THE PARADIGM OF THE PARTICIPATORY UNIVERSE

by

Danilo Boskovic
Division of Biochemistry
Department of Basics Sciences, School of medicine
Loma Linda University

Background

The struggle between the left- and right-wing ideologies for control of the human mind has been the source of numerous battles. The current conflict between Darwinist and Creationist models for explanatory rights of life's origin represents merely the latest in a long string of contests. Viewed from this vantage point, it is possible to conceive of a scenario where the Creationist model wins out, but the resultant socio-political climate becomes much more oppressive. Similarly, one can entertain scenarios where Darwinist thinking prevails, as fondly hoped for by many atheist groups, followed by the ensuing sense of emptiness, and lack of purpose or meaning. Both of these potential outcomes are equally unstable and would naturally lead to further subsequent conflicts. Apparent success by either, or indeed any, group would not even support stability much less guarantee it. This has been well substantiated by the evidence of millennia of human upheavals and coups, accompanied by tremendous suffering and loss of life. Justice seems to represent nothing better than pay-back even in the minds of most thought leaders. One is alerted to dangers of moral hazard when one questions the wisdom of such approaches. It appears obvious that injustice can not be allowed to go unpunished or you will simply get more of it. Moreover, don't the victims deserve some justice? To compensate for the ever-present instability the respective proponents of either the left or the right wing ideologies have tended toward increasing reliance on state control over the lives and thinking of individuals.

A transition occurs, regarding public as well as private life, within a government's implicit attitude toward an individual's freedom to act. The attitude changes from "it is permitted unless explicitly prohibited" to "it is prohibited unless explicitly permitted".

1

The government begins to see itself less as a protector and more as a controller and director of its citizens. But for this to be truly effective the governing body would have to be a genuine authority on every topic. Moreover it would also need to be able to anticipate real future issues and project appropriate responses to them in a timely manner. Since fulfillment of these requirements, even for a short period of time, is at best extremely unlikely, such totalitarian governments can not avoid becoming oppressive ideologically, culturally, religiously, and even economically.

In spite of numerous examples of accumulating losses because of such approaches, which should serve as adequately demonstrable failed experiments, our collective human understanding of issues is not improved, and people of vision are difficult to find. Continued settling of conflicts through power struggles appears inevitable even though it offers little promise of improved outcome in the future. "The considerable conflicts, which we now face, can not be solved at the same level of thinking that we were at when we created them."(1)

As Seventh-day Adventists we have identified at times with various components of right-wing movements, particularly when one speaks about moral standards, as well as the left, as in the development of social justice standards. Yet, a comprehensive worldview that would give us both an objective foundation for ethical principles as well as some protection against excessive pendulum swings is still lacking. It is time for the development of a paradigm of reality that will be both consistent with the mission that was entrusted to us in the scriptures, and with a saner approach to conflict resolution.

Participatory nature of the universe was first proposed by the particle physicist John Wheeler (2,3). He saw an inseparable relationship between information and matter

coining the term "it from bit" (4). Yet, as startling as these concepts are, they seem to have received little consideration, except perhaps within the context of the philosophy of science, while discussing the connections between the observed, the observer and the observations (5). Apparently, there is greater interest in how these concepts affect our views of science, than in how they might impact our views of reality. Little has been done to explore the properties and implications of participatory network systems, particularly when compared to command/control systems.

Network Examples:

Even a short time ago ideas about nets would be limited to discussions of implements for holding, blocking or catching something, like hairnets, mosquito nets or fishing nets, respectively. In all such examples nets represented forms of physical barrier or constraint. Perhaps the earliest concepts regarding dynamically functional networks started to emerge relatively recently, along with geographical studies of roadways or railways. These were further supplemented and reinforced by considerations of distribution networks for public utilities such as water, natural gas, electricity, telegraph and telephone services. Advancing ease of communication was employed by the public and private media such as newspapers, radio or television. The most recent addition to this growing list of functional networks is the computer internet service. The term *internet* essentially implies a network of information networks. As such, with steadily growing accessibility, it represents democratization of communication so that every individual has an opportunity to participate in a shared discussion with essentially any one else.

