lack of incentive or inadequate, outdated "boring, everything has been discovered" teaching methods.

Add to this the exploitation of many third world Human resources, a modern slavery, unpaid, workforce (the crumbs paid do NOT provide food, shelter, health, education), and we may well prove where the IDIOT belief *originated* from, that "there is not enough to go around". (See Nader, preservation of the Power Structure)

In the light of, and amidst modern day behavioral, scientific, and technological advances, including the nuclear physics law of matter/energy conservation unlimited, maybe we should take another look as to the why, as to the causal twofold factors still perpetuating this prehistoric, out-dated belief, that there is not enough to go around.

An expanding viewing point may allow us to perceive and connect the biblical promise of abundance to the scientific wonder of life and its purpose and meaning, in an exalted, living, responding, evolving, and unlimited universe.

An expanding viewing point may allow us to deposit kings and queens of compulsive, meaningless, trivia addiction and human misery into perspective. It may permit us to unmask the source of the brain drain, and low self-esteem with its resultant enormous psychological consequences and economic deprivation worldwide. An expanding viewing point may help us connect the state of infancy to the state of mature adulthood; a backyard perspective to a universal perspective; the degree of freedom and democracy to the degree of personal and social responsibility, contribution and empowerment exhibited 'enmass' towards a sustainable world order.

It would be sad indeed, to eventually conserve ourselves out of life because of a brain drain.

We may eventually have to filter out the unrelated trivia attached to the expressed definition of conservation, and discriminate between waste, slothfulness, recycling, effort, creativity, innovation, and the ridiculous attempt to conserve the unlimited.

This would require greater incentives and value placed upon teachers, scientists, and pure research, than on a person who plays with a ball.

This would require greater incentives and value placed upon teachers, scientists, and pure research, than a person who plays with a ball. It would be sad indeed, to eventually conserve ourselves out of life because of a brain drain.

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Limited Points of View.... The Razors Edge & the Wild Swing of the Pendulum



Approval ratings 100%: "**The Economy is Great**", **preWW2 German people said**".

Freedom WITHOUT Choice: Cowboys and Indians, Kindergarten Bullies on an UnUnited, United Nation Scale: Economic Sanctions, [NAFTA](#), etc., & Untold Millions Dead by Starvation, Ongoing.

Neither of the above scenarios would appear to be an intelligent, sane, common sense, voluntary choice at the individual level, were outcomes, intervention and prevention strategies known beforehand.

The economy was great in Germany under Hitler. That statement left a lot unsaid, unseen, limited, narrow, tunnel vision point of view - the consequences, devastating.

Using United Nations statistics, what is being left unsaid today in 'the economy is great, let's play ball! (movies, shop, party, play trivia)'"

Undeniably, countless variables filter our screen of perception to create our beliefs, drives, feelings, motives, not the least of which are Maslow's Survival Needs. But Science and Technology has far surpassed the capacity where 'survival needs' need be an issue anywhere in the world. Yet the 'survival needs' issue looms larger than ever, worldwide. Basic elementary education, covering local and global perspectives, revealing 'I and community' *survival* requirement values, have not only been lost, but are denied existence.

So how do points of view relate to, and eventually express individual and collective Reality, in the spectrum between the 'razor's edge path', to the periodic swing of the pendulum, to a pendulum gone 'wild', 'chaos'?

A brief review of the razor's edge path and the pendulum swing follows:

Historically, the Razor's Edge Path referred to an individual's religious, spiritual or metaphysical path to 'enlightenment', following in the footsteps of religious/mystic masters. Sharp and narrow and straight was the way, the razor's edge path, distinguished by the *ease of flow* of high energy, focus, balance required to attain lofty ideals and goals. (see 'The Possible Human' previous issue)

The Pendulum demonstrates basic characteristics like harmonic oscillation and resonance, but also exhibits parametric resonance, nonlinear dynamics, and chaos. We make special note that the pendulum displays periodic *and chaotic behavior* depending on the values of the forcing and damping parameters. Transition to chaos can be observed by applying small increments to the forcing amplitude. This applet simulates the behavior of a damped sinusoidally driven pendulum. <http://www.gre.ac.uk/~fi437/java/pendulum/pendulum.html>

History and hindsight have given us Nazi Germany, Rome (Nero, Caligula), Sodom and Gomorra the historical rise and fall of civilizations. A DePaul University course provides an excellent archeological account, a story of a people, in "Reading the Old Testament". It presents the physical level (of a tri-level meaning) chronicle of a people, any people, concluding: "...when the people gave up their responsibility to the kings, they suffered the errors of the kings. They lost their Kings, their Temples, their land, their lives.

History exams still ask: "Discuss the overall concept of the rise and fall of civilizations. Are there visible seeds of destruction? Do civilizations have to collapse? What indicates a strong civilization? Compare and contrast the civilizations of the Ancient Near East, Egypt, Greece, Rome, Orient and India.

So how do Systems run away with our freedom, and limit, take away our choices? Are we doomed to the consequences of the 'rise and fall', or do we, together, as a bell curve behavior output, have volition and free will to at least go past survival needs? Knowing that we have all the education, resources, technology, hardware, software, unlimited energy available, to fulfill the promise and allow a world that works for all?

Let's look at the Pendulum and the Razor's Edge in the individual and collective mode, and their interaction. Perhaps, we shall see useful 'handles', 'rudders' we can apply to shape the bell curve of reality more to our liking, and regain our freedom by **consciously** controlling our systems.

Collective behavior outcomes produce the bell curve of the reality we experience. They are a statistical composite, resultant, of individual creative choices and behavior, and can be readily measured. Derived from the Flux of the Pendulum Swing between Conscious Choice and Unconscious Choice, individual choices, actions, behavior are shaped, created, and spontaneously arise in the Energy Stream of Conscious Consensus Reality.

There is more to Conscious Choice and Unconscious Choice, than meets the eye. Here the metaphysical, Razor's Edge balancing act comes into play in all its wondrous complexity. Stabilizing Criteria implicate both the single and collective mode of the observer and the observed - degrees of conscious awareness; degrees of unconscious awareness, as in lack of awareness/ignorance; degrees of Supra/Collective unconscious awareness; and degrees of self-esteem reality filters, covering the full range of psychological social behavior and learning parameters.

"So careful of the type it seems, So careless of the single life", a maxim rises from esoteric realms. Intelligence works by the law of averages which provide a wide margin of accident and failure to the individual. The progress toward higher intelligence is always in the direction of narrowing down this margin of accident and taking the individual more and more out of the law of averages, and substituting the law of individual selection, survival of the fittest. It may, therefore be taken as an established fact that in proportion as intelligence advances the individual ceases to be subject to a mere law of averages and has a continually increasing power of controlling the conditions of his own survival.

Interesting. Natural evolution provided the required conditions to permit 'type', 'collective species' survival. Evolving intelligence permitted Volition, Free Will, to do the same in evolving species unfettered by instinct and unconscious 'forces', 'Intelligence', that created order out of primordial matter and chaos.

What is the human species constantly losing, as their systems grow more complex, and result in the "Rise and Fall" error cycle?

The incredible and awesome discovery, is that even contemporary Psychology has the answer. The same one found throughout the world in common religious, philosophical, and metaphysical themes. The maturation criteria of both individuals and social systems. An evolving awareness of the One and the Many, I and Community that lead to an understanding of both human and energy evolution requirements for survival.

Collective humanity is somewhat distant from the razor's edge path. This is clearly observed in the Chicago Sun Times front page, 1/6/00, heading "ME FIRST CRUSADE SNARES 1ST DRIVER. Apparently we are needing more and more laws to get us out of the Narcissistic cesspool of Me first, Me only, Me Generation. Common sense no longer prevails. The connection, between the one and the many required for survival is lost. FOUR CHICAGO FIREMEN, IN A TWO MONTH PERIOD ARE DEAD BECAUSE OF ME ONLY. And some of us are naive enough to believe the System is improving because the laws tell us what to do, not common sense or intelligence.

Hence, the Pendulum swing, which through repetition and increased momentum and mass, manages to swing to the wild side, the rise and fall of civilizations.

Clearly recognized and identified by Nader, Korten, Derber and others (see Treasure Chest links above), this wild swing can be tamed. It requires a review and a viewing point assessment of the variables involved, their validity and reliability, past performance, as well as new and intervening criteria necessary for future performance.

The following reviews some of the criteria, as well as some of the principles our founding fathers had in mind for this great nation.

An Undeniable fact:

We will not be capable of changing the system structure and momentum back to Sanity, without the simultaneous energy evolution required for survival, and link to human evolution. Energy capacity must meet growing System complexity ([Prigogine](#))- fossil fuels are inadequate.

This is also addressed to the increasing number of those who smugly believe they are either spiritually superior, waiting for the 'old' civilization to collapse, and new a order to replace it, or the diehards, quackery critics, going down with the ship, (or the down with the "ole buggy whip" manufacturer that failed to recognize he was in the transportation business) .

If you are not getting it now, you won't get it then - and will start all over, repeating History!

A Citizen Agenda to Tame Corporate Power, Reclaim Citizen Sovereignty, and Restore Economic Sanity The following is based on David C. Korten, *When Corporations Rule the World* (Kumarian Press and Berrett-Koehler Publishers, 1995)

Policies advocated by free market or [corporate libertarian](#) ideologues have led to the creation of [an economic system out of control](#). So what can we do? Needless to say, it hasn't been easy to create an economic system able to produce 358 billionaires while keeping another 1.3 billion people living in absolute deprivation. It took long and dedicated effort by legions of economists, lawyers, and politicians on the payrolls of monied interests to design and implement such a system. It required a radical altering of the dominant culture and the restructuring of many important institutions. It will take a similarly committed effort on the part of civil society to design and put in place an economic system supportive of economic justice and environmental sustainability.

To reclaim our economic spaces, we must first reclaim our political spaces from the corporations and other big money interests that control them. This will require far more than incremental or marginal changes.

Shifting Power to the Citizen: "Significant, enduring change will require an institutionalized shift of power from corporations and government to ordinary Americans. While politicians have now made an art of populist symbolism, virtually none have a serious agenda to strengthen Americans in their key roles as voters, taxpayers, consumers, workers, and shareholders."

Reinventing Democracy: "Reinventing democracy requires that we create new tools of empowerment: new mechanisms of civic communication, political organization, government assistance, and legal rights that can advance the distinct interests of citizens, taxpayers, consumers, workers and shareholders."

These structural and procedural reforms will help to foster a new "fifth estate" of individual Americans, capable of acting independently from entrenched institutional—that is, chiefly corporate and governmental—power."

The Need for an Informed and Mobilized Citizenry

"Only an informed and mobilized citizenry can counteract the entrenched interests that create, shield, and rationalize corporate welfare programs."

If there is no organized and focused public outrage, legislative efforts will yield minimal success as compared to the overall scale of the corporate welfare budget."

Democracy Requires Public Participation

"The Roman orator Cicero said that 'freedom is participation in power.' A genuine democracy has to provide for the participation of the public in decisions relating to technology whose use is so fraught with tragedy to millions of people."

The basic approach here is that the political system has been hijacked by corporate power and the people are left

without a countervailing force against what Jefferson called the excesses of moneyed interests. And when you have that kind of unified concentration of power and wealth, what might be called the corporate government, the policies favor the few over the many.

Let us conclude with a review of a few historical events that led to the formation of the United States of America and the Principles of democracy.

IN CONGRESS, July 4, 1776.

The unanimous Declaration of the thirteen united States of America,

When in the Course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.--That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed, --That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their future security.--Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States.

The Virginia Declaration of Rights

Note: Virginia's Declaration of Rights was drawn upon by *Thomas Jefferson* for the opening paragraphs of the Declaration of Independence. It was widely copied by the other colonies and *became the basis of the Bill of Rights*. Written by George Mason, it was adopted by the Virginia Constitutional Convention on June 12, 1776.

A DECLARATION OF RIGHTS made by the representatives of the good people of Virginia, assembled in full and free convention which rights do pertain to them and their posterity, as the basis and foundation of government .

Section 1. That all men are by nature equally free and independent and have certain inherent rights, of which, when they enter into a state of society, they cannot, by any compact, deprive or divest their posterity; namely, the enjoyment of life and liberty, with the means of acquiring and possessing property, and pursuing and obtaining happiness and safety.

Section 2. That all power is vested in, and consequently derived from, the people; that magistrates are their trustees and servants and at all times amenable to them.

Section 3. That government is, or ought to be, instituted for the common benefit, protection, and security of the people, nation, or community; of all the various modes and forms of government, that is best which is capable of producing the greatest degree of happiness and safety and is most effectually secured against the danger of maladministration. And that, when any government shall be found inadequate or contrary to these purposes, a majority of the community has an indubitable, inalienable, and indefeasible right to reform, alter, or abolish it, in such manner as shall be judged most conducive to the public weal.

Section 4. That no man, or set of men, is entitled to exclusive or separate emoluments or privileges from the community, but in consideration of public services; which, nor being descendible, neither ought the offices of magistrate, legislator, or judge to be hereditary.

Section 5. That the legislative and executive powers of the state should be separate and distinct from the judiciary; and that the members of the two first may be restrained from oppression, by feeling and participating the burdens of the people, they should, at fixed periods, be reduced to a private station, return into that body from which they were originally taken, and the vacancies be supplied by frequent, certain, and regular elections, in which all, or any part, of the former members, to be again eligible, or ineligible, as the laws shall direct.

