A Proposed Unified Theory of Human Nature
Based Upon
Thermodynamics, Electrodynamics and Emergence

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This theory envisions a universe which is finite and competitive rather than infinite and harmonious. It is a universe which is lawful, yet unpredictable in many of its emergent expressions. It is a causal universe, but not a determined universe. It is a universe which can be understood within the potential of the "tools" presently available. This is not to suggest that we (the generic "we") are there yet. It is a "work in progress."

1. Introduction

This is a shortened version of an abstract which appeared in Vol. 7, No. 2 of the Proceedings of the Natural Philosophy Alliance. In that abstract, we asked the question, "What drives the formation of complex structure?" In this version we propose an answer to that question. Our answer is, "The second law of thermodynamics." We suggest that what the second law means, in its description of ever increasing entropy, is that all matter is programmed to give up energy. Giving up energy makes energy available to form bonds which are the basis of new structure. The laws of electromagnetism subsequently dictate the exact formation of structural bonds. The second law does not have a strict time parameter, which is the reason for the uncertainty/probability function in quantum mechanics and the life cycle of living structures. This proposal is suggested by the work of NPA members, Professor Dr. Tolga Yarman, Dr. Garret Sobczyk, Professor Dr. Rati Ram Sharma, Professor Dr. Mahmoud Melehy, Professor Jaroslav G. Klyushin and Mr. Greg Volk. It is also consistent with and suggested by the work of Dr. Peter Atkins, Professor of Chemistry at Oxford University.

2. The Laws of Thermodynamics

Albert Einstein (1879-1955) and Sir Arthur Eddington (1882-1944) believed that the laws of thermodynamics were the laws of physics least likely to be falsified.

A theory is the more impressive the greater the simplicity of its premises is, the more different kinds of things it relates, and the more extended is its area of applicability. Therefore the deep impression which classical thermodynamics made upon me. It is the only physical theory of universal content concerning which I am convinced that, within the framework of the applicability of its basic concepts, it will never be overthrown (for the special attention of those who are skeptics on principle). Albert Einstein "Autobiographical Notes" (1949) [1]

The law that entropy always increases - the second law of thermodynamics - holds, I think, the supreme position among the laws of Nature. If someone points out to you that your pet theory of the universe is in disagreement with Maxwell's equations - then so much the worse for Maxwell's equations. If it is found to be contradicted by observation - well, these experimentalists do bungle things sometimes. But if your theory is found to be against the second law of thermodynamics, I can give you no hope; there is nothing for it but to collapse in deepest humiliation.

Sir Arthur Stanley Eddington, Gifford Lectures delivered at the University of Edinburgh (1927) Lecture IV "The Running-Down of the Universe" [2]

We begin our reasoning about human nature with the laws of thermodynamics. As material members of our universe, human beings are constrained, if not necessarily explained, by the laws of physics.

The first law of thermodynamics, the law of the conservation of energy, suggests that there is a finite amount of energy in our universe. In his Special Theory of Relativity, Albert Einstein equated matter with energy, thus conserving matter in line with the first law. (For a history of the development of this equation prior to Einstein's enunciation of it, see "*E = MC 2 - A Biography of the World's Most Famous Equation*" by David Bodanis, Berkley Books, New York, 2000.)

We propose a corollary to the first law of thermodynamics: In a universe of finite energy and matter, some things necessarily exist to the exclusion of other things. Therefore, competition for existence is a core principle of our universe.

Caveat: For those who do not believe that the conservation law implies that the total amount of energy is finite and for those who do not believe in the equivalence of matter and energy, the corollary to the conservation law still holds, because of the limitation upon "locally available energy" at any point in space and time.

The second law of thermodynamics, the law of continually increasing entropy, dictates that no structure is permanent. The law of entropy continually stirs our finite pot, thus ensuring that the competition for existence is dynamic. The chemist, Peter Atkins, argues in his book, *Four Laws Which Drive the Universe* (2007), that this is indeed what happens. [3]

Biochemists, following Josiah Willard Gibbs (1839-1903), recognize that living structures must continually expend energy in order to maintain themselves in the face of the second law. In order to expend energy, living structures must consume energy and other material structures external to themselves. This necessity to consume other structures, in order to survive, exacerbates the core competitive survival principle in our universe. All living structures are thermodynamic systems. "*Energy must be expended to pay the price of organization.* "(See *Biochemistry Third Edi-*

tion (2000) by Christopher K. Mathews, K.E. Van Holde and Kevin G. Ahern) [4]

Returning to physics, we see the same principle. NPA members, Dr. Garret Sobczyk and Professor Dr. Tolga Yarman, in their paper "*Unification of Space-Time-Matter-Energy*" demonstrate that the creation of binding energy (to create structure) requires the loss of energy from the 'rest mass" of a particle. They state, "if we want to boost the mass from the rest-frame into the instantaneous frame we must expend energy to get the job done" or "we must pay for the work done by deducting the required energy-equivalent from the mass." Further, "At the atomic level, our insistence upon the strict local conservation of the total energy of each particle means that whenever an elementary particle undergoes a change in its kinetic energy, it must pay for it with a corresponding change in its instantaneous rest-mass." NPA member Greg Volk is doing similar work on the self-energy of particles/systems/structures/objects as contrasted with the field or interactive energy of particles/systems/structures/objects. Mr. Volk distinguishes between bonding energy and binding energy. Binding energy is utilized to hold a particle together (its self-energy) and bonding energy is utilized to form bonds between particles. It may be that this distinction continues as we proceed up the levels of increased structural complexity. A bonding energy, as perceived from the standpoint of the particle or "part," becomes binding energy as perceived from the standpoint of the whole at each new level of structural complexity. [5][6]

This brings a certain scenario to mind. All particles/systems/objects have self energy or rest energy which is the measurable energy when the particle/system/object is totally isolated. These structures give up some of that self energy to form a bond with other structures. Sub-atomic particles give up energy to form electrons and protons. Electrons and protons give up energy to form atoms. Atoms give up energy to form molecules. Molecules give up energy to form gases, liquids and solids. Some gases give up energy to form liquids. Liquids give up energy to form solids. Under certain circumstances, gases give up energy to form weather systems. Carbon molecules give up energy to form proteins. Proteins give up energy to form organs. Organs give up energy to form organic systems or living organisms. Living organisms give up energy to create conscious awareness. Cosmic structures follow a similar pattern of energy transfer from binding energy to bonding energy to dissolution. The process by which energy is conserved and expended to do the work of creating structure is thermodynamic. The operational details of how bonds are created and broken is electromagnetic.