In sciences, network studies really took off with research of neural nets in an attempt to rationalize brain function (6). Computer simulations of such networks led to development of specialized programs to exploit the learning capabilities and pattern recognition potential of such networks. Some of the contributions to the appreciation of neural networks came from the studies of the interconnections in the biochemical pathways such as the immune system (7). In turn, one can not but wonder if the properties of biochemical macromolecules could be viewed as the characteristics of the interaction networks of the comprised individual elements.

Social networks. Most people, regardless of their personal ideology, implicitly recognize the importance of networking with colleagues, clients, friends, and acquaintances. This tendency was recognized for a long time and often exploited for purposes of protection and advancement. Whether for laudatory or derogatory purposes the concept of the 'old boy's network' is well recognized? Usually it is accompanied with considerable negative baggage. This is particularly so because it is very difficult for an outsider, regardless of merit, to overcome the network's defenses or to be admitted into such a structure. Perhaps it's most threatening aspect is the danger that the network may be exploited for acquisition of power or imposition of control.

There is a curious relationship between our perceptions of the merits of the powerful and our continued striving to acquire more power for ourselves. It was said that most people revere the positions of power while despising the individuals occupying them. It is indeed doubtful if those considered to be 'most powerful' are in fact generally most effective. There are numerous examples of individuals who served as thought leaders impacting the course of history even though they occupied no official public

office at the time. Two names come to mind: Socrates and Jesus. Interestingly, both were rejected by those 'in power' and ultimately put to death. Socrates' thoughts are still being studied. We, as Christ's followers, people of every tribe and nation, are looking for His return and a heavenly kingdom where righteousness reigns. Yet, there are few who know the names of those 'in power' or what these contemporaries Socrates or Jesus thought or cared about. How is this possible?

Clearly, there are people who can relate to and connect to other people, very effectively even in the absence of official authority to do so. Such people are often referred to as Connectors, since they easily relate to people around them, and in some ways appear to function as collectors of relationships (8). They see people as having great intrinsic inalienable value, and people sense this and respond to them. Among those who the Connectors actively seek out are individuals with specific gifts, such as acquisition of knowledge (Mavens), skills (Specialists) or ability to render something popular (Salesmen).

Perhaps the best example of the effectiveness of such people-networking tendencies is the continued functioning of a community even in conditions of privation in countries under totalitarian regimes. In such circumstances it is customary to expect little from the official office, shop or store. When one has a need, one asks: Who do I know who can provide me with information, service or goods? In this sense, difficult circumstances essentially train all of us to develop some networking skills as connectors.

Neural networks. In philosophical circles it is often wondered if it is possible for a brain in fact to understand its own functioning. Yet, in scientific circles there is accumulating evidence about the properties of neural networks, including the emergence

of such phenomena as memory, pain, joy, or even free will (6). Mathematical simulations and computer modeling appear as important tools in testing new hypotheses (9). These are employed broadly in applications as far-ranging as predictions of wastewater flow (10), consumer expenditure predictions (11) or molecular modeling (12). Entire periodical serials are dedicated to archiving new knowledge in this field.

Nevertheless, it could be argued that there is no individual neuron, or small group of neurons, that is in control of brain's function. If some part of the brain were to seize control of the functioning of the brain the result would be a seizure. This condition, far from being some higher state of mind, represents a serious danger to life itself. We generally seek medical help to restore normal brain function. This principle applies also to the functioning of the mind. If someone loses their freedom and comes under the control of some idea, we call that obsession. If one falls under the control of some habit, we call that compulsion. None of these situations represent a higher state of being. We reason, quite rightly, that the affected individual is suffering from the condition and needs help to be free from it.