Section 6. That elections of members to serve as representatives of the people, in assembly ought to be free; and that all men, having sufficient evidence of permanent common interest with, and attachment to, the community, have the right of suffrage and cannot be taxed or deprived of their property for public uses without their own consent or that of their representatives so elected, nor bound by any law to which they have not, in like manner, assembled for the public good.

Section 7. That all power of suspending laws, or the execution of laws, by any authority, without consent of the representatives of the people, is injurious to their rights and ought not to be exercised.

Section 8. That in all capital or criminal prosecutions a man has a right to demand the cause and nature of his accusation, to be confronted with the accusers and witnesses, to call for evidence in his favor, and to a speedy trial by an impartial jury of twelve men of his vicinage, without whose unanimous consent he cannot be found guilty; nor can he be compelled to give evidence against himself; that no man be deprived of his liberty except by the law of the land or the judgment of his peers.

Section 9. That excessive bail ought not to be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

Section 10. That general warrants, whereby an officer or messenger may be commanded to search suspected places without evidence of a fact committed, or to seize any person or persons not named, or whose offense is not particularly described and supported by evidence, are grievous and oppressive and ought not to be granted.

Section 11. That in controversies respecting property, and in suits between man and man, the ancient trial by jury is preferable to any other and ought to be held sacred.

Section 12. That the freedom of the press is one of the great bulwarks of liberty, and can never be restrained but by despotic governments.

Section 13. That a well-regulated militia, composed of the body of the people, trained to arms, is the proper, natural, and safe defense of a free state; that standing armies, in time of peace, should be avoided as dangerous to liberty; and that in all cases the military should be under strict subordination

to, and governed by, the civil power.

Section 14. That the people have a right to uniform government; and, therefore, that no government separate from or independent of the government of Virginia ought to be erected or established within the limits thereof.

Section 15. That no free government, or the blessings of liberty, can be preserved to any people but by a firm adherence to justice, moderation, temperance, frugality, and virtue and by frequent recurrence to fundamental principles.

Section 16. That religion, or the duty which we owe to our Creator, and the manner of discharging it, can be directed only by reason and conviction, not by force or violence; and therefore all men are equally entitled to the free exercise of religion, according to the dictates of conscience; and that it is the mutual duty of all to practice Christian forbearance, love, and charity toward each other.

COMMON SENSE by Thomas Paine

I draw my idea of the form of government from a principle in nature, which no art can overturn, viz., that the more simple any thing is, the less liable it is to be disordered, and the easier repaired when disordered; and with this maxim in view, I offer a few remarks on the so much boasted constitution of England. That it was noble for the dark and slavish times in which it was erected is granted. When the world was overrun with tyranny the least therefrom was a glorious rescue. But that it is imperfect, subject to convulsions, and incapable of producing what it seems to promise, is easily demonstrated.

Absolute governments (though the disgrace of human nature) have this advantage with them, that they are simple; if the people suffer, they know the head from which their suffering springs, know likewise the remedy, and are not bewildered by a variety of causes and cures. But the constitution of England is so exceedingly complex, that the nation may suffer for years together without being able to discover in which part the fault lies, some will say in one and some in another, and every political physician will advise a different medicine.

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Expanding The Window to Reality II Dice, Schrodinger's Cat, Insurance Statistics & Common Sense

"...One extreme is the idea of an objective world, pursuing its regular course in space and time, independently of any kind of observing subject; this has been the guiding image from modern science. At the other extreme is the idea of a subject, mystically experiencing the unity of the world and no longer confronted by an object or by any objective world; this has been the guiding image of Asian mysticism. Our thinking moves somewhere in the middle, between these two limiting conceptions; we should maintain the tension resulting from these opposites."

Werner Heisenberg *Across the Frontier*

follow the Radius of Curvature



AT RELATIVISTIC SCALES TIME AND MASS CHANGES ARE NOTED BUT MISINTERPRETED

While the quantity C (velocity of light) represents an energy differential, it is usually considered in terms of kinetic energy. Some may believe that it can be reached only when there is a rate of increase or decrease in the degree of spatial separation between the reference points, equal to 3×10^{10} centimeters per second, or in simpler terms, a velocity equal to that of light. It is necessary therefore to point out the fact that an energy differential does not necessarily manifest itself as a velocity. It can also exist as a frequency. Our present laws of physics state that the energy level upon which an electron, a photon, or other particle exists is proportionate to its frequency. The mathematical rule is E equals Fh , where E is the energy, F is the frequency and h is a factor called Planck's constant.

We can now see that a frequency differential which by the above formula is equal to 9×10^{20} ergs per gram also represents the quantity C . When such a frequency differential exists between the observer and the point which he is observing, we again find that the natural laws at the observed point reach zero value with respect to the observer. If the frequency differential exceeds this value, the action of the laws will become negative. A material object such as a spacecraft upon or near the surface of the earth would cease to exist as matter and would enter the plane of energy insofar as the observer on earth was concerned, but as we have previously pointed out, an observer upon or within the object, whose frequency or energy level had been raised to the same degree as that of the craft, would be unable to detect any change.

The concept of the "radius of curvature" was introduced in the first issue of this newsmagazine, (reprinted above - Expanding the Window #1). This and future issues, in related articles, will continue to detail and expand upon the book beginning online at **StarSteps** <http://www.idt.net/~mgi19/starsteps.htm>. WILL BE MOVING: NEW ADDRESS **FUEL 2000** <http://www.fuel2000.net> Here we will begin to contrast current ideas of Quantum Mechanics and the Theory of Relativity to the radius of curvature viewing point. We are certain, that as this multidimensional perception develops and spreads with the readers' help and contributing views, a revised and simplified mathematical base will result and astound us with its practical applicability.

Let us take an elementary stroll around and through relativity and quantum theories, and assess from a distance, a viewing point, our data. We will carry with us the possibility that "the difficulty with our present mathematical approach to the inconsistencies between relativity and quantum mechanics lie not in any error of the mathematics themselves, but in the fact that the methods and terms used in the attempt to explain them, often lead to incorrect thinking and assumptions". We will do this because somewhere deep within all of us lies the certainty that common sense and reason are not opposed to, nor alienated from our own nature, or the nature of the manifest Universe.

We inevitably must and will, begin to question the sometimes preposterous and absurdly complex models of reality that the two partial theories, quantum and relativity, are having us conjecture.

With this in mind, and in light of the postulated "radius of curvature of natural law" and the utter simplicity it brings to bear upon our concepts of space, time, mass, matter, energy and gravity, we inevitably must and will, begin to question the sometimes preposterous and absurdly complex models of reality that the two partial theories, quantum and relativity, are having us conjecture.

The general notion of relativity theory, writes Dana Zohar (1990), is that "it is the physics of high velocities and very great distances which plays itself out on a cosmological scale with virtually no application in our everyday, earthbound world. Quantum physics is different. Being the physics of that tiny micro world within the atom, it describes the inner workings of everything we see and, at least physically are."

Steven Hawkins (1988) writes, "scientists describe the universe in terms of partial theories, namely two basic theories, the general theory of relativity and quantum mechanics. The general theory of relativity describes the force of gravity and the large scale structure of the universe in scales from a few miles to a million, million, million, million miles (the size of the observable universe). Quantum mechanics deals with phenomena on extremely small scales such as a millionth of a millionth of an inch. The two theories are known to be inconsistent with each other, they cannot both be correct. However, the partial theories are sufficient to make accurate predictions in all but the most extreme situations. The search for the ultimate, unified theory seems difficult to justify on practical grounds except to satisfy our craving for understanding."

Steven Hawkins - the belief that we know almost everything are errors of enormous magnitude that carry far reaching and devastating future consequences. Future historians would write of such an age as the "Dark Ages" of the 20th Century, where curiosity, inquiry, commonsense, meaning and creativity toward significant and "evolutionary" survival issues were stamped out for generations.

If this is a cross section of a summation of our authoritative beliefs of reality, then we are doomed from the start. At this infantile level of humanity's growth (browse through ["State of the World"](#)), for us to consider that we are even approaching "knowing everything except the most extreme situations" (i.e., the beginning and the end of the universe); or that physics is separate from the limits placed upon our technology, the way we live, and what we are to be; that relativity has virtually no application to our everyday world; or that statistics and probabilities of the microworld tell us the exact nature of everything we see and physically are are errors of enormous magnitude that carry far reaching and devastating future consequences. Future historians would write of such an age as the "Dark Ages" of the 20th Century, where curiosity, inquiry, commonsense, meaning and creativity toward significant and "evolutionary" survival issues were stamped out for generations.

How have we arrived at such preposterous, oversimplified, general conclusions that makes our ordinary world, including the micro to the macro, lose all common sense and meaning, becoming more and more complex as we justify successive, outlandish theories with even more inane ones, as we try to cover up the holes?

Let us look into statistics and probability functions. Two of the fundamental tenants of Quantum theory are the Principle of Complimentarity and Heisenburg's Uncertainty principle. The Principle of Complimentarity (Zohar 1990) states that each way of describing the tiny microworld within the atom, as a wave or as a particle, complements the other and that a whole picture emerges only from the package deal. Both waves and particles are equally fundamental. Each is a way that matter manifests itself, and both together are what matter is. Heisenburg's Uncertainty Principle states that we can never focus on both waves and particles at once. Only one is available at any given time. Either we can measure the exact position of something like an electron when it manifests itself as a particle, or we can measure its momentum (its speed) when it expresses itself as a wave, but we can never measure both, exactly at the same time.

The question, "are you energy or are you in position?" (Wolf 1984) can have many answers depending upon how much we narrow the accuracies of our measurement. By releasing a little control in how we determine the energy,

we gain a little control in what configuration the particle is to be found. So we introduce "choice" in the "new physics", the element of consciousness into the material world. We, the observers of reality, bring into existence one form of reality or another. We do this by conscious choosing. Either we choose to observe the position of the particle or we choose to observe its energy of motion.

Now the last sentence of the foregoing paragraph is valid. But on what basis do we deduce the previous sentence and form models of reality that conclude "the observer, by conscious choice, brings into existence one form of reality or another at the wave/particle duality level"? Are we not jumping the gun? The wave/particle choice of measurement will not affect the chair, or cat, or anything else in the real world (provided we use instruments that do not destroy that which is measured). You could measure their frequency and energy level, or position and weight, and at all times the "chair or cat will remain a chair and a cat". They will not change to a table or a mouse. Thought does not begin affecting matter (as supposedly Uri Geller's bending the spoon) except and until, far, far deeper levels of reality are reached. Certainly further than our elementary models admit that reality exists.

So far, so good. Causality can still be in effect, depending upon the choice of measurement. Both wave/particle aspects are part of matter. What needs to be determined is, "what is inherent in the measurement process that permits us to observe one or the other, the wave or the particle?" Or multidimensionally and analogously, the forest one way, and the tree, another. What changes and relationships in dimensions and energy levels differentiate the measurement, the measured, and the observer, so that we may more precisely define the nature of the statistical probability occurrence?

....Are there specific degrees of change in scale or energy levels that transform the relationship between the measurement, the measured, and the observer?

When we say that atoms do not follow the laws of cause and effect except statistically or on the average, we are geared toward a true nature of quantum reality. It appears our problem begins when we try to define statistical action beyond what it is, namely statistics, probabilities. Statistical analysis allows us to conduct research, draw conclusions, foster new and creative ways of thinking about problems, as well as aid one to understand and interpret the results. It helps the insurance executive to understand that 'x' percentage of a specific population dies in bed (how absurd were he to deduce that a specific individual was 'x' percent dead in bed, and the remaining percent alive and romping around), or the probability that a coin will land heads or tails. The probability function says nothing about a specific, single individual's cause of death, or whether a specific toss of a coin will be heads or tails; *or the relationship between a specific particle or wave when viewed through the energy differentials and the radius of curvature existing between the observer and the observation.*

This brings us to Schrodinger's Cat. Is it alive or dead? Or Einstein's comment, "God does not play dice with the universe". Hopefully, we will attempt to bestow credence to the oft quoted, glib phrases, "the local and the global, the point of view and the viewing point" that so much emphasis was given in our first issue of this news magazine. This dimensional, conscious quality should afford us a commonsense recognition of what it is we are doing with our mathematics, namely, that the statistical nature and single action of reality are entirely separate mathematical concepts. The problem arises when we begin to mix the two together. We then begin to lose sight of the relational processes between charge, gravity, energy differentials and space time equivalences at the $E=MC^2$ level (that is when the energy differential or its space time equivalent, both macro and micro, between the observer and the observed, reach or exceed VC^2).

It is true quantum mechanics provides us with excellent predictability of probability functions and a good view of the "general" nature of the microworld. But it gives us an extremely inaccurate interpretation of the why of wave/particle duality, or the live and dead cat, creating numerous and humorous hypotheses such as the many worlds theory.

We suggest that to conclude (Zohar 1990), "there is no good reason to the 'why' of actuality, it's all a matter of chance, or that the act of observation" (not the parameters of how we observe) "plays a role in the quantum wave collapse of creating reality", needs to be revisited in conjunction with the radius of curvature intercept. To transfer

the probability function to single action and conclude ... "that the electron makes its transition from one energy level to another in a completely random and spontaneous way; with no prior warning and certainly without 'cause' in its electron energy shells; or with equal probability, makes a transition to a higher or lower energy state, causing time reversibility; in any direction and every direction at once (the question of lost probabilities) in the guise of a probability wave as though it were 'smeared out over a large region of space' creating 'virtual' transitions; behaving as multiple aspects of some larger whole without distance and separateness; manifesting in actuality the once ghostly notion of action at a distance (nonlocality)"should bring clearly to mind the differentiation that needs to be brought to bear between the general and the specific to better understand what it is we are seeing.