We suggest that what the conservation law means is that energy is "handed" from one structure to another structure (or the structural field) as we move up the chain of increasingly complex structure. We suggest that it also means that material structures are "programmed" to give up energy. When an appropriate partner is available, the energy is transferred/given/expended into bonding/binding energy with that partner. When an appropriate partner is not available, the energy is expended as radiation, motion or photon emission with the inevitable (sooner or later) dissolution/decay of the structure at whatever level of structural complexity. We assume here that heat is motion, consistent with thermodynamic theory, and that what is visible with night vision goggles, as the heat emanating from a living organism, is molecules in motion. This scenario is obviously based upon "local" action with respect to energy transfer. This scenario does not commit "information" transfer to local action although it may. Dr. Yarman and Dr. Sobczyk suggest that the field carries only "information" and not energy and, in our reading, they appear to distinguish between energy and forces in the universe, which we do not in the sense of thermodynamic conservation. Forces are emergent representations of energy determined by the laws of electromagnetism. Our scenario suggests that the "space" in our universe is not empty. It suggests that all particles in the universe are connected, in order that energy may be transferred by motion, as many NPA members believe. What is debated is whether that connection is by particle fields or by the existence of the aether. (Einstein redux.) [7]

For energy to be conserved, it has to be handed off from one form of matter to another, either as self/binding energy or as bonding energy. (The energy lost from the standard kilogram of platinum and iridium locked away in France must have gone somewhere.) In his paper, *A Matter of Definition,* Greg Volk argues, consistent with the views of Dr. Charles W. Lucas Jr. and other NPA members, that energy is a property generated by the motion of matter. While I am in agreement with all of the other points made by Mr. Volk in this and other papers he has written, I have to differ on this one fundamental point. If energy can be expended, conserved and stored, it is a fundamental "thing" and not a property. As Mr. Volk points out in this paper, matter cannot exist without motion. Motion is energy, so matter cannot exist without energy and energy cannot exist without matter. (This is NPA member, Dr. Glenn Borchardt's Scientific Assumption # 4, "INSEPARABILITY.") Therefore matter and energy together are the fundamental "things" or "thing" of this universe. A subtle distinction, but, an important one. NPA member, Professor Rati Ram Sharma, has postulated that the fundamental indivisible non-composite elements are two with opposite charges and opposite (right or left handed) ½ spin. These two non-composite elements form a particle from which all matter and energy arise. Mr. Volk also postulates a fundamental non-composite element. Mass is an emergent property of matter and energy. There are no Higgs bosons here. [8] [9] [10]

The next question is, what force drives particles/structures to give up energy? We have an available candidate. According to the biochemists, Mathews, Van Holde and Ahern, "*For all chemical and physical processes, it is the competition of enthalpy and entropy terms that determines the favorable direction.*" [11]

We can clearly see the effects of the second law of thermodynamics at the end product of complex thermodynamic systems. Energy must be given off (into the cold sink) if the thermodynamic process is to do work. If there is no way for energy to be given off, the system does not do work. So the rule of the second law is that energy must be given off for work to be done. The process is spontaneous. Work results in the creation of structure. Work also results in motion which can be associated with or independent of the creation of structure. Under appropriate circumstances, the energy given off can be used to bind/bond particles into greater levels of structural complexity. When the "end

of the line" has been reached and there are no appropriate circumstances, energy is simply given off to available particles as heat/motion or radiation.

In their book, *Subatomic Physics (2007*), Ernest M.Henley and Alejandro Garcia, report that "*The data suggest that a particle decays if it can and that it is stable only if there is no state of lower energy (mass) to which it is allowed to decay.*" This is a reflection of the second law. What our scenario proposes is that the energy given up in the process of decay can be utilized to form new bonds if appropriate particles are available. [12]

The energy given off, by thermodynamic processes, has been considered "useless" heat energy since the laws of thermodynamics were first enunciated. However, if our principle/scenario is correct, that energy is always "handed" from one form of matter to another, useless heat energy and radiation end up in particles or in the "fields" of particles where they are in a position to begin the process of giving up energy to form structure all over again. This is what gives the second law its directionality. Energy must always be given up. This means deterioration of the self energy in a particle. However, to repeat, in giving up energy, the particle may use that energy to cling/bond/bind to another particle. One could say, as Dr. Yarmin does that the goal of this process is human conscious awareness. One can also possibly see why the concept of sacrifice (something must be given up for good things to occur) is so deeply ingrained in human consciousness. [13]

NPA member, Dr. Glenn Borchardt, has proposed that there is a complementary principle which balances the second law and which "drives" the creation of order. We agree that such a principle has to exist and propose that it may be found in electrodynamics. Dr. Borchardt suggests that it can be found in the unification of thermodynamics with mechanics. Dr. Borchardt posits that "*Noncomplementarity,* the indeterministic alternative can exist only in a finite universe in which the system is considered more important than its environment. The rejection of this "system myopia" will be the culmination of the great work that Copernicus began." Since we believe that there is a "cause" or reason why we care whether we live or die, we will stick with the "system myopia." We agree with Dr. Borchardt's premise, which is why we believe that at least matter and energy must be finite. (Time and space as non-actors can be infinite.) This is a fundamental assumption from which all else flows. It remains to be seen which assumption, that matter and energy are finite or infinite, has the greater explanatory and predictive power. [14]

The second law has no fixed time parameter. It only has time probabilities under certain circumstances and types of structures. This scenario implies a degree of probability in whether or not particles are available to form bonds. Gravity, chemical, and nuclear reactions will predictably occur if objects/particles are conjoined in time and space. Experimenters will see to it that objects/particles are conjoined in the laboratory. Nature is less reliable in that regard. Given availability, there is certainty. However, there is no certainty as to availability in nature. The reason nature is less reliable, as to availability, is the indeterminancy of the time factor of the second law of thermodynamics. When a particle/object will "choose" to give up its binding energy cannot be precisely predicted. Such an "action" can only be predicted within a probabilistic range of time. This is what quantum mechanics is all about.