Biochemical networks. Until recently one would be hard pressed to find the word 'network' anywhere within the discussion of biochemical reactions. Descriptions of pathways would be supported with terminology like control, regulation (with/without allosteric components), activation, inhibition, positive and negative feedbacks, and similar. All of these terms are suitable if describing the relationship between a reaction and an effector. They are ill suited for description of network behavior in response to some system stressor. Yet these are the kinds of studies that are currently bearing fruit.

An example of such a study is the modeling of the functioning of the developmental genes during body pattern formation (13). The network is composed of the developmental genes connected by the genes' DNA-binding products. The interactions between the regulatory proteins and the DNA-based binding elements may be augmented to include other protein-protein effects in an interactome network (collection of all the available interactions) (14). Most of the intracellular protein-protein interactions, however, are not yet quantitatively characterized. Because of this little is understood about the emergent properties from such biochemical networks.

A particular example of this need for quantitative measurements has come to light from the studies of the blood coagulation components of the hemostatic system. Classically the coagulation system was represented by two pathways, intrinsic and extrinsic, finally feeding into the final common pathway of serine protease catalyzed reactions leading to the final product fibrin. This fibrin in turn spontaneously polymerizes to form a gel like water trapping meshwork of fibers. Since the extrinsic and the intrinsic pathways appear to function in parallel one would expect that if there was some deficiency in one the obvious redundancy provided by the other should be able to compensate. Yet this is not the case. Hereditary hemophilia, a genetic disorder resulting in a deficiency of Factor VIII or Factor IX, leads to a pronounced risk of bleeding with numerous crises. This occurs in spite of the fully functional extrinsic pathway of reactions. Why should this be the case? This question represented a particular puzzle to workers in this field, until recent quantitative studies addressed this question (15). With careful accounting of both the intrinsic and extrinsic Factor X activation, in the presence of physiological levels of inhibitors, it became apparent that the original modeling of the

coagulation cascade was inadequate. With added cross-reactions between pathways, including positive and negative feedback steps, this coagulation system appears to be more like a network. Moreover, this network is exhibiting particular emergent properties. Some of its components, the extrinsic pathway, serve for the initiation of the coagulation response, while parts of the intrinsic pathway serve to follow-through and maintain the pro-coagulant state (15,16). Now it becomes clear why the hemophiliacs bleed – they are unable to maintain the pro-coagulant response beyond the initiation phase because the relevant components are missing.

This reveals another aspect of network function. All its components are implicitly accounted for. It becomes misleading to talk in terms of redundant components while discussing a network. The very essence of a network is that it contains multiple interconnections. This does not, however, imply that they necessarily have to be equivalent. Specializations may develop. Individual members of the network may take leadership roles under certain circumstances, based on their particular capabilities, while deferring to others as the circumstances change. Every member is of value. No one is superfluous.

This may not be as easy to see when the network becomes very large, perhaps comprising millions, or even billions, of members. Under those circumstances a new phenomenon emerges, that of capacity for detail. Perhaps the best analogy would be the resolution capacity of digital cameras. Typically, the camera with a greater number of recordable pixels is preferred, because of finer image resolution and greater observable detail. If a gradual loss of pixels (or network components) occurs, from an originally large number, this may not be necessarily immediately obvious. Nevertheless, a gradual

loss in resolution is taking place. An observer with clearer vision could be able to see it. This reminds us of Christ's words that God has the hair on our heads all numbered (17). What awesome perceptual resolution God employs to interact with us. Such care reveals the enormous value that He places on even the lowliest among us.