Consider, for instance, the roll of dice. Is the result of a single roll mere chance? With a computer, could not every grade school student predict how a single die would land? Providing all the variables were known and their formulas programmed? Position, angle, elasticity (die and ground surface), height, temperature, friction, gravity, all the variables in how the die is released ... to name just a few of the factors required to change "chance" to precise "fact". The same holds true for a game of cards; and quantum mechanics.

It was Einstein who first demonstrated that the equations of quantum theory predicted the necessity of instantaneous nonlocality. But for him, this was the proof he needed that quantum theory was incomplete and wrong-headed, and he proposed the theory of hidden variables. Zohar (1990) too, concludes "there is nothing paradoxical about reality itself, but rather something wrong, or at least incomplete, about quantum theory. In its present form, since it cannot account for whatever it is about observation that collapses the wave function, the theory simply can't apply to the whole of physical reality. We must need some further mathematics, perhaps even the discovery of wholly new physical principles, before we can understand the transition from the quantum world to our own."

"there is nothing paradoxical about reality itself, but rather something wrong, or at least incomplete, about quantum theory." From Maxwell's equations, electromagnetic fields erroneously considered to be mutually independent, to Formal Correspondence and Covering Theory, and the missing recognition of the Radius of Curvature of Natural Law."

In fact, the possibility of hidden controlling parameters cannot be ruled out. Several other physicists, including David Bohm and John Stewart Bell (Wolf 1984), have successfully constructed hidden variable theories for a single object in an energy field. They claim that the hidden universe of variables gives back to each particle its "common sense" attributes.

This newsmagazine concurs. Some new mathematics to differentiate the statistical, probability functions from single action variables, and wholly new physical principles that take into account the relationship of the radius of curvature of natural law to our notions about mass, matter, energy, space, time, charge, gravity, and especially reference points. How do each of these factors change in their relationship with each other, according to $E=MC^2$, as the differential between the observer and that which he is observing, increases or decreases in energy differentials, frequency differentials, space differentials, time differentials, dimensional differentials, or their combination. Articles in this issue and future issues will continue to probe the simplicity of this relationship, as well as what the radius of curvature predicts and implies, contrasted to what we think we understand about both quantum reality and relativity.

In a different light, we will note that our interpretation of relativity is incomplete and filled with holes (though not black holes). The theory is also surrounded by hidden variables. These hidden variables will be found to take the form of "processes", "relationships" of the "radius of curvature" kind. As this *sine wave variable relationship* of the various factors of nature - to each other - and the differential through which they are measured are omitted in our calculations, we are reduced to some of the limitations and complexities that follow.

Hawkins (1988)

* Gravity is always attractive. "... although Einstein introduced a so-called cosmological constant into his equations, a new antigravity force, which, unlike other forces, did not come from any particular source, but was

built into the very fabric of space-time. He claimed that space-time had an inbuilt tendency to expand, and this could be made to balance exactly the attraction of all the matter in the universe, so that a static universe would result." Hawkins too, speaks of a possible antigravitational effect. However, he does this like "going to visit his next door neighbor by going around the world". Hawkins refers to it as a supercooling phenomena. "the temperature might drop below the critical value without the symmetry between the forces being broken. If this happened, the universe would be in an unstable state, with more energy than if the symmetry had been broken. This special extra energy can be shown to have an antigravitational effect". However, gravity is always attractive.

* The speed of light is the limiting velocity of everything - not just electromagnetic radiation.

* Space is curved. Bodies like the earth are not made to move on curved orbits by a force called gravity; instead, they follow the nearest thing to a straight path in a curved space, which is called a geodesic. Light rays too must follow geodesics in space-time.

* Red shift of galaxies - the Doppler Effect: (separation of the frequency of light from the velocity of light) ... "when the source that is moving toward us, emits the next wave crest it will be nearer to us, so that the time that wave crest takes to reach us will be less than when the star was stationary. This means that the time between the two wave crests reaching us is smaller, and therefore the number of waves we receive each second (i.e., the frequency) is higher than when the source (or star) was stationary". Therefore the conclusion that the spectra will shift toward the blue when the source is moving toward us, and red shifted when the source is moving away from us. Now the speed of light is constant, but the speed of the wave crests, or frequency that carries the light varies its velocity, dependent upon the motion of the source. How can that be? Then, is light a particle or a wave? "All particles are in fact waves, and that the higher the energy of a particle, the smaller the wavelength of a corresponding wave".

* The Big Bang - "Penrose and myself in 1970, at last proved that there must have been a big bang singularity provided only that general relativity is correct and the universe contains as much matter as we observe. Nowadays nearly everyone assumes that the universe started with a big bang singularity. If the classical theory of general relativity is correct, the singularity theorems show that the beginning of time would have been a point of infinite density and infinite curvature of space-time. All the known laws of science would break down at such a point. However, what the singularity theorems really indicate is that the gravitational field becomes so strong that quantum gravitational effects become important. However, we don't yet have a complete and consistent theory that combines quantum mechanics and gravity."

This inconsistency, and the fact that the theory of relativity has not fully incorporated the radius of curvature, leads us on and on to not only the big bang, but to black holes, white holes, imaginary time, virtual particles, antimatter, "anti people", strong force, weak force, "in-between force", "all-around force" (pun - we haven't got to some of these yet). . . . until common sense has totally flown out the door.

How much simpler, were we to take in the concept of the radius of curvature of natural law (see related chapter, "The Nonlinearity of Physical Law" [Starsteps](#) - **WILL BE MOVING: NEW ADDRESS FUEL 2000** <http://www.fuel2000.net>). Applying the new definition to the constant C (velocity of light), through the sine wave characteristic, we would find that the so called singularity is but the zero point on the sine wave curve where all laws are held in abeyance. Beyond this point the laws begin to operate in reverse.

We would then note that what we assume happens at the speed of light and over great distances, also happens in reverse format in front of our noses, albeit at micro distances; this dimensional reversibility will be found to flow easily from the macro to the micro along the common thread of the radius of curvature's sine wave characteristic. In all probability, the micro aspect will play itself out through complex and negative numbers with their corresponding "appearance" of changes in matter, energy, waves, and particles with respect to the fixed "observer". Again, these changes in the "appearance" of matter, follow the precisely defined radius of curvature of natural law. What ensues from this recognition, is that midway on this dimensional curve, between the micro and the macro, exist you and I,

and our cat and car. And that once the appropriate mathematics incorporates this radius of curvature, we shall then be better able to access the phenomenal energies, frequencies, and relationships from both extremes and apply them to our everyday world; and exchange our car for a clean, non-polluting antigravity vehicle, change to a clean, cost effective, solar/hydrogen energy base, understand catalysts . . . or reach for the stars.

so is it going to be - MATHEMATICAL ERROR OR EYESIGHT LIMITATION - because the theory of relativity does not say that man cannot travel faster than the speed of light, it merely says that no one on earth will be able to see him do it.



[To StarSteps - book in progress](#)

STARSTEPS WILL BE MOVING: NEW ADDRESS [FUEL 2000](http://www.fuel2000.net) <http://www.fuel2000.net>

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Science & Spirit Scientific Connections to the Living Universe

Two separate and extreme views of the same continuum, physics and metaphysics.

Like the two sides of a coin, heads or tails, one side is always heads, the other always tails. Standing back, we note the two sides bridged by a single coin in the larger viewing point.

This section will be devoted to stepping back, reflecting on the larger view, coming from the Metaphysical towards the Scientific. As the Bridge has already been discovered in many forms through the ages, we will merely go high tech, upgrade the language and view, until the full spectrum, the single coin picture becomes common sense, common place, self recognized. From the resulting scientific understanding will burst forth an infinitude of common sense creative initiatives leading us past the obstacle Limits threatening our future and evolutionary freedom of expression for all. The Promise: to have Life and live it more abundantly, for all.

The previous issue looked at the question of the Possible Human, Evolutionary or Stagnant. Max Plank's Law of Radiation was specifically related to a metaphysical concept, and postulated that the relationship revealed scientifically connected energy applications the Teacher in the New Testament may have used to perform His demonstrations, showing us the Nature and Path of our Evolutionary direction. That relationship becomes even more profound as we begin to expand our perception of energy and frequencies beyond the relativity and quantum isolation realm, with the radius of curvature perceptual view.

The soul within the body, represents the application of spirit, the active principle of change or as the motivating force. It is the spirit which impels the material essence up the curve of development through stages of constantly increasing significance and manifestation.

One major relationship, mutual reference point between the two extreme views demonstrating that the path is the same regardless of the direction traveled is quoted again. In 1901, Max Planck's Law of radiation states that the level of energy upon which any nuclear particle or atom exists at any given moment is directly proportionate to its frequency of oscillation, and that the energy level of any body of matter is, therefore, proportionate to the mean frequency of its particles. For at least two thousand years the metaphysician has stated that the level of energy, spirit, or potential upon which any particle, any body of matter, or any being exists, at any given moment, is directly proportionate to its rate of vibration.

In his documentary "[The Future of the Body](#)", Michael Murphy confirms many of the mystic/miracle/mystery demonstrations performed by Christianity's Master Teacher, were not isolated events. The literature abounds worldwide, both past and present linking *Our Nature* to more than that which is defined as Human. And while not front page news, more and more scientists are similarly documenting unexplained occurrences, many in the area of instantaneous healing. The intent here is not to document evidence. Michael Murphy has already done an excellent job extensively detailing both an historical and contemporary summation.

This newsmagazine is making a bolder claim.

- The Radius of Curvature of Natural Law is a perceptual and mathematical tool that will
- Bridge Science, Religion and Metaphysics on equivalent principles, including sacred geometry
- Expand our perception of Ourselves, Space, Time and energy
- Provide AHA! I get it! I see! profound revelations, and understanding for a majority
- And certainly take us out of the Energy, Pollution, Sustainability, Economic Crunch

Science will: (from David Jinks)

- Expand to include anomalies, not preserve itself by excluding them
- Incorporate and unify knowledge, not exclude and divide it
- Empower regardless of status, not preserve the status of those in power.

[The Monkey and the Tetrahedron](#) - David Jinks is not afraid to ask the Questions. He presents a skillful historical summation of anomalies and will astonish you by showing how so many obvious links to our past were so grossly mishandled." - [Infinite Energy-Cold Fusion and New Energy Technology](#),

Prior to perusing additional fundamental precepts arising from the metaphysical end of the continuum equivalent to those of contemporary science, we will review a very general and common theme from our past. Creditability, reliability, validity will come only from "Can it be applied? Does it work?". Does the Radius of Curvature play similar perceptive roles, supporting the maxim as above, so below, on both sides? By extending our viewing point to both ends of the spectrum, linked by common principles, will greatly assist in bridging the gap, bringing about common sense, and permitting science to advance past its self imposed limits, and lend a hand to bringing about Understanding.

[\(Troward\)](#) Troward, questioning in detail "how did universal substance get there?", presents an in-depth inquiry into the nature of Mind, Thought, Spirit and Matter. We will extrude some of the outcomes deduced. The reader may explore his works further from the preceding link.

Universal Substance cannot have made itself, for its only quality is inertia. The only mode action not of a material nature is Self Contemplation, Spirit's own inherent feeling of Aliveness. Moving from mere awareness to Self-Sustained Activity absolute (not depending upon any preceding mode of activity because there is none) produces the material correspondence of Motion through Polarity. Universal Substance and the Polarity of Being become the necessary consequence and expression of this Aliveness. Polarity, the interaction of Active (substance) and Passive (Spirit), become the basis of all evolution, and of Motion. From the law of reciprocity, the only similar self-sustained Activity in the material correspondence which can sustain a self-supporting body moving *in vacuo* is a rotary motion bringing the body itself into a spherical form. From atoms to galaxies, we find this to be true.

Characterizing the Polarity of Being, the absolute is that idea of a thing which contemplates it as existing *in itself, the essence of it*, and not in relation to something else, the creative, originating power throughout Nature giving rise to the infinitude of natural forms with which we are surrounded. The relative is that idea of a thing which contemplates it as related to other things, circumscribed by a certain environment.

The absolute is the region of first cause, subjective, all embracing responsiveness, whose distinctive quality is Thought. The relative is the region of conditions, universal substance, objective mind, whose distinctive quality is Form. Form implies extensions in time and space. Thought implies neither.

The absolute, being the originating Life-Principle, a single unit, Unity, wherever it is at all, the whole of it must be present at every point of space at the same moment. Because it is infinite, or limitless, it is everywhere, thus omnipresent in its entirety, and accordingly at every moment of time all spirit is concentrated at any point in space that we may choose to fix our thought upon.

The concepts of 'I and the Father are One', 'The One and the Many', begin to draw credence from a full study of Troward. These interactions, relationships and characteristics of the One and the Many are found throughout our religious and metaphysical literature and teachings worldwide. *The concepts may also be Experienced as a test of reality.* Be that as it may.