In his 1958 Gifford lecture, "The Development of Philosophical Ideas Since Decartes in Comparison with the New Situation in Quantum Theory", Werner Heisenberg (1901-1976) says,

"The law of causality is no longer applied in quantum theory.....Let us consider a random atom, which can emit an a-particle. The time for the emission of the a-particle cannot be predicted. We can only say that in the average the emission will take place in about two thousand years. Therefore, when we observe the emission we do not actually look for a foregoing event from which the emission must according to rule follow. Logically it would be quite possible to look for such a foregoing event, and we need not be discouraged by the fact that hitherto none has been found. But why has the scientific method actually changed in this very fundamental question.....Two possible answers can be given....The one is: We have been convinced by experience that the laws of quantum theory are correct and, if they are, we know that a foregoing event as cause for the emission at a given time cannot be found. The other answer is: .....We know the forces in the atomic nucleus that are responsible for the emission of the a-particle. But this knowledge contains the uncertainty which is brought about by the interaction between the nucleus and the rest of the world. [15]

The "cause" can be the second law of thermodynamics, which requires structures to give up energy. That is the rule and it does not have to have a strict time parameter. Causality can be restored in a theoretically economic manner.

Once a particle/system/object has given up energy, the Gaussian laws go into effect distributing the energy throughout the field of the particle/system/object which permits the opportunity for other bonds to form. The field of a particle/system/object is considered to be inseparable from its core particle/system/object so that the energy does not really leave, it simply moves from the core binding energy to the field energy where it is available to form bonds. Significantly, the Gaussian laws also do not have a time parameter. They are triggered by the release of energy by the particle/system/object. In his paper, *The Meaning of Maxwell's Equations*, Greg Volk describes how the Gaussian law "D" spreads matter with its energy throughout the "field" of the particle/system/object and Gaussian law "B" creates a closed charge loop or circuit. When circuits are closed particles containing energy move along the circuit. [16]

This scenario suggests that the second law of thermodynamics releases binding energy and the Gaussian laws spread and create the circuit along which energy flows creating and destroying complex structure as it moves along. The circuit is "doing work." The destruction of structure is necessary because of the first law - the conservation law - and its corollary, that not all structures can exist simultaneously, because there is a finite amount of energy in the universe, or at least in the universe of a single circuit. Mr. Volk states that because of Gauss "B", particles, which are loops of charge, cannot be created or destroyed because it would create a "break" in the loop. Obviously all particles, except the non-composite particles are destroyed all the time. Therefore, one can postulate that there is an all encompassing circuit created by Gauss "B" which is not broken and thereby conserves energy and matter in the universe. Particles are the topological "nodes" which come and go and are described in Marko Rodin and Greg Volk's paper, *The Rodin Number Map and*

Rodin Coil. NPA member, Dr. Christo Christov, refers to particles (structures) and charges as local deformations of the metacontinuum. It is not the fundamental particles of matter described by Dr. Sharmon and Mr. Volk, which are destroyed, but the structures emerging from them. All things/structures/forces emerge from the finite fundamental particles of matter/energy. Hence our corollary to the Conservation law. (See discussion of **Emergence** below.) We are in general agreement, as far as we can understand, with the views of NPA members, Drs.Wallace Thornhill and David Talbott in their book, *The Electric Universe* (2007). [17] [18][19] [20]

A further point: The process of the release of binding energy, which we propose is driven by the second law of thermodynamics, appears to be accomplished, at least initially, by a reduction in the radius of the particle/system/object. Because of the inverse square law, which appears to operate at all levels of structural complexity, reducing the radius reduces the binding energy required. Dr. Sobczyk and Dr. Yarmin support this as do Henley and Garcia. Greg Volk points out in, *The Meaning of Maxwell's Equations*, that this is a function of Ampere's Law and its derivative "H or magmentum (current moment)" which is a measure of current per length. Ampere's Law does have a time parameter once the process is initiated. [21] [22] [23]

Professor Dr. Yarmin presents a powerful argument to the effect that all relativistic effects can be predicted from the conservation of energy and he presents a universal matter architecture detailing how structures are formed as energy is "handed" off. [24].

Professor Dr. Mahmoud A. Melehy has developed a general theory based upon Einstein's 1905 theory of Brownian motion. This theory proposes that the first and second laws of thermodynamics require electric charges at most interfaces which explains such phenomena as surface tension, capillarity, atmospheric electricity and static electricity. [25]

The work of Dr. Yarmin and Dr. Melehy demonstrate the enormous explanatory power of the laws of thermodynamics. This explanatory power may continue to be further exploited and Einstein may come to understand that "the framework of the applicability of its basic concepts" extends much further than he thought.

Professor Jaroslav G. Klyushin is doing work on thermodynamic fields and believes that thermodynamics and electrodynamics can be unified. [26]

In the 2007 edition of the NPA Journal, Dr. Cynthia Whitney provided a very profound approach to the Periodic Table by presenting it as the Periodic Arch. The Arch is a pattern frequently found in nature. She presents a graph of ionization potentials, derived from algebra, which resembles the periodicity of the normal sinus rhythm observed in an electrocardiogram of a human heart. The original Periodic Table permitted the prediction of the existence of additional elements. Dr. Whitney's Periodic Arch, and accompanying algebraic equations, permit the prediction of the ionization potentials of elements currently known and unknown. The Periodic Arch and Dr. Whitney's adjoining article, "On the Visual Images that Galaxies Create" lead us down the road toward an understanding of the formation of structure. [27]

3. Space and Time

We agree with NPA member, Peter F. Erickson, on the absolute nature of time and space. That is we do not believe that time and space are warped or causative. There is no past or future to travel to. The quantum world (and entropy) teaches us this, in the lack of reversibility, and the fact that actions preclude other actions. There is directionality. In a material world, past events leave material records (including human memory) which are a source of information, but the past no longer exists. The future does not exist. Events in the "now" moment "create" the future next moment into infinity. Again, the sequence of the moments of time is also essential to the functioning of thermodynamic systems. It is the instruments to measure time and space, that is the relationship between objects and between events, which are the challenge. [28] [29]

In the 1958 Gifford Lecture, *Quantum Theory and the Roots of Atomic Science*, Heisenberg states, *But the possibility of empty space has always been a controversial problem in philosophy. In the theory of general relativity the answer is given that geometry is produced by matter or matter by geometry.* We remind the philosophers, that thermodynamic processes cannot take place without relatively empty space for the "cold sink." Our scenario proposes that the energy "dumped" into the "cold sink" is actually "handed off" to particles of matter, but those particles must be free to move. Matter and energy exist within relatively empty space, and they fill or empty (or produce) that space as the thermodynamic processes proceed. In listening to and reading the work of NPA members, however, we are becoming increasingly impressed with the role of geometry in the architecture of structure and its relationship to the dynamics of energy and the "emergence" of properties. [30]

Space and time are probably infinite. Space may take many forms, but it is inert. It is primarily a measure of the relationship between objects and that relationship is geometric. (It is matter and energy that are finite.)