Molecular networks. Biologically active macromolecules such as proteins, carbohydrates, lipids and nucleic acids can be quite large involving thousands of atoms. When the atoms interact to form a molecule, sometimes even a small molecule, the resulting product will have certain emergent properties which are often not easily predictable from the atomic composition. Perhaps a basic example of this would be water. Even though it is composed of 1 atom of oxygen (O) and 2 atoms of hydrogen (H), both of which are gases, the product water (H_2O) is a unique liquid with unexpected heat capacity and surface tension. This is largely due to the development of significant dipoles, yielding a network of up to 4 hydrogen bond interactions per water molecule (Figure 1). Because of the tetrahedral organization of these hydrogen bonds a new emergent property is observed. As temperature cools, to the point at which liquid water turns to solid ice, there is a reduction in density, thus allowing the ice to float. This unusual feature of intermolecular interactions of water is what enables life in the seas, because these bodies of water remain liquid even at great depths.
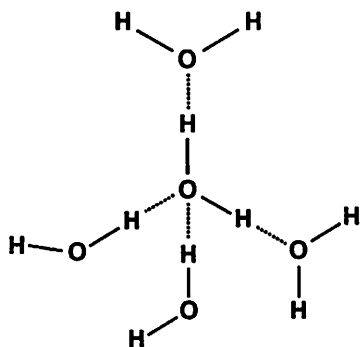
Figure 1. Hydrogen Bond Interactions of Water. Each water (H_2O) molecule is able to interact with up to 4 neighboring water molecules via hydrogen bonds.

9

A more elaborate example of molecular architecture is the Fe_7S_9Mo cofactor of nitrogenase. This cofactor contains 7 atoms of iron (Fe), 9 atoms of sulfur (S) and 1 atom of molybdenum (Mo) in an elaborate 3-dimensional organization that could make any sculptor proud (18). And yet it is merely a tool in an enzyme found in the lowly bacteria, which is present in the protective root nodules of leguminous plants. The function of the cofactor is the reduction of the inert nitrogen gas (N_2) from the air into biologically usable ammonia (NH_3). The synthesis of ammonia from nitrogen and hydrogen gasses is a highly energy requiring process, usually done at 500°C and 300 atmospheres of pressure. Yet, the nitrogen fixing bacteria are able to achieve this at ambient temperature and pressure. The Fe_7S_9Mo cofactor, a highly symmetric network of 17 atoms of 3 different elements, is believed to serve in the transfer of electrons essential for the N-H bond formation. It is because of the symbiotic interactions between these anaerobic bacteria and plants that amino acids can be produced. These amino acids, in turn, are the building blocks for proteins, which fulfill the many varied functions of life.
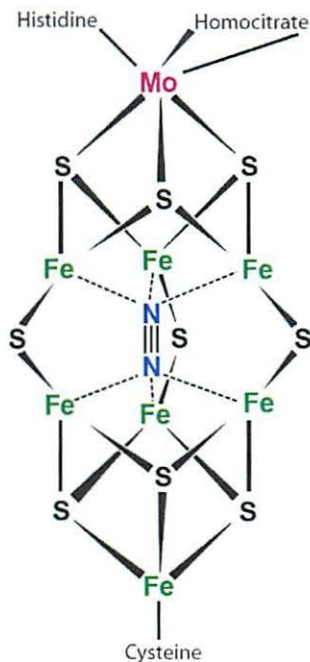

Figure 2. The Fe_7S_9Mo Cofactor of Nitrogenase. The Iron-Sulfur-Molybdenum cluster serves to convert 1 molecule of nitrogen gas (N_2) to two molecules of ammonia (NH_3), which can be used to form amino acids, the building blocks of proteins. Adapted from Chan,M.K. et. al. (1993) (18).

Network Properties:

There are two major paradigms of relationships that potentially permeate our concepts, the hierarchical command structure or a participatory network. The command hierarchy is based on power ideology and may be simply represented by the easily recognized 'chain of command' organization. The properties of this structure include a vulnerability to failure. A chain is always weaker than the weakest link (Figure 3). In order to support this otherwise unstable hierarchy, the commands or orders are generally accompanied implicitly/explicitly by threats of punishment in case of failure.

By its very nature the command/control system exhibits at best only limited capacity for learning. The reason is implicit in the very attitudes embodied by the code of conduct: "Yours is not to reason why, yours is but to do or die!" Thus, learning is simply not a major concern of this type of system.