-*the primal ocean, infinite point or all compassing seed/thought begins the initial polarization to differentiate Itself - the first word, the initial vibration or oscillation in the infinite giving rise to everything in the universe, polarizing and spanning outward to endless shock patterns of oscillating electromagnetic waves manifesting the stars and galaxies and everything in them to the smallest quark. In sacred geometry the initial vibration is referred to as the first fractioning of unity.*
-*in the beginning was spirit, a vast sea of mind-force, of discerning energy. The spirit moved, and by moving out of itself, began the first vibration, a mirror of Itself. All space, all time, all power and matter are essentially one and are based on the force of attraction and repulsion, the positive and negative law around which the universe revolves. During its nebulous activity the gathering of the positive-negative forces becomes the creative power. The cosmos is built by and upon the principles of music, arithmetic and geometry, harmony, system and balance. All matter contains spirit, and is electrical in function, manifesting in different forms because of varying rates of vibration or speed. Every condition that exists in the material dimension has its counterpart and its pattern in the cosmic or spiritual domain. Things spiritual and things material are the same in essence although different in manifestation or expression. The law of creative forces are universal - the law of love/gravity, the law of propagation, the law of evolution or growth and development.*
- [Laminated Space-Time](#) *Barbara Dewey Consciousness and Quantum Behavior : The Theory of Laminated Spacetime Re-Examined - The Big Blink versus the Big Bang. Mind is spaceless, mind is timeless, mind is a creating medium. Creation is in continuous, constant manifestation in the Now. Electromagnetic waves are spiraling particles of matter-in-motion, or a laminated quantum of spacetime. Electrons are wave-like particles because they are going through the process of creation and destruction in the blink of Laminated Spacetime. They are surging "up" as they come into existence. They are dying back as they expire. They display "positive" (counterclockwise) and "negative" (clockwise) characteristics because of the twist of the double helix. They have polarity because of an off-center axis. Polarity is created when the counterclockwise motion of north reverses itself to the clockwise motion of the south in the double helix. This polarity creates magnetism or gravity and allows them to form chains. They are the consummate expression of spacetime's six-dimensional design. ([Cycles in the Universe - references Barbara's father, Edward Dewey founder of The Foundation for the Study of Cycles](#))*
- [The Self-Aware Universe](#) *Amit Goswami, Ph.D. - ".....it is the appearance of the world of manifestation that leads us to the experience of a self or a subject that is separate from the objects of appearance. That is, subject and object manifest simultaneously in the initial collapse of the quantum state of the brain-mind. We*

cannot escape the fact that the world we know is constructed in order to see itself. In order to do so, evidently it must first cut itself up into at least one state which sees, and at least one other state which is seen. The brain mind is a dual quantum system measuring apparatus. As such, it is unique: it is the place where the self reference of the entire universe happens. The universe is self aware through us. In us the universe cuts itself into two - into subject and object. Upon observation by the brain mind, consciousness collapses the quantum wave function and terminates the von Neuman chain. We resolve the von Neuman chain by recognizing that consciousness collapses the wave function by acting self-referentially, not dualistically.

The highlights to be recalled here for future reference are:

- a state of first cause and responsiveness devoid of space, time
- Polarity, a continuous self-sustained activity
- a holographic principle
- substance/form implying extensions in space, time
- revisiting a macro energy/frequency/field concept and equivalencies

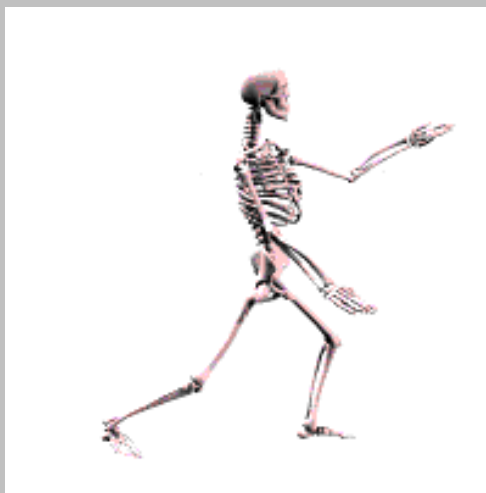
While certainly not the same, in principia, (as above so below), we will find 'action at a distance', 'non-locality', 'zero point' all traverse through that 'no space, no time' zone, described above and represented mathematically by the Radius of Curvature's zero point on the sine wave curve of the mass/matter energy/frequency relationship.

.....to be continued

TRIVIA QUESTION

For all quackery critics still investing in the "buggy whip", "dinosaur" economic and science concepts

What would be likelihood modalities - of operation and belief - for:



an Evil Empire?

an Anti-Christ?

- life is not fair - get used to it
- increasing multitudes of children dying of starvation - preventable technology available 50 years

- unprecedented worldwide gap between 5% rich, 95% poor, and growing
- predatory price gouging from medicine to energy
- the love of power, not the power of love
- environmental, ecological destruction for Profit
- hunger fundraising for American *working* families that cannot afford food
- prehistoric medical practices - testing pain thresholds, conserving anesthesia costs
- as health costs rise and errors increase (cut off wrong leg, drilled wrong hole in head, etc.)
- and so on... as described above in **Treasure Chest of Freedom**

All the above? none of the above?

Who supports Wall Street "short term system" hysteric mania? We do! (Audience - Cheers!)

And so the Dragon eats its own tail, body, and dies.

Might we be in danger of losing all the good that science, technology, and the arts have created

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A Look At The Quantity C (from chapter 5 StarSteps)

We have seen that the factor known as the quantity C has a greater significance than is usually credited to it. It is not merely the velocity with which light and other forms of energy are propagated in a vacuum. The quantity C is a degree of energy differential. We can define it as the maximum differential which can exist between two reference points in the factor which we call matter. We can also define it as the minimum differential which can exist between a reference point in matter, and one in energy. This is only true, however, when the reference point in matter is at the same energy level as the observer.

The quantity C is a degree of energy differential. the maximum differential which can exist between two reference points in the factor which we call matter; the minimum differential which can exist between a reference point in matter, and one in energy. *This is only true, however, when the reference point in matter is at the same energy level as the observer.*

One of the postulates of the theory of relativity is that as a body of *matter* accelerates and approaches the velocity of light, or a kinetic energy differential equal to the quantity C with respect to a given observer, the body loses dimension in the direction of motion. If the velocity reaches the velocity of light it will *appear* to have lost all of its dimension in this direction. To this observer it would no longer be matter, since matter, by definition, requires three dimensions. The matter would have become energy insofar as the original observer was concerned since it would now exhibit a kinetic energy differential equal to the total energy inherent in the original matter.

This statement, however, seems to produce a misconception in the minds of many students of physics. Before we

attempt to clarify the concept by the use of a simple analogy, let us recall the thought experiment the reader was asked to perform in chapter three. Follow closely as the analogy proceeds and concludes with the acceleration example, then walk through it again using three *stationary* objects whose frequency energy differential approaches, equals, then exceeds the quantity C. Apply the same postulates, noting the spatial separation remains constant and extrapolate the results.

We will assume that we have three space ships assembled at a given point upon the surface of the earth, (or at a given point in space.) For the purpose of this analogy we will assume that the ships are capable of any desired degree of acceleration. We will dispatch two of these ships into space, flying side by side in a given direction. We will launch the remaining craft in the opposite direction in space. We have an observer upon each of the three craft and a fourth observer who remains at the point from which they departed. We will designate the ships which departed together as A and B, the ship which is moving in the opposite direction as C, and the observer at the starting point as D. When we have accelerated all three of the ships to a velocity equal to one half of light, (with respect to the starting point) we pause to determine what changes, if any, have taken place. To the observer at the starting point D, the three ships have become slightly shorter in the direction of their motion, and have gained a small amount of γ but are otherwise unchanged. The observer upon the ship C, however, discovers that while he and his own ship appear to be unchanged, the ships A and B have lost all dimension in the line of motion, because they have reached the velocity C with respect to his reference point. They have ceased to exist as matter and have entered the plane of energy. The two observers upon the ships A and B also note that C has ceased to exist as a material object, but when they examine themselves and each other, they find that no change whatever has occurred to them or to their ships since they are all upon exactly the same energy level and no differential exists between them.

We will now accelerate all three ships to the velocity C with respect to their starting point D. At this velocity the three ships cease to exist materially insofar as the observer at D is concerned, since they have entered the plane of energy, and are also at the zero point of the curve of time with respect to him. The observer upon the ship C would note that the ships A and B were again in existence but that they were now in the negative portion of the curve. Since this concept may prove somewhat difficult to grasp at the first attempt, it will be explained further and a simple analogy given in the chapter on Time.

The foregoing analogy also demonstrates that the term velocity has no meaning or significance except as an observed kinetic energy differential between two specified points of reference.

The Quantity C is a constant, the only true constant in the universe, because it is the pivotal point about which the natural laws become manifest.

If we examine this analogy carefully, we will find that we have demonstrated the most important aspect of the factor which we have named the quantity C. C is a constant, the only true constant in the universe, because it is the pivotal point about which the natural laws become manifest. It is the factor for which many great physicists have spent years of search, even though they had it constantly in their possession. ***In short, the quantity C is the measure of the radius of curvature of natural law.*** It is the factor which will enable us to determine precisely the degree of change in the curvature of one law which will be brought about by a specified change in the application of the others. It is the factor which will eventually tell us how to place our spacecraft in either the positive or negative portion of the gravitational curve with respect to the earth or any other planet which we may choose to visit.

When we state that the quantity C is the radius of the curvature of natural law, we mean simply that if a differential of energy equal to this quantity exists between the observer and the point which he is observing, the natural laws will be suspended. If the energy differential is in excess of the quantity C, the laws will appear to operate in reverse at that point.

When we state that the quantity C is the radius of the curvature of natural law, we mean simply that if a differential of energy equal to this quantity exists between the observer and the point which he is observing, the natural laws

will be suspended. If the energy differential is in excess of the quantity C, the laws will *appear* to operate in reverse at that point. As we stated earlier, this effect will be demonstrated by a simple analogy in our discussion of the factor called time.

While we have repeatedly referred to the quantity C as an energy differential, we have heretofore considered it only in terms of kinetic energy. Some may believe that it can be reached only when there is a rate of increase or decrease in the degree of spatial separation between the reference points, equal to 3×10^{10} centimeters per second, or in simpler terms, a velocity equal to that of light. It is necessary therefore to point out the fact that an energy differential does not necessarily manifest itself as a velocity. It can also exist as a frequency. Our present laws of physics state that the energy level upon which an electron, a photon, or other particle exists is proportionate to its frequency. The mathematical rule is $E = Fh$, where E is the energy, F is the frequency and h is a factor called Planck's constant.

When such a frequency differential exists between the observer and the point which he is observing, we again find that the natural laws at the observed point reach zero value with respect to the observer. If the frequency differential exceeds this value, the action of the laws will become negative.

We can now see that a frequency differential which by the above formula is equal to 9×10^{20} ergs per gram also represents the quantity C. When such a frequency differential exists between the observer and the point which he is observing, we again find that the natural laws at the observed point reach zero value with respect to the observer. If the frequency differential exceeds this value, the action of the laws will become negative. A material object such as a spacecraft upon or near the surface of the earth would cease to exist as matter and would enter the plane of energy insofar as the observer on earth was concerned, but as we have previously pointed out, an observer upon or within the object, whose frequency or energy level had been raised to the same degree as that of the craft, would be unable to detect any change.

We must clear our minds of the thought block produced by the assumption that the quantity C is a factor of absolute limit. We must realize that it is a limiting factor only with respect to two given reference points, and that it is perfectly possible to conceive of a series of consecutive reference points between each two of which a differential equal to the quantity C may exist.

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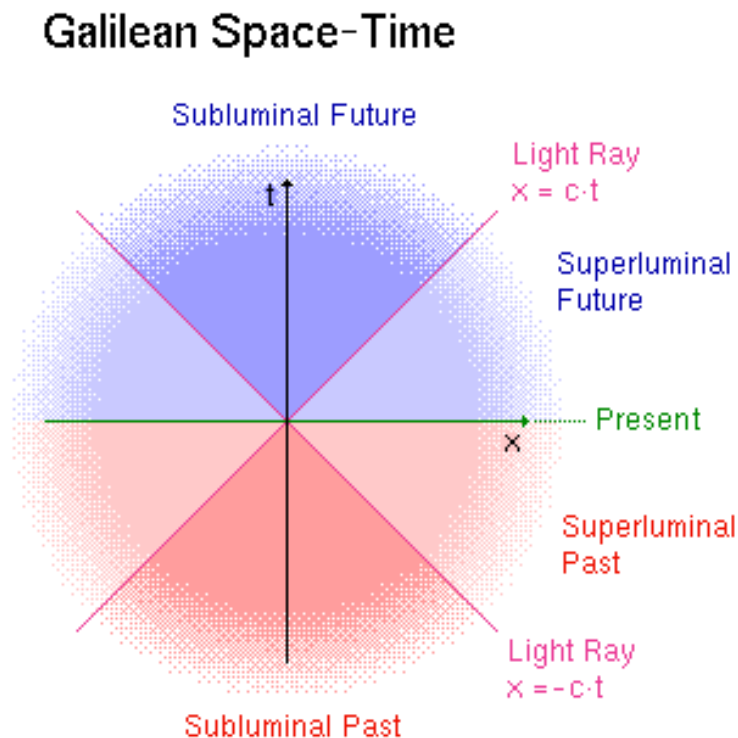
News and Views From A Viewing Point....

The Speed of Light - A Limit on Principle?