Alan Newman, in his article "The Perpetual Emergence of Space" published in the NPA Journal for 2007 proposes that space emerges from matter. As we struggle with what it is that is fundamental, from which we can begin our reasoning, we are all confronted with the problem enunciated by Aristotle as to the identity of the "first mover." We are free to start from different assumptions about the fundamentals, whether it be time and space or matter and energy or any combination. We then start our reasoning process, supported by evidence at each logical step, (or not if the evidence does not exist, but might) and we see how far our logic will carry us. If we are attempting to solve a rather restricted problem, the logic does not have to carry us very far. If we are trying to solve the problem of the nature of the universe and the life upon it, we have to keep trying to see how far we can go. Any initial assumption is a reasonable starting point. Dr. John R. Warfield, in the same NPA Journal has another perspective on space, "Consequences of the Theory of Inflowing Space." [31] [32]

We propose, that time, the infinite series of "now " instants, is essential to effect "choice". "Choice" is that irreversible action which limits future "choices," which is described in the quantum mechanics of sub-atomic particles. Time is neutral with respect

to the "choice", but its inevitable progression ensures a sequence of "choice". The sequence of choice is essential to the creation of structure. Structures are "built" "choice" by "choice". Hence, also, the necessity of the quantum of energy.

4. Gravity

Gravity is a binding force and in line with our proposal that self energy is sacrificed to create binding/bonding energy, bodies such as the sun and the earth which exert gravitational force, give up self energy to do so. We know that neither the sun nor the earth will last forever. Like all material objects they are programmed to give up energy. If we follow the concept that energy is handed off from structure to structure, gravitons or the aether are candidates to carry gravitational force. There are many NPA members who support the existence of the aether. Binding energy can be either a push or a pull. The details of how energy effects bonds is what physics and chemistry is about.

NPA member Thomas N. Lockyer sees gravity as binding energy in which "bonding" occurs as a result of nature's attempt to replace missing energy (the atomic mass defect) in each of two different bodies with energy which becomes shared and replaces the mass defect. Mr Lockyer has developed *Quantum Vector Particle Physics* which provides geometric models of energy and the energy structures of particles from which he can derive physical constants. [33]

Bonding is a behavior, which occurs at various levels of structural complexity. It includes nuclear bonds, chemical bonds and quantum entanglement, as well as, the parent-child bond, the pair- bond, and the fraternal bond which can be observed in living structures. Understanding gravity as a bonding process, as Mr. Lockyer has done, may help to unite gravity and the quantum world. Bonding works differently, at different levels of structural complexity, but it is always based upon information and mutual recognition. The "field" is the spatial area within which the energy/information/message may be effectively communicated.

The energy given off by the sun supports all life on earth. The life giving energy traverses the distance between the sun and the earth. NPA member, Gary Willits, gives a good discussion of the role of the sun in this regard in the 2007 NPA Journal. Gravitational energy/force can likewise travel [34]

We know that the sun is giving up energy and will eventually burn out. What is perhaps of more immediate concern is the conceivable loss of self-energy of the earth. There are reports that the earth is expanding. If it is expanding it could be because of loss of self-energy which internally binds the earth together. A reduction in radius will permit a smaller amount of energy to effect the binding of a structure. If the structure continues to lose energy, the binding energy may drop below a minimal amount required for binding and the structure may begin to expand. If the earth is expanding, it could also contribute to global warming, because the surface of a larger earth would be closer to the sun. The loss of self energy could also contribute to earthquakes as the internal binding energy is decreased. The question also occurs as to whether or not the extraction of energy/mass from the earth in the form of oil and minerals is significant enough to hasten the loss of earth's self-energy.

We propose that matter and energy are emergent. We propose that mass is an emergent property of matter and energy, and that gravity and inertia are emergent properties of mass. We propose that gravity and inertia are competitive forces which, together, maintain the cosmic structure. Their relationship is geometric as befits structural relationships. Erik Verlinde of the University of Amsterdam is proposing that gravity is an "entropic" force emerging from the interplay of mass, time, and space. Verlinde sees gravity as emergent, and he sees it as somehow related to entropy. Our approach would say that energy is emergent and gravity is an emergent binding/bonding form of energy which creates structure. Gravity is "entropic" because it requires the loss of self-energy which is dictated by the second law of thermodynamics. [35]

In the March/April 2010 issue of *Galilean Electrodynamics*, NPA member, Morton F. Spears (deceased) suggests that gravity is electrostatic. His approach is consistent with this scenario. Dr. Spears finds that a reduction in the radius of a particle reduces the energy/mass so that the sum of the energy/mass of the whole is less than the sum of the energy/mass of the parts taken in isolation. Greg Volk also discusses this finding. [36] [37]

5. Quantum Mechanics

Just when we were in the process of producing certainty in our universe, we discovered quantum mechanics. Uncertainty is a controversial issue. Nonetheless, we have to deal with it. Watch a weather report. The sun will rise and set at a precise time. However, there is a 60% chance of rain and the possibility of a tornado. It would be very beneficial if we could say with certainty that a tornado will occur or it will not, but we cannot. We can also not say, with certainty, how long we will live, whether or not we will get cancer or who will be the next President. We can give probabilistic predictions on all of these events given certain risk or other factors. We suggest that this uncertainty is related to the fact that the second law of thermodynamics has no time parameters and the existence of "choice." When a particle will give up its energy can only be known probabilistically and, therefore, what happens subsequently is also probabilistic. The only reason we can say with precision when the sun will rise and set is that the sun has not yet given up enough of its self energy to alter its gravitational affect.

There is much similarity between the behavior of quantum particles and biological organisms. As is well known, the first experimental observation, of the behavior of atoms, was done by a botanist, Robert Brown (1773-1858), who also named the nucleus. Roger Penrose points out, in discussing quantum mechanics in his book, *The Road to Reality* (2005):

In quantum mechanics, one has to consider that the various possible things that "might" happen, in a physical situation, can all contribute to the quantum state, and therefore all these alternatives have an influence on whatever it is that does happen.

This is exactly what the biological and the social sciences have to deal with. [38]

The "collapse of the state vector" is one of the mysteries of quantum behavior. A probe is inserted and behavior changes. Where have we seen that before? A probe is inserted next to a single celled amoeba, and the amoeba stops what it is doing, and

withdraws. In living structures, it is called awareness - responsiveness to stimuli. As we have said, there is much in the probabilistic behavior of quantum particles, which parallels the probabilistic behavior of living structures. The behavior of the structural levels, in between quantum particles and living structures, is, fortunately for us, much more deterministic. Deterministic behavior, may also be an emergent property, at the atomic level of structural complexity, which cannot be predicted, based upon behavior at the sub-atomic level of structural complexity.