Discipline, however, is. Carrying out orders, no matter how unreasonable or inappropriate they may appear and no matter what consequences follow. In this type of system each member is, by the very nature of the system, strictly subservient to the will of the one in control. Ironically, with increasing power, the person in command also becomes increasingly dependent on the subordinate members, both for information as well as executive success.
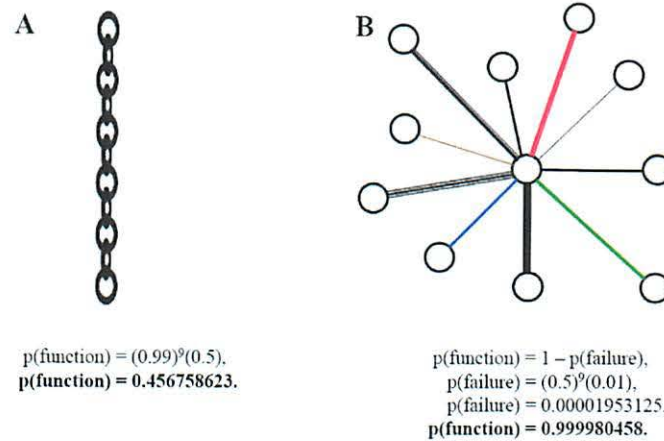
A

$p(function) = (0.99)^9(0.5),$
$\mathbf{p(function) = 0.456758623.}$

B

$p(function) = 1 - p(failure),$
$p(failure) = (0.5)^9(0.01),$
$p(failure) = 0.00001953125,$
$\mathbf{p(function) = 0.999980458.}$

Figure 3. Comparison between the Chain of Command and the Participatory Network. A. The model of the chain of command. The assumed p(function)=0.99 for 9 of 10 links, while the remaining link has a p(function)=0.5. The resulting overall p(function)<0.5 for the chain. B. The participatory network model is presented in a simplified form showing only the connections to the network member in the center. The assumed p(function)=0.5 for 9 of the 10 connections and the remaining link is given p(function)=0.99. The resulting overall p(function)>0.99 in spite of the less favorable assumptions that those for panel A. p(function): probability of appropriate function. p(failure): probability of failure to function appropriately. p(function) + p(failure) = 1.

In an effort to ensure success, at each level, the participants may expand the number of subordinates, in effect converting the 'chain' organization to a 'pyramid'. If the pyramid is expanded further it effectively begins to appear like a network. The functioning within the power ideology, however, still remains command/order oriented. To finally convert this to a functional participatory network the communication must become bidirectional and the focus must be shifted from commands/orders to information. In this way a transition can occur to leadership by illumination. This type of leadership is generally not particularly dependent on the recognized trappings of authority, but rather on the leader's ability and willingness to serve.

In contrast to the command/control system, a fully developed participatory network has the emergent property of forgiveness because the network is always stronger

than the strongest link (Figure 3). The weaker connections are essentially bypassed by default. In this sense the entire system is self stabilizing. As the weaker connections strengthen they are bypassed less often and so carry greater responsibilities. Additional interactions simply expand the already established network, allowing each new entry to grow into the system. This literally provides an opportunity for trans-generational or even inter-species connectivity.

The general content of network interactions is the sharing of information. In this context the essence of leadership is access to information and the willingness and ability to provide illumination. Since the participants have different experiences and skills each one has an opportunity to contribute something under specific circumstances. Extending this to the context of eternity, since anyone can accomplish anything they wish, everyone will be an authority in some field of interest. Everyone is of value. From this vantage point, even escape from the constraints of time and space becomes possible. As individuals we are limited to experiences personally gained, while clearly omitting others, because we are limited to what can be done at a time in a particular place. These constraints in time and space are no longer true to the same extent regarding networks of individuals, because different people may be doing/learning different things in same/different space-time. In this way each individual gains access to the lives of others. This need not be limited only to humans. Currently, we have relatively poor communication with other living organisms on this planet. Generally, we assume that this is because they are not intelligent enough. Judging by the multiplicity of conflicts among people, however, it quickly becomes obvious that we do not communicate well with one another either. This will not always be so! Freed from the trappings of sin, we

will one day enjoy the privileges of personally interacting with other intelligences in the universe, be touched by their experiences, gain access to their insights and experience what "eye has not seen, nor ear heard, nor have entered into the heart of man" (19)