[A physicist's view on an old controversy](#)

by Laro Schatzer <schatzer@ubaclu.unibas.ch>

(comments and criticism welcome)



"Easy" Treatise

Contemporary physics states that no object should be able to travel faster than the speed of light

$$c = 299'792'458 \text{ m/s (meters per second).}$$

Although the value of c appears to be enormous when compared with conventional traveling speeds, it suggests a limit which renders a practical realization of interstellar travel improbable. Whereas another planet in our solar system is reachable within minutes or at least hours at the speed of light, a journey to the nearest star system [Alpha Centauri](#) would already demand a traveling time of several years. Surely, the question remains: Are faster-than-light speeds possible? At the present time most scientists believe that the correct answer should be "no". However, it has to be emphasized that there is no definite proof for this claim. Actually, whether superluminal speeds are possible *in principle* depends on the **real** structure of the space-time continuum, which contemporary physics ignores, however. Basically, there exist two distinct notions of space-time in physics, both of which represent a possibility:

- Galilean Space-Time (GST)
- Minkowski Space-Time (MST)

Briefly, whereas Galilean space-time allows the realization of faster-than-light speeds, at least in principle, Minkowski space-time does not. What is the reason for this difference? In the next sections it is exposed that the key point is the conception of *global time*, i.e.. the physical significance of the term **simultaneity**. In fact, what

does it mean when we call two *spatially* separated events "simultaneous", actually? What we need is a clear physical notion of past, present and future, not only on a local but on a global level.

It is important to note that without some definition of global time the physical *quantity* speed (and thus light-speed) has no definite meaning anyway. Why? Consider an example: Imagine an object moving from position *A* to *B*. Its speed v is given by the formula

$$v = \frac{\text{Distance}(A \text{ to } B)}{t(B, \text{finish}) - t(A, \text{start})}$$

Here, the start time $t(A, \text{start})$ and the finish time $t(B, \text{finish})$ are read off from two *spatially separated* clocks: one clock is located at point *A* and the other one at point *B*. Now, the difference of the two times in the denominator $t(B, \text{finish}) - t(A, \text{start})$ is an indefinite expression, unless there exists a rule how to synchronize both clocks, because clock *B* ignores the "current" time at clock *A* at first. But, in fact, the decision in favour of a particular synchronization rule is **pure convention**, because it seems impossible to send an "instantaneous" (infinitely fast) message from *A* to *B* like "Initialize the clocks now!". Thus, the actual quantity of speed is conventional too, depending on the particular choice of the simultaneity definition.

The question concerning global time is also important in the context of different reference frames. What is a reference frame? A reference frame *R* is simply a coordinate system of some observer. (For instance, let us imagine a physicist experimenting in his laboratory.) The observer attaches to all physical events personal coordinates, i.e.. space coordinates x, y, z (where?) and a time coordinate t (when?). Another observer in his personal reference frame *R'* attaches to all physical events another (not necessarily equal) set of coordinates x', y', z' and t' . (Let us here imagine another physicist who is working in a train moving with constant velocity v with respect to the reference frame *R*.) While two events may appear simultaneous in reference frame *R* (happening at equal time t), does this still hold in reference frame *R'* (at equal time t')? And while the physical laws have a particular form in frame *R*, does one obtain the same formulas in frame *R'* also? The answer is given by a theory which relates the new coordinates x', y', z', t' to the old ones x, y, z, t . Essentially, this is what a *theory of relativity* is all about.

Remark: For a better understanding of the distinct space-time concepts it is fruitful to study a geometrical representation of space-time, the space-time diagram (see below). In this picture four-dimensional space-time is reduced to two dimensions. Instead of three space x, y, z and one time coordinate t , one uses only one space and the time coordinate, x and t , respectively. (Obviously, it is much more easier to draw and think in two than in four dimensions.) For reasons of convenience the units are chosen such that the speed of light equals unity $c=1$. Hence, a light ray, which is described by $x=+ct$ or $x=-ct$, appears as a straight line in the (x,t) -plane at 45° or 135° , respectively.

The reader is encouraged to reconstruct the arguments by studying the space-time diagram. Remember that the x -axis is the line of simultaneity (i.e.. with constant time $t=0$), and that the t -axis is the line of constant position ($x=0$).

For the full text, [A physicist's view on an old controversy](#)

Have you ever wondered . . .
When can we build something like this?



<http://www.lerc.nasa.gov/WWW/PAO/warp.htm>

NASA Breakthrough Propulsion Physics Project

<http://www.lerc.nasa.gov/WWW/bpp/>

[The California Institute for Physics and Astrophysics](#)

Category 2 -- Technology Projects for the Future

The following are broad revolutionary technology areas that we hope may eventually be an outgrowth of quantum vacuum research at CIPA. Certainly no one knows today whether any of these things will become possible, much less on what time scale. But we can say that based on our current understanding of physics, none of these things is demonstrably impossible, and plausible hypotheses and rigorous analytical tools are available to take the first steps toward investigating these possibilities.

- Deep space propulsion without propellant
- Extraction of energy from the quantum vacuum
- Modification of inertia and gravity
- Quantum vacuum physics leading to quantum vacuum engineering

Additional financial resources are needed to pursue all of the current Category 1 technology and patent projects.

Apparently we are and have been long aware of the above possibilities. For some odd reason, for the last 50 years "Additional financial resources needed to pursue" are still unavailable. In the feeble, financially restrained attempts above, the Radius of Curvature concept - a far out, NATURAL COMMON SENSE THEORY, has yet to be considered. Where is the MONEY?

SOMEHOW, THE MONEY WHERE OUR VALUES ARE PLACED, THE SYSTEMS WE HAVE CREATED, IGNORE SURVIVAL AND SUSTAINABILITY - in a totally Me Only Generation - FOR THE PEOPLE, BY THE PEOPLE, OF THE PEOPLE.

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Points Of View & Feedback....

Subject: Is Relativity an Illusion?

by John Kooiman john.kooiman@home.com

Note: references to "StarSteps" web site, <http://idt.net/~mgi19/exploring.htm>,

WILL BE MOVING: NEW ADDRESS FUEL 2000 <http://www.fuel2000.net>

I have always been uncomfortable with the standard interpretation of Special Relativity that says that "nothing can move faster than the speed of light". I have no quarrels with the mathematics of Relativity, just how it is commonly interpreted.

The theory of Special Relativity only describes what an observer will see under different circumstances, assuming that all observations are done using light or other waves that travel at the speed of light. It only says what "Observer A" will see when "Observer B" is moving very fast relative to Observer A. It says nothing about what is actually happening at Observer B's location. To say that since Observer A can never "observe" Observer B moving faster than the speed of light means that, therefore, it is impossible for Observer B to actually move faster than light is a logical fallacy. This is equivalent to saying that, "because I observe you through the bottom of a Coke bottle to be green and fuzzy, therefore you are green and fuzzy." We are confusing distortions caused by the intervening medium with physical changes in the object being observed.

This is illustrated by an example from the "StarSteps" web site, <http://idt.net/~mgi19/exploring.htm>, as follows:

Actually, Relativity does not prohibit us from making this trip in one hour (shipboard time) if sufficient energy and thrust are available (an enormous amount would be required). Relativity says that as the ship approaches the speed of light, it's acceleration would be restrained and it's velocity held below the speed of light by an apparent increase in mass resisting the available thrust. Simultaneously, the distance from Earth to Alpha Centauri would also contract by just precisely the right amount to offset this reduced velocity, thereby allowing the ship to cross the reduced distance in the same amount of time as would have originally been calculated by using classical mechanics and superluminal velocities, while ignoring the effects of Relativity. However, an Earthbound observer would see the journey taking 4 years and one hour, due to the time dilation effects of Relativity and the ship's crew would see a similar time dilation taking place back on Earth. This forms the basis for the famous "Twin Paradox".

The "Twin Paradox" goes as follows: If one twin travels to Alpha Centauri and back as described above, while the other stays home, both twins will observe the other twin aging faster. So, who will be older when the space traveler returns home? The conventional "solution" to the "Twin Paradox" says that the twin who traveled to Alpha Centauri and back would return to find his twin brother 8 years older than him, because the space traveler "changed inertial planes" by turning around and returning home. This is a scientific cop out, because Special Relativity says nothing about what happens when one "changes inertial planes". It is simply a "Wild Ass Guess", based upon an unfounded assumption, designed to explain away the paradox. More about this later.

So, both classical mechanics and Relativity allow the theoretical possibility of traveling 4 light-years in one hour of shipboard time. Both give the same shipboard transit time, given the same initial mass and the same amount of thrust and energy available. Classical mechanics allows it by ignoring the "light-speed" barrier and allowing the ship to accelerate smoothly to superluminal speeds, regardless of any distortion that an observer may see. Relativity allows it to occur at sub-light speeds by causing the entire universe to shrink along our direction of travel by precisely the correct amount to offset the acceleration that we lost due to our mass increase caused by the

$\text{SQRT}(1-v^2/c^2)$ "warp factor". Which explanation is true and which is the illusion? Occam's razor would suggest that the first explanation is true and that Relativity is just an optical illusion.

What if our ship does not utilize the thrust of conventional rocket engines? Suppose, for example, that we are successful in creating an Antigravity space drive that works by creating a gravity field, or bubble, around a vehicle which causes it and its occupants to "fall upward". In theory, we could create very high acceleration rates since the occupants of such a craft would feel no G forces, because both craft and occupants would be in free fall. Many people believe that this is how UFO's operate. UFO's have commonly been reported to make radical maneuvers that would require accelerations upwards of 30 G's.

What would happen as such a vehicle approached the speed of light? Would the relativistic "mass increase" cause the acceleration rate to fall off? No, because the acceleration in a G field is independent of the mass of the object. As long as we are able to maintain the G field, our craft would continue to accelerate smoothly right on past the speed of light.

How long would it take to travel from Earth to Alpha Centauri if we could maintain a constant acceleration of 30 G's until the half-way point and then turn around and decelerate at 30 G's until we arrived at Alpha Centauri? From classical mechanics:

$$X = \frac{1}{2} * A * T^2, \text{ or } T = \text{SQRT}(2 * X / A)$$

$$X = \frac{1}{2} \text{ distance from Earth to Alpha Centauri} = 2 \text{ light-years} = 2 * 9.47E15 \text{ Meters} = 1.89E16 \text{ Meters}$$

$$A = 30 \text{ G's} = 30 * 9.8 \text{ M/S}^2 = 294 \text{ M/S}^2$$

$$T = \text{SQRT}(2 * 1.89E16 \text{ Meters} / 294 \text{ M/S}^2) = 1.134E7 \text{ Seconds} = 131 \text{ Days}$$

$$\text{Total Travel Time} = 2 * \text{Time to Half-Way point} = 2 * 131 \text{ Days} = 262 \text{ Days}$$

Such a craft could travel from Earth to Alpha Centauri in less than 9 months!

It's maximum velocity at the Half-Way point would be:

$$V = A * T = 294 * 1.134E7 = 3.33E9 \text{ M/S} = 11.11 \text{ C}$$

Over 11 Times the Speed of Light!

What would a "stationary" observer see? If they are observing us using light, they would not be able to see us exceeding the speed of light. Instead, they would see all of the distortions predicted by Relativity. Occupants of our craft looking out the window would also see a distorted view of the universe. They would not be able to measure themselves traveling faster than light (at least not using light to perform the measurement), instead they would see the universe "contracting" along their direction of flight. But, because of length contraction they would still end up at their destination in the same amount of time as if they had ignored Relativity and calculated their trip using classical mechanics and superluminal speeds. So which is true: did the craft travel faster than the speed of light, even though optical distortions prevented them from "observing" that fact; or, did the entire universe "contract" as they were accelerating and then "expand" again as they were decelerating to arrive at their destination?

The "StarSteps" web site, <http://idt.net/~mgi19/exploring.htm>, provides further insight into what an observer would see if they had a large enough telescope:

From the above example we can now see that the famous "Twin Paradox" is also just an illusion. There is no paradox! The twin who traveled to Alpha Centauri and back can return in plenty of time to assist his brother in observing the time delayed distortions of his trip as described above. There will be no accelerated aging of one twin over the other, because it was all just an optical illusion caused by the limited speed of light!

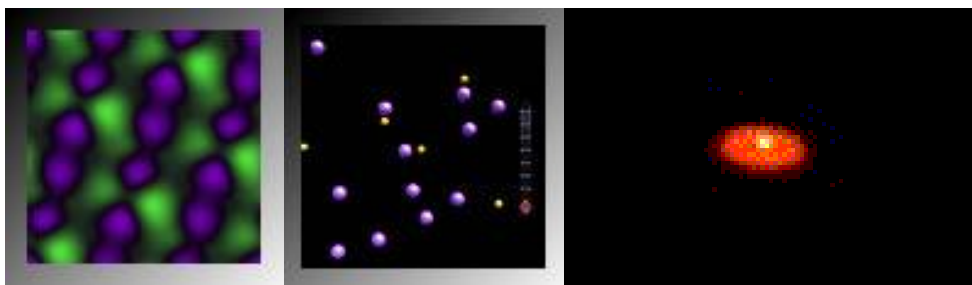
All comments are welcome.

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For the Kids

Understanding Magic - Predicting Scientific Laws Without Standard Learning

Cruising Understanding Lane: Atoms to Galaxy Formation



INTRODUCTION

The discussions presented are offered in the hope that they may assist all kids, and all adult kids at heart, still open to curiosity, enthusiasm, zest, including the layman, the beginning student, and perhaps even a few of the more advanced students of cosmology - *in the achievement of an approach to science which is based upon simple understanding rather than upon the complex and often confusing lattice-work of abstract mathematics which has been erected about it.*

While it is true that the language of mathematics is a universal language, it is, nevertheless, a language which must be learned before it can be used or understood.

There are many persons in the world today, besides our children, who would like to acquire a greater knowledge and understanding of the nature of the universe about them, but who have never had the opportunity to familiarize themselves with the language of mathematics to a degree that would permit them to follow the paths through which this knowledge is customarily presented.