6. Darwin and Biological Evolution

This leads us to the biologist, Charles Darwin (1809-1882). There are three parts to Darwin's theory as outlined in, *The Origin of Species by Means of Natural Selection* (1859), *The Descent of Man and Selection in Relation to Sex* (1871), and *The Expression of the Emotions in Man and Animals* (1872). The first is his theory of evolution. The second is his theory of natural selection. The third is his evidence of innate competitiveness, which we consider to be the most important part of his work, certainly the most neglected part. Darwin also incorporates the economist and demographer, Thomas Malthus (1766-1834), who, in his *Essay on Population (1798)*, observed that the multiplicative reproductive rates of living structures exacerbates the competitive survival principle. [39] [40] [41]

Based upon the assumption that all conceivable material structures cannot exist simultaneously, it can be demonstrated that all structures have survival requirements i.e. conditions which must be met for the particular structure to continue in existence. In living structures we call these survival requirements "needs" and living structures/organisms expend energy to meet these needs.

We have developed a classification system for the survival needs of living structures, including humans. Each class of needs has specific characteristics, awareness of which may help researchers to sort things out. There are two major sets of need classes. The first set includes those classes of needs which are essential to individual survival. It means, these needs are met or the individual dies or is severely damaged. The need for food and oxygen are classic examples of this class of needs. The second set of need classes includes those needs, that are essential to the survival of the species, but are not essential to the survival of the individual. This is an important distinction. The individual can survive without meeting these needs, but the species will not. In consequence, by design and/or through natural selection, these species survival needs are provided with strong internal drives, which are necessary to encourage individuals to engage in these behaviors, which tend to put them, as individuals, at risk. Sexual reproduction is the classic example of this class of needs. There is a third unique need or drive called "the need to self-actualize" which is discussed below.

The biologist, Richard Dawkins, does not believe that species survival requirements play any causative role in behavior. He and the ethologist, Konrad Lorenz (1903-1989), among others, disagreed on this point. Dawkins believes that the individual gene's drive to maintain and reproduce itself, drives all behavior. We point out, that individual genes cannot survive outside of a system. In addition, postulating the existence of species survival needs, increases explanatory power. [42] [43]

The need classes exhibit time parameters in their expression and they exhibit interference patterns. Interference patterns are also seen, for example; in quantum particles, including Wolfgang Pauli's (1900-1958) exclusion principle for electrons, and the wave interference patterns of light; in the dominant and recessive expression of competing genes; in the excitatory and inhibitory characteristics of neurons; in the dominance of certain survival need classes, as we propose; and in the dominance and territorial behavior of members of living species.

In 1954, the psychologist, Abraham Maslow, (1908-1970) published *Motivation and Personality* which contains a proposed needs classification hierarchy. Maslow, specifically rejected competition. According to his system, the "upper" level needs, in his hierarchy, were only addressed after "lower" level needs were met. In our proposed classification system, the relationship between the need classes can be competitive, and the individual organism can experience need conflict - something which we think that we have all experienced. Evolution or design has developed a "rough" system for dealing with need conflict, which leads to probabilistic outcomes. Maslow's "highest" need is the need to self-actualize. We strongly endorse this need as the representation of the principle of Emergence. [44]

In the 1920's, the physiologist, Ivan Pavlov (1849 - 1936) published *Conditioned Reflexes* and *Conditioned Reflexes and Psychiatry.* Pavlov described needs as "instincts" and identified most of the same "needs" as are included in Maslow's hierarchy and in our classification system. Pavlov pointed out that much work needed to be done to fully understand our survival "instincts". Pavlov's work on conditioned reflexes, plays an important role in our theory about developmental needs. (Developmental needs are in the major class of Individual Needs as opposed to Species Survival Needs.) We argue that much of the behavior that is considered "genetic" results from environmental experiences, or lack thereof, during the developmental period. Pavlov's work on the role of the conditioned reflex in emotional development, was ultimately rejected, although much work has subsequently been done, primarily with animals, by experimental psychologists and learning theorists and we wish to reintroduce the relevance of Pavlov's work. As we observe, a dog, who salivates at the sound of a bell, may be an animal model for the inappropriate affect that is so characteristic of mental illness. In the developmental process of the child, what becomes associated with pleasure and what becomes associated with pain? This becomes especially significant with needs subject to "one trial learning", that is, one experience that produces a conditioned response, to a stimulus, associated with pain and fear. One-trial learning has been repeatedly demonstrated by experimenters. In fact, it is so reliable, that the fear response is now used experimentally to test for other behaviors, reactions, and attributes. The phobic fear response has been accepted as legitimate, but phobic conditioning occurs, developmentally, after the child is able to discriminate. What if the response is conditioned before the child is able to discriminate? Do we then get generalized anxiety? [45] [46]

Gerald M. Edelman, who won a Nobel prize for his work on the physiology of immunology, has turned his attention to neuroscience. He has developed a *Theory of Neuronal Group Selection*.

This theory proposes that, in the development of the brain and consciousness, environmental experience "selects," in the Darwinian sense, from previously selected and established "neuronal groups." He terms these groups "value centers," and they reflect survival requirements. These "value centers" correspond to our concept of "survival needs." Edelman has not, as yet, to our knowledge, proposed specific "value centers." We had originally proposed that the "survival needs/value centers" are located in the Limbic System, that portion of the brain between the cortex and the brain stem. The Limbic System is a term coined by the neuroscientist, Paul D. MacLean, who developed a theory called, *The Triune Brain (1973)*. Edelman, and a co-author, Giulio Tononi, in their book, *A Universe of Consciousness (2000)*, have identified a topological region of the brain that they refer to as the "noradrenegic locus coeruleus." that covers roughly the same area as the Limbic System. Edelmann and Tononi provide considerable evidence concerning brain development, which supports our concept of developmental needs. They have neurologically operationalized Pavlov, by demonstrating that, with respect to neurons, those which fire together, wire together, even over relatively great distances in the topography of the brain. Francis Crick (1916-2004), one of the principle discoverers of DNA, objected to Edelman's theory. In our book, we discuss the controversy and the findings of neuroscience. [47] [48] [49]