Communication of information necessarily implicitly invokes rules. These rules naturally fall into two categories. First, linguistic rules such as grammar or syntax are essential to render communication consistent and understandable. Second, rules regarding content of communication, deal with issues such as accuracy vs. error, truthfulness vs. deception, appropriate vs. distracting and profound vs. trivial.

Violation of linguistic rules introduces at least ambiguity and possibly confusion. In order to communicate more effectively the language will implicitly adapt until it is recognized as satisfactory. What makes the language adapt? Our simple desire to communicate with one another, and the need to explicitly formalize concepts. As our linguistic ability improves the acquired implicit rules help us to explicitly organize our concepts. This in turn further stimulates communication, this time on a higher level employing the added insight. Interestingly, we do not learn our first language by learning all the rules first. Instead we implicitly acquire the rules as we learn the language. This is true even if no one sets out to teach us to speak. If a number of people come together without any common language, their mutual interactions may lead to the development of a common language. This was perhaps best demonstrated by the Nicaraguan deaf children who, following prolonged civil strife, finally had a chance to attend school. The teachers had considerable difficulty until they discovered that the children were developing a sign language all of their own, complete with implicit grammatical rules (20,21).

Rules regarding communication content are also generally implicitly assumed. This occurs contemporaneously with developing communication as well as maturing relationships. Quite naturally, we gravitate toward people with whom we feel more of a kindred spirit. Trust is implied because it continues to work. In fact we don't necessarily even think of trust, because we just click. This means that we have gained confidence that we are able to appreciate and are appreciated in turn. When we develop this kind of intimacy we have essentially grown into one another. We have transcended the limitations of ourselves as individuals and implicitly gravitate to the greater experience of shared interests and insights. Once they began developing their sign language, the Nicaraguan deaf children described this newly acquired experience of communicating with one another like a rocket going off in the head. Perhaps this implicitly trusting close interaction is in some way a part of what Jesus was thinking of when He prayed that "...they may be one just as We are one: I in them and You in Me; that they may be made perfect in one..." (22).

With such close interaction and interdependence among network members encountering a falsehood has a disruptive effect. The level of disruption is dependent on the relevance, circumstances and implications of the falsehood. It might be analogous to driving along a beautifully surfaced highway and encountering litter, pothole, pit or landslide. No interaction can continue to function indefinitely if false information (disinformation) is repeatedly shared. That would be like a prospect of driving 350 miles of bad road. One would soon look for alternatives. Initially one might feel surprised, alarmed or even betrayed. In time one simply concludes that the interaction in question is flawed and thus unreliable. How can a network member arrive at such a conclusion? In

a network, unlike a command system, information is received from many sources. Because of this capacity for multiplicity, the network inherently provides an opportunity for verification for all sources. False information from one source will conflict with the information from another. In addition, different forms of information such as body language, speech, music, or actions, may not be consistent with each other. With all such real or perceived conflicts the network provides an opportunity for reconciliation, and learning will occur. If the repairs to an interaction appear to be beyond the purview of a network member, or group, then that interaction will likely be avoided (23). A network, therefore, can defend itself against disinformation, incidental or deliberate, originating with some network member(s). This represents an innate self-correcting resilience of a network.