It was principally for these reasons that this article is being written. Consequently, simple discussion, explanation and analogy will be substituted for mathematics, to the greatest possible degree. We will risk, thereby, the scorn of the mathematician, but may gain the gratitude and the comprehension of the non-math student.

Much of the material presented in these pages was taken from a series of lectures originally written and published some years ago, but whose basic concepts are only now beginning to be accepted by cosmologists.

Since the study of cosmology embraces the microcosm as well as the macrocosm, we will begin this text with a consideration of the most minute and fundamental particles of nature, insofar as they are known and understood today. We will examine the forces which bind these particles together, but which may also under certain circumstances, hurl them violently apart.

THE BUILDING BLOCKS

We will begin our examination of the universe by considering, briefly, the nature of four of its most minute and fundamental entities: the neutron, the proton, the electron and the photon (or quantum of energy). No man has been ever seen any of the four. So minute are they, that the most powerful microscope every made could not begin

to resolve them. Yet all of the matter in the universe is composed of the first three, and all of the changes which occur in that universe come about as a result of the action of the fourth.

In order to achieve the basic understanding of the nature and properties of the electron, the proton and the neutron, we will arbitrarily create or assume a fourth particle which we will call the 'nullatron' (*editor's note: subsequently discovered 10 years later, the neutrino*). We will postulate that this particle has no charge, possesses no energy, and consequently is not associated with any type of field. In fact we will assume that this particle has no property other than that of inertial mass, or resistance to acceleration. We hasten to confess that, so far as we know, no evidence of the existence of such a particle is available in our present technology and, because of its dearth of properties, its existence would be exceedingly difficult to demonstrate by any presently known method. Nevertheless, the assumption of such a particle offers an ideal starting point in our examination of the nature of matter, and so we will assume the particle, if only to serve as an aid to understanding.

If, to the nullatron, we add a photon or, as it is more usually known, a quantum of energy, in such a way that the energy is entirely contained within the particle, we will find that the particle has acquired several additional properties. In adding the quantum of energy, we have supplied the particle with both a positive and a negative charge. (See definition of energy in [StarSteps](#), Fuel 2000.) Since these charges are united within the particle, there will be no exterior electrical field, but a gravitational field will be created. This particle, which now exhibits the properties of inertial and gravitational mass, has been named the neutron. Its existence was demonstrated in 1932 by Sir James Chadwick, an English Physicist.

If we could find a means of dividing the quantum of energy into its two component parts, and of drawing the negative charge out of the body of the neutron, so that the charge formed a shell of force around the core, we could convert the neutron into the simplest of all atoms, the atom of the element which we call Hydrogen. The simple particle has now become a rather complex mechanism. The central core which retains almost all of the mass, and from which the gravitational field still emanates, now has a positive electrical charge, and is known as a proton. The shell of force, which consists entirely of the negative portion of the quantum of energy is known as an electron.

In most of our textbooks today, the electron is represented as a small particle in a precise orbit about the proton in much the same manner as the earth orbits the sun. While this analogy works fairly well as long as we confine our study to the field of chemistry, if we attempt to explain all of the observed properties of matter by nuclear hypothesis, we will find that we require a somewhat more complex analogy.

Let us, therefore, attempt to create such an analogy, remembering that, like the nullatron, it is created only as a tool of understanding. We will begin with the usual concept: a small particle in a simple orbit around the proton. We will then assume that the electron is extended or 'stretched out' along the path of its orbit until it becomes a ring of charge occupying, simultaneously, all parts of its orbit, but still having the same rotational, or angular velocity. If we now rotate the ring upon an axis which passes through the proton and two opposite points in the ring, we will create a sphere of charge about the proton which is uniform in density but characterized by precise angular velocities about each of the two axes. While the assumption of these angular velocities is not particularly important in our first approach to the nature of matter, they do become necessary to the explanation of some of the more complex phenomena such as crystallization in solids, diffraction of light, etc.

Having examined the atom from inside outward, as it were, by theoretical creation, we should now be better prepared to examine it from the outside inward, as we shall presently proceed to do.

We must remember that the atom which we have created is the simplest of all the atom family. It is known as 1H1 or 'normal' hydrogen.

If we add a neutron to the proton which is at the center of this atom, we create a particle called 1H2 or deuterium. This atom is still hydrogen and has chemical properties identical with those of 1H1. The mass and weight, however, are now twice as great. For this reason, 1H2 is frequently referred to as heavy hydrogen.

If we add a second neutron to the nucleus we will have $1\text{H}3$ or tritium. It is still chemically identical with $1\text{H}1$ but has three times the mass. It is sometimes known as heavy, heavy, hydrogen.

It becomes apparent that the chemical properties of the element are determined by the number of electrons in the shell and the number of protons in the core.

In the three types of atom which we have considered, each contained one electron and one proton, and all are therefore considered to be atoms of the same element. They are known as Isotopes of the element.

If we attempt to add a third neutron to the nucleus, we will find that the field condition within the atom is now such that a considerable amount of force will be required, and that the act of forcing the neutron into place will cause its quantum of energy to divide spontaneously. The negative charge will be emitted from the neutron, and as a second electron, will join the first in the shell of force surrounding the atom. The remaining portion is now positively charged and so becomes a proton.

The atom now contains two electrons, two protons and two neutrons. We have created an atom of the second element in the series called Helium. Its name was taken from the Greek word 'helios' (The Sun) because it was discovered by a spectrographic analysis of the sun's atmosphere a quarter of a century before it was discovered on earth.

In symbolic terminology, this atom is described as $2\text{HE}4$. The letters represent the name of the element, the number preceding the letters gives the number of orbital electrons, and the number following the letters gives the total number of protons and neutrons contained in the nucleus.

If we consider (theoretically) to build up our atom by the addition of neutrons, we will find that, in each step of the process, we can create a certain number of isotopes. That is, we can add a certain number of neutrons without changing anything but the mass of the atom. If we exceed this number, the force required to insert the next neutron will cause it to emit the negative portion of its charge, becoming a proton and adding another electron to the shell. Thus the next higher element in the atomic scale is formed. If we continue this process long enough, we will eventually have created atoms of all the known elements, and all of their possible isotopes.

In building the next element after helium, that is: lithium, we would have to insert two neutrons simultaneously, since there is no known combination of five nuclear particles which will remain together for any appreciable time.

We have described this addition of neutrons to the nucleus as though it were a simple process. Therefore, lest the reader be misled we will hasten to state that we have no means in our present technology of forcing a consecutive series of neutrons into the nucleus of a single atom, and that if we did have such a means, we would find that remarkable changes in energy level would occur during some stages of the building process, resulting in the emission of considerable electro-magnetic radiation, and the loss of a small part of the mass of the atom, even though all of its particles were still present. There are, however, some transmutations of elements which we can, and do, achieve by the simple addition of neutrons. The conversion of Uranium 238 to Plutonium is one example.

It should also, perhaps, be mentioned at this point, that the number of electrons which will occupy a single shell of force is limited. If, after a shell containing this number of electrons has been formed, more electrons are emitted from particles within the nucleus, they will not be absorbed by the shell but will pass through it, to form a second shell outside the first, and so on.

Let us now expand our scale of observation for a moment so that we may consider a drop of ordinary water. If we divide the drop into two equal parts, we will find that each of the two parts retains all of the properties which were possessed by the original drop. Each of the parts is still water. We might repeat this division many times without changing anything except the size of the parts, but eventually we would reach a particle which could not be further divided without producing a complete change in its properties. This particle is called a molecule and is defined as being the smallest particle of a complex substance or 'compound' which can exist as that compound.

A molecule is composed of two or more atoms which have come together in such a way that some of the electrons in the outer shells have expanded their orbit so as to create a new shell which encloses all of the atoms. The several atoms will then behave to some extent as though they were one.

If we divide the molecule of water, we find that it is composed of two atoms of our simplest element, hydrogen, and one atom of a somewhat more complex element called oxygen.

The word 'atom', as related to particles of matter, originated in the philosophy of ancient Greece. In the fifth century B.C., the Greek philosophers, Democritus and Leucippus, set forth the postulate that all substances are built up of small units which are not capable of further division. They named these particles Atoms, a word meaning indivisible.

In one of the peculiarities of the progress of human knowledge that, although this theory was enunciated more than 2,000 years ago, it is only within recent years that we have come to accept fully the first portion of this concept, and at the same time we have worked vigorously and successfully to disprove the latter portion. We have demonstrated that the atom is not an indivisible particle, but is actually a complex mechanism made up of a number of cooperating parts.

The parts are exceedingly small, even in comparison to the size of an atom. If the orbit of an atom were drawn on an eight by eleven sheet of paper, and the electrons, neutrons, and protons were drawn to true scale, they would be invisible except under the most powerful microscope. The volume occupied by the nucleons (nuclear particles) is considered to be about one million millionth of the total volume of the atom.

We can see that the atom is far from being the solid, indivisible particle which the Greek philosophers imagined. Indeed, the atom is practically all space! It is, however, a space which is filled with powerful fields, and it is the operation of these fields that makes the atom behave as though it were a solid, indestructible particle.

TWO HYDROGEN ATOMS IN SPACE

Having examined the individual atom and learned of its characteristics, let us now consider the effect which atoms will have upon each other, when several are in the same vicinity.

We will picture two hydrogen atoms, side by side, but completely alone in space. We will postulate that the atoms are not in motion with respect to each other, and that no fields or other influences are present except those which are produced by the atoms themselves. We will assume that the two atoms are separated by a distance of two diameters. That is: the distance between the orbits of the electrons is equal to twice the diameter of the orbit.

We have learned that the electron consists entirely of a negative charge and that 'like charges tend to repel each other'. Therefore, a force field will be set up which will tend to 'push' the atoms farther apart. We also know, however, that the proton has a gravitational mass, and consequently, a gravitational field will be created which will tend to pull the atoms closer together.

The mass of the proton is more than 1800 times that of the electron, and the gravitational field is considerably more powerful, if measured at the same distance. However, in the case of the two atoms, the effective distance for the gravitational field must be measured between the protons, while the electrical field must be measured between the closest points of the two orbits. (The full charge of the electron must be considered to act simultaneously in all parts of the orbit.)

At this point we must recall the rule first propounded by Sir Isaac Newton, that the amount of force created by a field is in proportion to the inverse square of the distance separating the two points between which the force acts.

In our example, the two atoms are separated by a distance equal to twice their diameter. If we assume that each atom has the same diameter, and if we choose the radius of the atom as a unit of measurement, we find that the protons are separated by a distance equal to 6 radii; while the shells are only 4 radii apart. The distance ratio therefore is 6 to 4.

We will further assume that at this point, the attraction of the gravitational field is greater than the repulsion of the electrical field. The two atoms will, therefore, begin to approach each other, or to 'fall together'. When the shells have reached a distance of one diameter, or two radii, we find that the protons are now four radii apart, or that there is now a distance ratio of 4 to 2. If the atoms continue to approach until the shells are 1 radius apart, the distance between the protons will be three radii, or a ratio of 3 to 1, etc.

We can readily see that, whatever the relative strength of the two fields to begin with, there will be a distance at which the attraction of the gravitational field will be exactly balanced by the repulsion of the electrical field. We will call this the 'critical distance'. We cannot call it the stable distance because the atoms would not actually stop at this point. In falling together, the atoms would have acquired momentum, and this momentum would carry them inward to a point where the repulsion was greater than the attraction. Then the atoms would 'bounce' apart and because of acquired momentum, would again pass the critical distance in their outward movement. Since the atom may be considered as a perfectly elastic body, and since no friction is involved, this bouncing back and forth, or oscillation, as it is usually called, can and does continue indefinitely, each atom constantly seeking its critical distance, but always being carried beyond it by the momentum of its search.

Even if it were possible to place two atoms exactly at their critical distance without imparting any momentum to them, they would not remain long in that position because there is a factor which almost constantly changes the critical distance between atoms. This factor is known as the photon or quantum of energy. The word photon is derived from the Greek word "photos" meaning light. It was chosen because light was the first form of energy which was shown to be composed of definite units.

As our understanding of nature progressed, however, it became apparent that what we call 'light' is simply a form of electromagnetic radiation.

Electromagnetic radiation may be defined as 'Primary energy', since all of the changes which occur in matter come about, either as a direct or as a secondary effect of its action.

This primary energy is divisible into very small, but definite units or particles which have been given the name of 'quanta' in the plural, or quantum, in the singular.

The quantum is considered to be an indivisible particle of energy, but one whose energy level is determined by its individual frequency.

The known spectrum of electromagnetic radiation covers a tremendous range of frequencies, from long radio waves on the low end, to high energy cosmic rays, on the other.

Near the center of this spectrum is a narrow band of frequencies, covering about one octave, which we call 'visible light' because radiation of these frequencies can be perceived by the human eye. We divide this band of frequencies into seven narrower bands which we call colors. Starting from the highest frequency and going down, we name these colors violet, indigo, blue, green, yellow, orange and red. All of the hues, shades, and tints of color which the human eye can perceive are created by some combination of these seven frequencies.

It was the quantum, or individual particle of radiation in this particular portion of the frequency spectrum to which the term photon was originally applied. The usage of the term, however, has since been expanded to include a considerably wider band of frequency.

Just below the red of visible light is another, and somewhat wider band which we call infrared. Except for the fact that its frequency is below the range of the human eye, infrared has all of the characteristics of visible light, plus the characteristic that its photons are readily absorbed by the electronic shell of force about an atom.