Evolution and/or God's creation has produced a developmental period in species in which environmental conditions can dictate how the organism continues to develop based upon environmental input. Jean Piaget (1896-1980), who taught us much about how humans develop intellectually, especially how children learn logic and mathematical concepts, also spent his life studying the evolution of snails and ferns. He discovered, that the phenotypic (observable) expression of the genes, for certain traits in these species, varied depending upon the environment in which the young snail or fern was located. The traits were, the shell of the snail and the leaves of the fern. His research was ignored, and he had to defend himself against charges of LaMarkianism, but that is another story. (He was a dissident in this area.) His approach is now ensconced in the new field of Epigenetics. Dependence upon environmental experience, opens up the possibility of an error rate (the wrong message is received), but its survival value for the individual species, is so great, that a significant error rate is tolerated, without diminishing the success of the species. (Edelman points out that variation is necessary for natural selection to act upon, and does not necessarily imply an error rate. However, errors do occur in reproduction and maturation, and it is recognized that most mutations are harmful.) [50][51]

7. The Anthropic Principle and Survival Needs

The anthropic principle in physics proposes, that the universe, in particular our earth and solar system, are the way they are, in order to support life. We turn that principle around a little, and say, that life is as it is, in order to survive in the universe as it is. The range of environmental conditions, within which life can be supported, is very narrow. We argue that to understand human nature, we have to understand how much of human behavior is driven by the survival requirements of this universe, which we have identified as "needs". Needs are dictated by information recorded upon our DNA. The message is, "Meet these needs or die". However, because the universe is in a state of flux (due to the second law of thermodynamics), our DNA has acquired the information that the environment is not always the same. Needs can therefore sometimes be met, epigenetically, within a "range" of possibilities. This is the essence of the "nature/nurture debate." Our position on this debate is, that the survival needs are fixed within our DNA, but some flexibility, in how those needs are met, is possible. Secondly, that some needs, especially the social and intellectual needs, (those attributes which, in degree not kind, primarily distinguish humans) have developmental experiential requirements, which must be met, for the successful maturation of the individual organism. Developmental errors do occur and should be distinguished from genetic errors. Developmental errors can be behaviorally passed down, but they are not genetically heritable. It also means that, if we hope to solve human problems, we have to have a clear understanding of what those survival needs are, in order to understand how they affect our survival and our behavior.

Some general statements about needs:

Needs are sequential.

Needs are positive and negative.

Needs may be absolute or relative.

Needs assume dominance, but there is no simple need hierarchy.

Behavior is a response to needs in the presence of a stimulus.

Needs have genetically programmed parameters, but within those parameters, needs are structured and shaped through conditioning and learning.

It is this latter characteristic which makes needs vulnerable to damage.

The genetically programmed needs continually press for satisfaction. If blocked by learning or conditioning from being met in one way, they will seek another way.

Needs are innate and insuppressible. They may be damaged, deformed or denied, but as long as the organism survives they will press for fulfillment. That is how needs are known. They are survival requirements.

Need deprivation and the ensuing damage is cumulative.

8. Competition

In human nature competition is innate because of the survival constraints of the laws of Thermodynamics. Competition is not all negative. Competition can lead to greatly enhanced quality of life for the human species as we compete in the creative and intellectual arena. It is the competitive drive to self-actualize that fuels our expenditure of energy in the struggle to meet our survival needs. We do not live in the Garden of Eden and survival requires work which is the expenditure of energy. We exhibit the characteristics of both the fermions and the bosons. We are capable of clinging together and cooperating like the bosons (who still may leave the group as individuals) and we are capable of maintaining a distance from one another like the fermions. Because of the corollary to the first law of Thermodynamics, cooperation always ends in competition. Some things exist and other things do not. This does not mean, as some have suggested, that

because it is so, that is how it is and nothing can be done about it. What it does mean is that we are presented with choices and we need understanding to make the best choices. It also does not mean that cooperation is always best, because we are capable of cooperating to do great evil. It is individuals within the group who stand up against the cooperative evil, frequently to their death. During World War II, Dietrich Bonhoeffer and Raoul Wallenberg, among countless others, provide an example. Lech Walesa is an example of someone who provided leadership and did not have to give up his life. The emergent capacity for individual self-sacrifice is a characteristic of all social species. It is the ultimate act of giving up energy.

There is competition between the individual and the group in a social species. The survival function of the group is to provide predictability so that the cooperative behavior of group members is possible. The survival function of the individual is to provide adaptive change. The function of adaptive change is driven by the need to self-actualize. The need to self-actualize can bring the individual into conflict with the group and, internally, with his/her own need for the support of the group and his/her own need to avoid the punishment of the group. Change rarely occurs without conflict and sacrifice. Change, not only conflicts with the survival function of the group for predictability, it also upsets the social dominance hierarchy, which can be very dangerous for the change/agent individual. We have the examples of Jesus, Socrates, Galileo, and countless others, to contemplate in this regard. What drove them to face death, rather than compromise their beliefs? We suggest, that it is the power of emergence, as represented in the drive to self-actualize. It represents a conscious choice to give up energy for a purpose beyond oneself. This same capacity also makes possible the choice of suicide when in despair. (Galileo did recant, thus saving his life, recognizing that the "truth was out there." He still stands as a beacon to those who defy the system. He is a rock for many NPA members.)

This is not to diminish the importance of predictability. Predictability is very important for social and economic (survival) functioning and humans will choose predictability over chaotic freedom. Also, successful change/agent individuals can wreak great havoc on society. Hitler, Stalin, Mao and Pol Pot provide examples. We discuss the complexities of this competition between the individual and the group in our book. Thomas Sowell is a resource in this discussion. Werner Heisenberg also provides an excellent discussion of this issue in his 1958 Gifford Lecture, "*Criticism and Counterproposals to the Copenhagen Interpretation of Quantum Theory.*" He concludes his discussion of the competition between the scientist and the community over world views with the statement, "*There is no simple solution to this problem, if tolerance alone is not sufficient; but some consolation may come from the fact that it is certainly an old problem belonging to human life.*" Dissidents take heart. [52] [53] [54]