When a network, however, is naïve and has no way of verifying the validity of a concept it could be misled to accept a falsehood as truth. If this happens, implying disinformation from a source deemed most trustworthy, new issues arise. Such falsehood, accepted *a priori* as truth, will percolate through all other concepts and cause their redefinition in order to bring about their reconciliation with itself. A network laboring under the burden of such false 'truth' will not be able to learn or recover of its own accord (24). In effect the network falls under the control of the one whose interests the falsehood serves. It will need a source of genuine truth, a savior, someone without duplicity or malice. One, who can introduce the real truth to the system in such a way that it can challenge the delusion and bring about a) a perceived requirement for reconciliation and b) a possibility of conversion back to truth. Conversion implies a re-evaluation and redefinition of all concepts in order to embrace truth. Thus, from the

network's (mind's) point of view the problem is: recognizing the savior in contrast to the deceiver, and choosing who to trust. The consequences of the correct choice are so liberating that even Lucifer will one day recognize that all "his hellish plots have been powerless to destroy those who have put their trust in Jesus" (25).

Implications:

From the perspective of the participatory network the ideas of power or control appear at best as illusions. The objective of the network is neither the acquisition nor maintenance of either power or control, but improved learning and functioning capability. Both of these objectives are achieved by increasing the number of participants. To avoid the potential pitfalls of delusion, why not include God in the network too. "For where two or three are gathered together in my name, there will I be also" (26).

The entire sorry history of sin may be viewed as an attempt to impose a command system (with oneself in command) onto what is quite naturally a participatory network. In that sense it appears like an attempt to impose an inferior process onto a superior functioning one. First, the one way information (command) flow essentially blinds the person in command to what is actually happening at a distance. Second, the command system is unstable and unforgiving. Compared to this the participatory network is both stable and forgiving. In addition, the attacks from other competing systems are absorbed as perturbations and resolved. In this sense the participatory system is inherently resilient. Ultimately, all the intelligent beings in the universe will identify sin as inherently false and it will no longer represent a threat of delusion to anyone.

Ethical Considerations. The power ideology implicit in Darwinian struggle for niche control (27) contains only one principle, that of survival. Evolution is believed to operate without reference to any purpose or concerns about moral or ethical issues. In this context all desirable ethical concepts are viewed simply as a human construction, without support from a foundation in basic natural principles. Unfortunately, such social constructs are always vulnerable to accusations of favoritism, leading to struggles for the politically correct high ground. Such struggles in turn lead to pendulum swings, when those perceived as favored loose credibility. Thus, such systems are inherently unstable. Ultimately, the only way that everyone can be in charge is if everyone is by themselves. Obviously this would not lead to any advance of civilization. So, to justify some being in charge over others, rightly or wrongly, the concept of their higher fitness is needed. To avoid the stigma of favoritism the "fit" have to keep demonstrating their fitness against all comers, not unlike rams/bucks butting heads to maintain/gain dominance. Thus, much energy is expended merely to gain/maintain the leader status. Little, if any, actual advancement for the general population is achieved. From the evolutionary point of view, the best contribution the fit can make is to pass their DNA to more progeny, who in turn will be more effective at butting heads. This system of thought, beginning with an idealization of power/control, ensures a philosophical foundation for continuing competition and perpetuation of conflict. In this context, all ethical constructs regardless of merit are vulnerable to vicissitudes of fashion and political correctness.

In contrast, a participatory network implicitly values all members, through a realization of mutual interdependence, and constantly seeks to expand itself by incorporation of new members. This is not done by force but by invitation. Every

individual is continually able to alter the nature of all interactions. Everyone recognizes the goodness, beauty, joys and thrills of interactions with others. Viewed from this paradigm, relationships are a privilege and they become inalienable aspects of us as individuals. If some aspect of competition arises it is viewed more with amusement than alarm, like witnessing a pre-adolescent tussle between siblings all the while knowing that they are inseparable. Best of friends can tell one another what they really think without endangering their relationship. In this context, an unpleasant truth may be of far greater value than any pleasing falsehood.