Each different type of atom, of course, has its own characteristic set of frequencies, and only photons in matching frequency bands will be absorbed. However, most of the photons whose frequency lies within the infrared portion

of the spectrum are readily accepted by almost all types of atoms. It is, therefore, with these infrared photons that we are particularly concerned at the moment.

Let us now return for a time to our two hydrogen atoms. We will assume that a proton of infrared radiation, emitted perhaps millions of years before from a star millions of light years away in space, strikes the shell of force about one of our two atoms. If the photon is absorbed, the additional energy thus gained, will cause the shell of force to expand. The expansion of the electronic orbit places the electrons closer together than they were before, while the distance between the protons remains the same. If the two atoms had been poised exactly at the critical distance prior to the absorption of the photon, we would now find that a net repulsion existed, and the two atoms would 'bounce' apart seeking the new point of stability, or critical distance where the two fields would again be in balance.

The shell of the atom does not, however, retain these photons indefinitely, but is constantly emitting them. With each emission, of course, the shell becomes one size smaller.

The mean time between successive emissions is determined by two factors, first the nature of the particular atom, and second by the number of photons which are present in the electronic shell. Each time the shell receives a photon its diameter increases by a precise amount, and with each emission it shrinks by the same amount.

If the number of photons received within a given time, is greater than the number emitted, the two atoms will constantly tend to move farther apart. If the number emitted is greater, the atoms will tend to move closer together. If we now learn that the photon of infrared radiation is also known as the unit of radiant heat, we immediately find that we are able to predict one of the fundamental rules of nature, which is that the addition of heat energy to a body of matter will tend to cause that matter to occupy a larger volume of space, or in simple words to expand. The loss of heat energy from a body of matter will tend to cause that matter to occupy less space, or to contract. We can make this prediction confidently, even though we may never have heard of this rule or observed it in operation.

[A number of other rules of nature may also be predicted through the consideration of the foregoing discussion. Some of these will be mentioned later on in this text.](#)

ESCAPE VELOCITY

Let us now assume that each of our two atoms receive a number of photons simultaneously. The orbits of the electrons, in springing outward, would approach very near to each other, and thus produce a very strong repulsion between the atoms. This repulsion would cause an outward movement of the atoms, with a very high rate of acceleration. By the time they had reached their new critical distance, their velocity might be so great that they would continue to move apart indefinitely. As soon as they had passed the critical distance, of course, the repulsion would become an attraction, and the outward motion of the atoms would begin to slow down. As they moved apart, however, because of the increasing distance between the protons, the attraction would also become constantly smaller.

We can see that if the atoms had achieved a sufficiently high original velocity, the attraction would diminish at a greater rate than the velocity, so that there would always be some outward velocity remaining. The minimum velocity at which this continuous expansion would occur, is known as the 'escape velocity' of the atom.

We have often heard the term, escape velocity, used in connection with the firing of rockets to the moon or to some planet. In this case it is defined as the minimum original velocity which must be imparted to a missile if it is to escape completely, from the gravitational field of the earth. The principle is exactly the same. The gravitational field of the earth exerts a retarding force upon the missile, which constantly slows its outward motion. This retarding force, however, diminishes steadily as the distance from the earth increases, so that if the original velocity is sufficiently high, the retarding force will diminish more rapidly than the velocity, and the missile will continue on and on until it comes into the influence of some other gravitational field and begins to accelerate in that direction.

The velocity of escape from the earth is usually given as being between 7 and 9 miles per second depending upon

whether the missile is being fired toward the moon or away from it: whether it is being fired in the direction of the earth's rotation or in the opposite direction: the position of the sun, whose gravitational field produces its own effect upon the trajectory of the missile; and several other minor factors.

In the case of the atom, the velocity of escape depends upon the type and mass of the atom, its temperature, the number and position of other atoms present, etc. It is, however, always a precise velocity for any given type of atom under any given set of conditions.

STATISTICAL ACTION

So far, in our examination of the nature of matter, our entire universe has consisted of two lonely hydrogen atoms. By the examination of these two atoms, however, we have learned something of the basic forces which actuate all atoms, whatever their size or number.

As long as we are dealing with only two interacting atoms, we are observing absolute forces and specific actions which result therefrom. If we add a large number of other atoms to our original two; as we must if we are to build matter from our atoms, all that we can observe is the *statistical* result of a large number of forces and actions, each of which is absolute in itself, but contributes only minutely to the resultant action of the whole.

Almost all of our present laws of physics are based upon the observation of the statistical results of a very large number of individual atomic or molecular actions. *If we do not understand the individual forces and actions, we have no means of understanding the statistical result of many actions, and so can learn physics only by memorizing blindly the observed results of certain conditions.* It is for this reason that we have spent so much time in observing our two atom universe, but we should now be ready to furnish our lonely atoms with some companions.

If we examine the illustrations to follow at the conclusion of this brief, we will see that the two atoms with which we have become so familiar, are now surrounded by many other similar atoms. We will assume that our two friends have just absorbed some photons of energy, and are 'bouncing' apart. We can see that before they have gone very far, each of them will intrude upon the critical distance of some other atom, and will bounce from that atom in a direction which will be determined by the angle at which the impact occurred. The atom which was 'struck' would, of course, acquire some of the momentum of the striking atom, and its own path and velocity would be altered accordingly. We could create much the same effect if we were to place a large number of billiard balls upon a billiard table, and rush about it with a cue stick, rapidly striking various balls at random, and in different directions. The balls struck would acquire velocity (kinetic energy), some of which would be transmitted to the first ball which it struck. If we moved fast enough, we would soon have all of the balls in constant motion.

The air friction, the rolling friction on the table, and the fact that the balls are not perfectly elastic, would all tend to slow the balls down. Therefore, if we assume that our strokes are all of uniform amplitude, the average speed of the balls would be proportionate to the *number of strokes* which we delivered in a *given unit of time*.

In the case of the atoms, the cue strokes are represented by the photons which they absorb. There is no friction, and the atoms can be considered as being perfectly elastic bodies, but the slowing effect is still present because of the fact that the atoms constantly emit photons as well as absorb them.

By comparison with our billiard table experiment, we can see that the *average velocity* of the atoms will be proportionate to the total number of photons per *unit volume*, which are in circulation at any given moment.

If two or more atoms have combined to form a molecule, the outer shell of electrons which now encloses all of the atoms, absorbs the photons and produces an effect much the same as in the case of individual atoms.

There are, of course, other means by which the velocity of atoms or molecules may be increased. These means will be considered in the following chapter.

TEMPERATURE AND HEAT

The term ‘temperature’ and ‘heat’ are often confused in the mind of the beginning student. In most text books on physics the statement is made that the ‘temperature’ of a body of matter is the measure of the rate of motion of its particles. In simple words, a body of matter is said to be at a high temperature when the atoms or molecules which compose that body are moving at high velocities, and therefore coming into frequent and violent collision with their neighbors. The temperature is said to be low when the particles are moving at low velocities and the collisions are relatively gentle. If the motion should cease entirely, the matter would be said to be at the temperature of absolute zero.

Since all atoms and molecules emit photons so long as any are contained within their electronic orbits, and since the emission or absorption of a single photon will cause oscillation which will ultimately be transmitted to all parts of the matter, it seems obvious that a body of matter can never reach a true state of absolute zero unless all emittable photons have been lost from the body, and no more are being received from any other source. But as all bodies of matter at temperatures above absolute zero are constantly emitting photons and since these photons travel endlessly through space until they are absorbed by matter, it seems unlikely that any appreciable body of matter has ever reached a true state of absolute zero, although the condition has been approached quite closely in laboratory experiments.

Each atom emits photons at a rate that is proportionate to the total number of photons which it contains. This ratio is the same for all atoms of a given element, but varies with each different type of atom or molecule.

Suppose that we have an atom of hydrogen, and an atom of mercury. Let us assume that the atom of hydrogen emits one photon per second for each ten photons contained in its electron shell. The atom of mercury, on the other hand, emits one photon per second for each two photons contained. We can see that if we added one hundred photons to an atom of mercury, we would increase its emission rate by 50 photons per second, but if we added one hundred photons to an atom of hydrogen we would raise its emission rate by only ten photons per second.

We have added exactly the same amount of heat energy to each atom but have raised the emission rate of the mercury atom five times as much as that of hydrogen atom. Since the temperature of a body of matter is proportionate to the emission rate of its atoms, by adding the same amount of heat to each, we will raise the temperature of the mercury much more than that of the hydrogen.

The total kinetic energy possessed by the particles of a body of matter, is known as the active heat of the body, while the total number of photons still contained within the electron shells of the particles is known as the latent heat of the body. The ratio between the active heat and the total heat energy of a body of matter is known as the ‘Specific’ heat of the material of which the body is composed.

The figures which we have given for the emission ratio between hydrogen and mercury are not, of course the correct ones. To give precise figures for these two elements we would have to deal in micro- seconds instead of seconds, and employ figures with a number of decimal places. We have used simple figures only for the purpose for forming mental pictures of what goes on in, and between, the atoms, in order to gain a better understanding of those often confused terms, ‘temperature’ and ‘heat’.

The specific heat of each element is different, and also changes when the elements join to form compounds. That is, when atoms join to form molecules, a change occurs in the amount of heat which must be added in order to raise the temperature to a given degree.

Every element and every compound, however, has a precise ratio of specific heat. Many of these can be found in any handbook on physics or chemistry. The specific heat of water (H₂O) has been chosen as the standard or reference point. Its specific heat is, therefore, said to be 1.000. Since the specific heat of water is high compared to most other compounds or elements, the values of the others are shown as decimal fractions of one.

As we mentioned at the end of the last chapter, the emission or absorption of photons is not the only means of changing the velocity, and therefore the temperature, of atoms or molecules. Obviously, any application of kinetic

energy to the particles will have the same effect.

Let us imagine that a blacksmith is striking his anvil with a hammer. As the face of the hammer comes in contact with the face of the anvil, the outer layer of particles on the face of the hammer, because of their momentum, will intrude upon the critical distance of the outer layer of particles on the face of the anvil. When the repulsion caused by this intrusion tends to halt the forward motion of the first layer of particles, the second layer, which has equal momentum, will intrude upon the critical distance of the first, the third layer will intrude upon the second, and so on throughout all of the trillions of layers of particles in the hammer. A compression wave will be produced which will race back and forth through both the hammer and the anvil until the linear kinetic energy of the hammer has been converted to a proportionate increase in the random velocity of the particles of both masses. We can see that the temperature of the masses would be increased by an amount which is directly proportional to the momentum of the hammer.

If instead of striking the anvil, we were to rub the face of the hammer against the anvil the same effect would be created. Since the surfaces are not perfectly smooth, projections from one surface would interlock with projections from the other. Large numbers of particles would be forced from their normal positions. Some of these would snap back into place when the opposing projection has passed, and some would be torn away entirely. In either case however, the temperature of the mass would be increased by an amount which was proportionate to the force applied to the hammer, and the distance which it was moved.

The striking of the anvil would be described as ‘work by impact’ while the rubbing action would be described as ‘work by friction’.

SOLIDS, LIQUIDS AND GASES

Before going farther in our study of the phenomenon which we call heat, it might be well to consider briefly, the three states of matter which result from the various degrees of heat energy or temperature which the matter may possess at a given time.

Let us consider first, a quantity, or block of atoms or molecules in which the total number of photons contained is small. The orbits of the electrons, and therefore the size of the atom is also small. The oscillation or ‘bouncing’ of each atom will continue, but the path of each bounce will be small because the atoms or molecules are quite close together, and their critical distance is small. Since none of the particles reach escape velocity, each particle will remain in the same relative position with respect to the others. The mass will retain its shape indefinitely, and a considerable amount of outside force would have to be applied to cause the body to change in shape. This condition is known as the solid state of matter.

If, to such a block of matter, we suddenly added a large quantity of energy in the form of photons, the orbits of the atoms would spring outward, the velocity of their oscillation would increase tremendously, and soon every particle would acquire a velocity greater than its escape velocity. The particles in the interior of the mass could not immediately escape because they would still be bouncing about among their neighbors, but the field of each particle would now be repelling all of its neighbors, and the mass would expand rapidly. The particles on the outside of the mass would move outward indefinitely, leaving the next layer free to escape and so on. Matter in this condition is known as ‘gas.’

Specifically, a gas is defined as being a body of matter in which all, or virtually all of its particles have velocities in excess of the escape velocity for the particular conditions in which they exist.

We can readily see that a gas, if released in a vacuum, will expand indefinitely, and if released within a solid container will expand until it is uniformly distributed throughout the volume of the container. Each atom or molecule, upon colliding with another, will glance off in a new direction, and will continue in that direction until another collision occurs.

The average, or ‘mean’ distance which a particle travels between such collisions is known as ‘the mean free path.’ In

a dense, or 'compressed' gas the mean free path would be a very tiny fraction of an inch, but in a very rarified gas, it might be many feet.

The liquid state of matter is not, in the strictest sense of the word, a true state of matter at all because it is dependent almost entirely upon exterior influences, such as the earth's gravitational field, its atmospheric pressure, etc. If we were to take a sample of almost any liquid to a remote point in space where there were no gravitational fields or atmosphere to affect the sample we would find that, even though we maintained the temperature at the same level, the liquid would have the characteristics either of a soft solid or of a gas.