In our book, we also analyze the role that competition for social power plays in human societies. Competition can be active or passive, positive or negative. Negative competition consists of succeeding by handicapping or holding other competitors back, by oppressing competitors, or by simply killing them. We have developed a classification system for human societies, including multi-class societies, single class societies, and intentional communities, based upon how social power is distributed either from the top down or the bottom up. We believe that there is biological unity beneath cultural diversity and that human cultures vary in their ability to meet human needs and produce human happiness. Respecting human cultural diversity, is not the same as respecting the rights of individuals to seek their own destiny, as long as they do not interfere with the rights of others to do the same. Positive human cultural advancement, is dependent upon the self-actualization drive of individuals. (Dawkins, to the contrary, it is the total individual organism - which contains specific genes - which struggles to survive.) As we have pointed out, the function of the group is to promote stability and to resist change, including the challenge of new ideas, a situation with which the members of this Association are very experienced. Competition for social power, among group members, and the competition of world views, will determine what is "politically correct" in any given group. We discuss, in our book, that which we call "the primary Platonic error," which is the belief, enunciated by Plato (c.428 - c.348), that a small group of "intellectuals" can be trusted to have the wisdom and forbearance to successfully control the lives of others. [55]

There is competition between species, which humans are attempting to mitigate. There is competition between groups within species, which within our own species, humans have learned to mitigate and channel through a balance of powers system. There is competition between individuals within groups, which, in humans, can be mitigated and channeled by the rule of law, which is an evolutionary development of the social species survival requirement of a behavior code. There is competition, within the individual, between his/her survival needs. Sigmund Freud (1856-1939) articulated need conflict, within the individual, with his postulation of the id, the ego, and the superego. He saw the id as being primarily the sexual drive, but, as we point out, there is need conflict, even within the id, between the safety needs, the self-maintenance needs, the species survival needs and the self-actualization need or drive, all of which compete for the finite available energy of the living structure. Freud also discerned the human capacity for self-sacrifice. He called it the "death wish". All competition stems from the scarcity, and the struggle for survival, imposed by the laws of Thermodynamics. Emergence and creativity can mitigate the impact of scarcity and competition, but cannot eliminate it. [56]

As any parent knows, situations frequently arise when there is need conflict between the parent and the child. Part of the responsibility of parenting is, to "set limits," for the child, in terms of the child's expectations of need gratification. However, there are also developmental needs which must be met for the child to mature normally. Whether or not those needs get met, depends upon the environmental situation in which the parent is operating, and, the degree to which the parent's own developmental needs were properly met. The psychologist, Harry Harlow (1905-1981), demonstrated that maternally deprived monkeys were barely able to successfully engage in sex and their parenting skills were a disaster. Similar outcomes have been demonstrated in mice. Ethologists, observing solitary animals in the wild, remark upon how, experience in parenting, measured by the number of previous offspring, is a good predictor of how successful a mother will be in raising her young to maturity.

Parental experience is thus a factor. (Epidemiology establishes that first borns (the oldest sibling), in the human species, are more likely to suffer from schizophrenia than younger siblings. In other species, the oldest sibling is more likely to kill or otherwise out-compete younger siblings. Greater complexity gives more room for error.) One of the benefits of social behavior is, that experience can be shared, and environmental conditions mitigated, by other members of the group. Competition can also be exacerbated. [57]

9. Emergence

The first pillar in our reasoning about human nature (and perhaps the nature of the universe), as previously explained, is scarcity (the conservation law) and the competition resulting from scarcity (the corollary to the conservation law.) These are the laws of thermodynamics.

A second pillar, in our reasoning about human nature, is less well acknowledged than the laws of thermodynamics by physicists and others. This pillar is the principle of "emergence." Emergence, for our purposes, is defined as the appearance of new and unpredictable properties at each new level of structural complexity. While scarcity is constraining, emergence opens up worlds of possibilities. Nature produces an incredible variety of structures and properties. Humans, through intelligent fabrication (two emergent properties in themselves) can produce excess human need satisfiers. Many species build nests for protection from the elements and for the rearing of young. Humans build incredible structures for such purposes.

The periodic table of the elements is, among other things, a table of emergent properties. (For all we know, our universe, with its finite amount of matter and energy, is emergent.)

Emergence resolves the dilemma identified by Thomas Malthus. The populations of all species expand/contract to the available food/energy supply. Malthus observed that this applies to the human species as well. (This is an illustration of our corollary to the conservation law, that not all conceivable structures can exist simultaneously.) Consistent with the conservation laws, history demonstrates that, under "normal" circumstances, Malthus is correct. However, history also demonstrates, humans have discovered that, through intelligent fabrication, the food supply can be expanded. History also demonstrates, once the food supply is secure, the human individual need to "self- actualize" competes with the human species need to self-reproduce, thus limiting the population growth to a level below what the available food supply will support. (If truth be told, the excess available food supply has contributed to the growth of individuals in excess weight, as opposed to the growth of the number of individuals. This is especially true for individuals with limited "opportunity" for self-actualization. Opportunity for self-actualization is another issue, which we will not get into here.)

The human species is presently (meaning multi -multi-generationally) in the midst of a very messy competitive process of learning to exploit the opportunities for the creation of need satisfiers within the constraints of the conservation laws. (Once humans have enough to eat we can get very contentious over things we know little about. We attribute this to our need to have more than others have and/or to be superior to them.) We need facts to the rescue with respect to the wise and appropriate exploitation of natural resources in order to create need satisfiers.

In his paper on *A Matter of Definition*, Greg Volk has distinguished between things and the properties of things. In our scenario of increasing levels of structural complexity, what are wholes on one level, become parts on the next level. At each new level of structural complexity new and surprising properties emerge and survival requirements will change. The atoms of hydrogen and oxygen provide a good example. Depending upon the "architecture" of the relationship between these elements we get properties such as solid, liquid, gas or Brown's gas. The properties of the liquid (water), for example, freezing from the top down rather than the bottom up, are different from other liquids. The properties of Brown's gas are extremely unique. It appears then that architecture determines properties as Dr. Yarmin and Dr. Whitney demonstrate. We have yet to discern how particular architecture produces particular properties and we refer to this as "emergence." (The work of many NPA members, for example, Jamahl Peavey, leads in this direction.) Based upon our discussion above, under the topic, **The Laws of Thermodynamics**, we are now coming to the supposition that not only are properties emergent, but structures themselves are emergent as well. [58] [59] [60]

Francis Crick defines "emergence", in his book, *The Astonishing Hypothesis* (1994), as follows: "*A system has emergent properties if they are not possessed by its parts. In science, "emergent" does not have mystical overtones*." We can explain how things work, but we cannot yet explain how things came to be. Evolution and natural selection explain how things work, but they merely push back in time, the question of how things came to be. [61]

Living structures have many emergent properties which we share. A critical emergent property is the ability to respond to stimuli. We define this ability as "awareness" and suggest that it is the core principle of consciousness.

Emergent properties of living structures include: *the ability to respond to stimuli; the ability to orient and to move purposefully (the purpose being survival); the ability to collect, store, organize, retrieve, communicate and act upon information about the environment; the ability to constantly renew, that is, to fabricate, a highly ordered self - structure; the ability to fabricate need satisfiers from environmental materials; and the ability to self-replicate.* All of these emergent properties are dependent upon the *emergent property of consumption, and the ability to thermodynamically convert the matter and energy consumed, into the energy necessary to carry out these emergent functions.*

Intelligence, or the ability to learn from, or adapt to, the environment, is an emergent survival strategy of many species which develops from "awareness" or the ability to respond to stimuli. Researchers, observing the behavior of species, other than human, are becoming increasingly aware, and are reporting, how intelligence is operative in many species, in which it has not been suspected. Our book will report the details. Intelligence enables, and requires, a world view, so that individual members of the species, can move purposefully to meet needs. Intelligent species, such as bears and parrots, learn what foods are available, when and where. Humans also develop world views. Because of our need for predictability, as a basis for cooperation, we compete over our world views - often violently. (This need for pre-

dictability is why cultural diversity does not work over the long haul. Sooner or later one culture becomes dominant, though it may well incorporate attributes of other cultures.)

Explaining the mind, in a thoroughly corporeal/material fashion, does not obviate the possibility, that something else exists. If energy and matter, can emerge from we know not what, and life, can emerge from energy and matter, who are we to say, that the soul cannot emerge from life. We do not need to prove it and we cannot disprove it. There are different ways of knowing. Arriving at an agreed-upon consensus about knowledge (the world view) is one thing, but knowledge is still, as Edelman has experimentally discovered, and to which Crick agrees, a unique and individual thing. Crick, equated awareness with consciousness, and devotes his book, *The Astonishing Hypothesis*, to the topic. [62][63]

We will suggest, that this Emergence, which includes the evolution of living structures, is not totally random, but that it occurs within certain parameters. We find evidence for this in quantum mechanics, in the parallel behaviors which occur across levels of structural complexity, and in the survival strategy behaviors which appear in otherwise widely separated living species. We follow Heisenberg's advice to physicists studying quantum mechanics, and we look at the behavior. Observing behavior also happens to be the primary scientific approach utilized by ethologists - those who study animal behavior.

We propose that emergence is a continuing phenomenon; that our universe, and the structures within it, will continue to emerge in surprising ways, but that as long as the laws of thermodynamics hold, the core principle of competition will hold as well.

An early version of the computer algorithm called "Eureqa", "discovered" the law of the conservation of energy in analyzing data from a chaotic double pendulum. "Eureqa" has now been applied to the behavior of genes in the bacteria *Bacillus subtilis*. The researcher, Gurol Suel, a biologist at the University of Texas Southwestern Medical Center in Dallas, states that at the molecular level, there is a probabilistic interaction between biomolecules that controls what is going on, which is analogous to the behavior of molecules in a gas. When the data was fed into "Eureqa", the algorithm produced a "biological law of invariance that is equivalent to a conservation law in physics." The researchers do not understand the meaning of the equation produced. We observe that the conservation of energy applies at all levels of structural complexity which may well be reflected in the equation. Secondarily, it provides support for our thesis that the emergence of structures, including living structures, and their unique properties, occurs within limiting parameters. [64]

Emergence is opposed to the concept of "reductionism" which is the notion that the behavior of complex structure can be explained by its component parts. Component parts constrain, but do not fully explain the whole. The concept of emergence does not deny the existence of cause and effect. On the contrary, it serves to bring more of the behavior of structures in our universe into the causal chain.

10. Consciousness and Free Will

Many, including Penrose, have commented upon the similarities of human mental functioning to that of computers. Edelman and Crick have objected to this. (Penrose is more circumspect than some others.) Our observation, on this disagreement, is that, the similarity between the human mind and computers is the programming language. The programming language is the binary language in both instances. Humans program computers. Natural selection or God (or both) programs humans. The decision tree in humans is infinitely more complex than the decision tree in computers; however, the binary language is still the same: yes-no, stop-go, heads-tails, excite-inhibit. It is the language of choice. It is competitive choice. The choice has to be one or the other. It cannot be both. Once a choice has been made, another choice is presented. The subsequent choice is affected by the preceding choice. We think that this is what the behavior of quantum particles is telling us about how the world works, because this is how the world works in its emergent, creative aspects. Edelman points out, that habitual behaviors require less and less conscious attention and become more and more efficient in the use of mental energy. When a choice is presented, however, it always results in a slowing of mental activity and a focusing of consciousness. Penrose reports on research, which demonstrates that brain activity precedes, by a second or more, the report of conscious awareness. This certainly supports consciousness as an emergent phenomenon. [65] [66] [67] [68] [69]

We propose that the existence of "choice" is the essence of "free will". What free will means, is that the choice, that will be made, is not necessarily pre-determined. The choice may occur within limiting parameters of choice, and the chooser may be compromised by personal damage or external circumstances, but the outcome is not pre-determined. Father Stanley L. Jaki (1924-2009), in his essay, *The Cosmic Myth of Chance*, which is found in his book, *The Only Chaos and Other Essays (1990)*, objects to the use of quantum mechanics as an explanation of free will. Suffice it to say, here, that human behavior, as we propose, is driven by competitive survival requirements. Competition necessitates choice, and it is choice, not chance, which we see as operative. Crick, Schrodinger, Edelman, Gell-Mann, Eddington, Penrose and Feynman also contributed to this argument, which we discuss in the book. Opening the door to choice, necessarily and irrevocably, opens the door, as well, to chance, to error and to evil. Penrose postulates that the quantum choice may be made by the "environment" - by one of the space/time frames (assuming space/time frames exist.) This proposal is very similar to Darwinian "natural selection." We suggest that the quantum choice is made electromagnetically. We propose that, in an evolutionary sense, increasingly complex structure emerged in our universe and, eventually, the possibility of conscious choice appeared. [70][71] [72][73] [74][75] [76][77]

11. Conclusion

The foregoing is a brief synopsis of a book which is in preparation for publication. We are thinking of entitling it, "The Politically Incorrect Guide to Human Nature" as a way to get past the current paradigms of Relativity and Evolution. We have been actively working on the book since 1970, but the ideas represent

two lifetimes of thinking about and studying the human problems of poverty, war, oppression, suppression of creativity and psychological damage otherwise known as mental illness. The events in the decades of the 1930's and the 1940's grabbed our attention early in life.

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