A liquid can be defined as a body of matter whose particles have velocities either slightly below or slightly above their natural escape velocity. Most oils or liquid metals, for instance, can be described as matter whose particle velocities are so close to that of escape that the additional force applied by a gravitational field such as that of the earth is sufficient to cause the particles to escape, or 'flow' in the direction of the force applied by the field. If such matter were removed from the influence of exterior fields, and released in space, it would immediately assume the shape of a sphere, which shape it would retain indefinitely so long as no exterior force were brought to bear. It would, therefore have the characteristics of a very soft solid.

A glass of ordinary water, on the other hand, has the characteristics of a gas, which is prevented from expanding by the pressure of the atmosphere around it.

We can demonstrate this if we take a glass of water which is at, say 100 degrees Fahrenheit, place it in a bell jar, and suddenly remove the air from the jar. The water will immediately begin to boil quite briskly. If we maintain the temperature of the water at 100 degrees and pump out the gas as it is formed, the glass will soon be empty, demonstrating that its particles do have velocities above those necessary for escape. Actually, even though we do not remove the air, molecules of the water will constantly be escaping from the surface in spite of the downward bombardment of the air molecules, and the glass would eventually become empty. This, much slower process of escape by the mingling of the molecules of a liquid with the molecules of a surrounding gas is known as evaporation.

HEAT TRANSFER

In any standard text- book on physics, three methods of heat transfer are usually discussed. These three types of heat movement are known as, conduction, convection, and radiation. Conduction is defined as being the transfer of heat energy from particle to particle in a solid substance.

Convection refers to the transmission of heat, usually in a gas or liquid, where the heat is carried from one point to another by the motion of the gas or liquid which contains it.

Radiation, of course refers to the transmission of heat by the emission of photons, or quanta of heat energy.

In order to gain a simple understanding of heat transfer from the nuclear standpoint, let us perform an imaginary experiment, in which all three of these types of transfer.

We will clamp a bar of iron in a machinist's vise, and to the upper end of the bar, we will apply the flame of an oxy-hydrogen torch.

When two atoms of hydrogen combine with an atom of oxygen, a molecule of ordinary water is formed, but the joining of the atoms causes a large number of the photons of energy contained in the atoms, to be emitted almost instantaneously. The water which is formed, instead of appearing as a liquid, becomes a gas at a tremendously high temperature. The gas is emitting large numbers of heat quanta, and also a few of the higher frequency photons which we call light.

The heat quanta, striking and being absorbed by the atoms of iron in the bar, cause a great increase in the velocity of their motion. The molecules of the gas, of course, have velocities far above that of escape, and as these molecules strike the particles of iron, a large percentage of their kinetic energy is transmitted mechanically, just as

the motion was transmitted by the balls of our billiard table experiment. The energy which is transmitted from particle to particle within the bar itself is known as conducted heat.

Since the incandescent gas is moving from the point of combustion at the tip of the torch, to the surface of the iron, its motion is carrying its supply of kinetic energy to the surface of the iron. This process is described as 'convection' because the heat is being 'conveyed' from one point to another by the motion of the gas which contains it.

The photons of infrared energy which are emitted at the point of combustion, do not, of course, follow the flow of gas, but radiate in all directions at the velocity of light until they strike and are absorbed by the iron, or some other body of matter. This type of heat transfer is, therefore, known as 'radiation.'

The iron bar, while it is receiving a very large flow of photons from the gas, it also, at the same time, emitting a smaller number. We can demonstrate this by continuing to direct the flame upon the surface of the bar. As the temperature of the iron rises, the frequency of the photons which it emits will also increase until finally some of the photons will have frequencies in the lower part of the visible spectrum, and we say that the bar is becoming 'red hot.' If we add still more heat, the frequency of the emitted photons will continue to increase and we will see that the bar has become white hot.

The iron particles are now approaching their escape velocity. If we continue to add heat, we will soon find that the force of the earth's gravity will be sufficient to cause those particles, which are moving in the direction of its attraction, to move beyond their normal range. The mass will begin to move, or 'flow' in the direction of the gravitational attraction. When this occurs, we say that the iron has 'melted.'

Having observed the transfer of heat from a gas to a solid, by heating the gas, let us see if we can raise the temperature of a gas without adding any heat.

We will imagine a simple steel cylinder, closed on one end, and with a closely fitting piston in the other. Through a small hole in the closed end we will insert the bulb of an ordinary mercury thermometer, sealing it so that no gas can escape from the cylinder. If we allow this apparatus to rest quietly upon a table in our laboratory, and maintain a constant air temperature in the room we will find that the air inside the cylinder, the air outside the cylinder, and the material of the cylinder itself will soon reach the same temperature. If we now suddenly push the piston halfway down in the cylinder, so that the gas within is compressed to half of its original volume, we will find that the temperature of that gas has risen sharply. The total number of photons in circulation has not increased, but because the volume has been reduced, more photons are in circulation per unit volume. This means, of course, that the walls of the cylinder, which are in contact with the gas, will receive more photons, per unit area, than they were receiving before the gas was compressed. The walls of the cylinder are, therefore receiving heat energy from the gas.

The total kinetic energy of the gas within the cylinder also remains the same, but because of the compression, the mean free path of the particles is shortened. Collisions become more frequent and more violent. This increase of oscillation rate is also transmitted to the walls of the cylinder.

Since the bulb of the mercury thermometer, which we inserted into the cylinder, is surrounded by the compressed gas, a proportionate amount of the energy will be conducted to the mercury in the bulb, causing it to expand. By observing the amount of expansion of the mercury, we can measure the rise in temperature caused by the compression of the gas.

The extra heat absorbed by the walls of the cylinder will gradually be passed along to the air outside, until the gas inside has reached its original temperature. It now, however, contains less heat than it had before. By compressing the gas, we have literally 'squeezed' some of the heat out of it.

If we now draw the piston out to its original position, the gas will expand to fill its original volume. The mean free path of the particles will be lengthened, the collisions, will be fewer, and the number of photons emitted, per unit area will be smaller than the number which the gas received from the walls of the cylinder. In other words, its

temperature has gone down, and the gas is now taking back from the cylinder, the heat which it gave up when it was compressed. A proportionate amount of heat will, of course, also be taken from the bulb of the thermometer, causing the mercury to contract, and thus to indicate the lower temperature.

Almost all of the commercial and household refrigeration systems in use today are based upon the principle of compressing a gas in one part of the system, dissipating the heat released at that point, and then allowing the gas to expand in another part of the system, so that it will continuously take up heat from that part.

PRESSURE

In our experiment with the cylinder and the piston, we discovered that a considerable amount of force was required to push the piston into the cylinder. Much more than that would be required to overcome the friction between the piston and the cylinder. We also noted that as long as the gas was compressed, a force continued to act upon the piston, tending to push it back out to its original position. We can readily understand why this should be so. In fact, even our brief consideration of the actions of gas particles has enabled us to predict that it would be true, even before we performed the experiment.

When the surface of a solid is in contact with a gas, the particles of the gas because they are moving at random in all directions, are constantly impacting, or beating upon the particles of the solid. The millions of tiny impacts which occur each second, produce a constant thrust or force upon the surface of the solid. We call this force 'the pressure' of the gas.

We can see, at once, that the amount of this pressure, upon a given area will be determined by three factors. First – the number of particles which strike the given area in a given time. Second – the velocity of the striking particles. Third – the mass of the striking particles. We can also see that the number of particles which will strike a given area in a given time will be determined by the number of particles contained within a given volume of the gas, and upon the rapidity with which they oscillate.

These facts bring out the close relationship which exists between temperature and pressure in a gas.

Stated as briefly as possible, the temperature is the measure of the total kinetic energy present, per unit volume, while the pressure is the force which that kinetic energy exerts, per unit area, upon any restraining surface.

For example, the air which we breathe is a gas composed principally of two elements, oxygen and nitrogen. But for two preventative factors, all of the earth's atmosphere would long since have been diffused into space. The first factor is the earth's gravitational field, which constantly tends to draw all of the particles back to the surface. The second is the fact that the particles at the outer edge have lower temperatures and therefore lower velocities than those near the surface.

If we assume that we are at sea level, and that the temperature of the air is 0 degrees centigrade (32 degrees Fahrenheit) the number of particles in each cubic inch of space will be about 400 quintillion. (400, million, million, million.) The average velocity of the particles will be about 1,760 feet per second, or twenty miles per minute. This velocity becomes even more remarkable when we realize that average distance which any of these particles can travel before colliding with another is only about four millionths of an inch. This means that each particle undergoes an average of more than five billion collisions per second. The kinetic energy of these collisions is sufficient to produce a constant force of 14.7 pounds upon each square inch of surface which receives these impacts. This is why we say that the air pressure at sea level is equal to 14.7 pounds per square inch.

We can readily see that the individual forces and masses of atomic or nuclear particles are exceedingly small when compared to our usual standards of measurement. Most of the quantities with which we must deal in the study of nuclear physics are so infinitesimal in comparison with our everyday standards, that it has been necessary to create new and much smaller units of measure in order to deal readily with these minute quantities.

Since these standards of measure may readily be found in any test book, we have not dealt with them here. We have

considered the photon, the neutron, and the electron without determining their size or mass. We have discussed the constant rapid motion of the atom without measuring the particles, the length and their mean free path, or the frequency of collision (except for the one example, air, which we have just considered.) All of these quantities are listed in handbooks, created for the engineer or the physicist who must obtain specific answers to specific problems. In this text we are primarily concerned with bringing about a simple understanding of the significance of these factors, and the conditions which cause them to exist.

The reader, who has perused these pages carefully and diligently, will already have achieved a degree of understanding sufficient to enable him to predict most of the laws of thermodynamics, which fill hundreds of pages in present day textbooks.

We will therefore take leave of our particles for a time in order to consider a few of the least understood factors of nature, gravity, space and time.

.....to be continued

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Pathfinding Purpose & Objectives

Lifestyles Unlimited is a reader's online newsmagazine offering an open forum for both the professional and the nonprofessional. Our intention is to provide a medium where the reader may enjoy the debates on the controversial issues/ fundamental dilemmas of the day, and to contribute to the research and exploration of innovative concepts that will give us a choice in how we approach the Future.

Due to its coincidental similarity of purpose to Noetic Sciences Pathfinding Project, and hopefully, a greater awareness level today, of dilemmas threatening our survival, we are reactivating this newsletter online.

The purpose of this newsletter is:

- to stimulate the development of new paradigms across multiple disciplines.
- to unveil and integrate the anomalies of scientific reductionism and determinism that impede our perception of a larger, sustainable and healthy reality.
- to reach the 'ah ha' comprehension of the radius of curvature of natural law, identifying it's characteristics and application..... that apparently, even ancient civilizations were aware of.
- to act as a vehicle and network for data assimilation, until sufficient evidence warrants research, testing, experimentation and development.
- to acquire sponsors to fund research at appropriate universities and educational institutions.

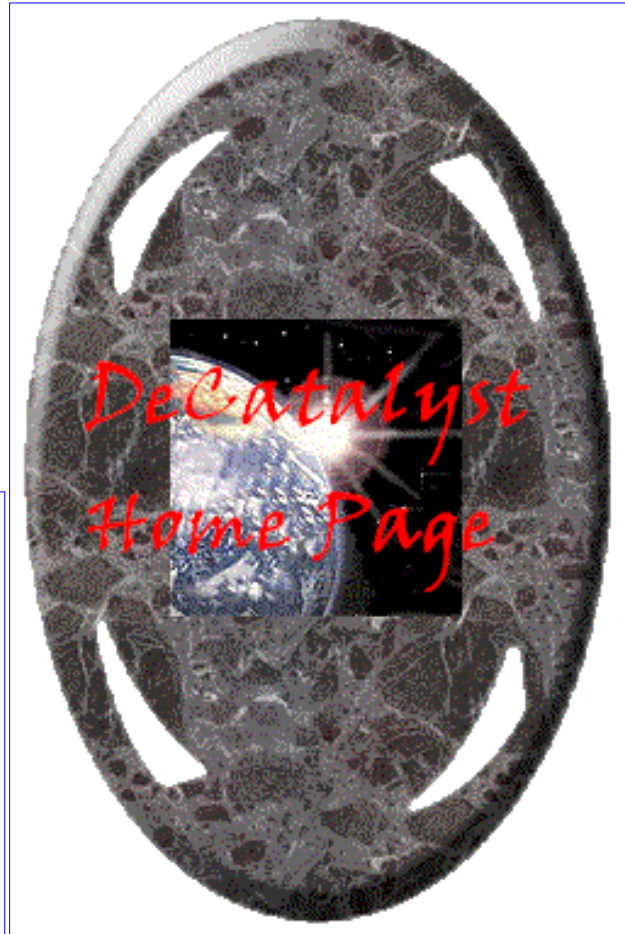
We feel strongly that the dialog between the professional and layman must be broadened. Here is a platform that allows both the professional and nonprofessional to communicate some of the thoughts that concern the future of the physical, mental, and spiritual sciences with reference to sustainable life on this planet.

We welcome disciplined and innovative thought from all quarters. Those who wish to express themselves without the peer review of professional journals, are welcome to contribute. We expect the layman who contributes will know and understand his/her subject matter sufficiently to present it with clarity and credibility. Personal observations and experiences, that have/can be replicated/or confirmed by others are also welcome.

Those who recognize or experience tendencies described in The Ten Insights (tendencies, which, regardless of critics, may be found underlying all major religions), may also express their views. One area of interest, perhaps is unspoken communication occurring with greater degree of clarity and frequency, not only between individuals, but between individuals and a "group consciousness", a morphic resonance, perhaps.

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