The network, however, is not defenseless. By the principles inherent in its very operation all relationships are in a constant state of development. Those that are the richest sources of insight and growth become stronger. Those that are not grow more slowly or not at all, implying that there are inherent relationship rules and laws. A disruptively persistent source of disinformation can be excluded from the network. Progressive weakening of all connections occurs ultimately leading to the isolation of the offending member. This essentially describes the reverse of network growth by invitation. It is perhaps what Lucifer will endure during the thousand years of his imprisonment (28). After communing with intelligences all over the universe, now he will be forever excluded from their councils.

Far from seeing one's relationships as sources of danger, however, one delights in them and jealously protects them from all threats because they are an inseparable part of us. Moreover, one implicitly becomes protective of the relationships of others. In stead of wanting to spread one's seed far and wide, as may be expected under the Darwinist paradigm, viewing relationships as a privilege makes adultery unthinkable, because it

represents a betrayal and a disruption of the very relationships that make us who we are. This was perhaps best voiced by Joseph: "Look, my master …has committed all that he has to my hand …but you, because you are his wife. How then can I do this great wickedness, and sin against God?" (29) Those who view seduction as an opportunity to demonstrate one's superior manhood/womanhood, unwittingly subscribe to the rationalization of "survival of the fittest". Such conclusions, however, simply do not follow.

Viewing reality from the vantage point of a participatory system logically leads us to conclude that doing harm to anyone is essentially equivalent to harming oneself. Win-win strategies would be preferred, but at the minimum an attitude of 'do no harm' may be employed. This occurs because self-interest includes the context of the network of all relationships we have privileges with. Thus, self-interest becomes inherently no more or less important than network-interest. By extension, since any two people on this planet can be related by no more than six degrees of separation, all people essentially represent one large network, or one family. Our implicit ethical principles, with inherent value for every network member, thus embrace all.

References

1) **Einstein, Albert.** Quote attributed to him.
2) **Wheeler,J.A. (1974)** The Universe as Home for Man. *Am.Sci.* 62(6):683-691.
3) **Horgan,J. (1991)** Profile: Physicist John A Wheeler. Questioning the "It from Bit". *Sci.Am.* 264(6):36-38.
4) **Horgan,J. (1992)** Quantum Philosophy. *Sci.Am.* 267(1):94-104.
5) **Ratzsch,D. (2000)** Science & Its Limits – The Natural Science in Christian Perspective. *InterVarsity Press.* Downers Grove, Illinois. p40.
6) **McNeil,R. (1987)** A New Model of the Mind. *Can.Res.* 20(12):41-44.

7) **Hoffmann,G.W. (1986)** A Neural Network Model Based on the Analogy with the Immune System. *J.Theor.Biol.* 122(1):33-67.

8) **Gladwell,M. (2002)** The Law of the Few. Chapter 2. In *The Tipping Point. How Little Things Can Make a Bid Difference.* Little, Brown and Company, New York. pp: 30-88.

9) **Bakircioglu,H. and Kocak,T. (2000)** Survey of Random Neural Network Applications. *Eur.J.Oper.Res.* 126(2):319-330.

10) **El-Din,A.G. and Smith,D.W. (2002)** A Neural Network Model to Predict the Wastewater Inflow Incorporating Rainfall Events. *Water Res.* 36(5):1115-1126.

11) **Church,K.B. and Curram,S.P. (1996)** Forecasting Consumers' Expenditure: A Comparison Between Econometric and Neural Network Models. *Int.J.Forecasting* 12(2):255-267.

12) **Cai,Y.D. and Chou,K.C. (1999)** Artificial Neural Network Model for Predicting a-Turn Types. *Anal.Biochem.* 268(2):407-409.

13) **Burstein,Z. (1995)** A Network Model of Developmental Gene Hierarchy. *J.Theor.Biol.* 174(1):1-11.

14) **Perkel,J.M. (2004)** Validating the Interactome. *Scientist* 18(12):18-22.

15) **Lu,G., Broze,G.J.Jr. and Krishnaswamy,S. (2004)** Formation of Factors IXa and Xa by the Extrinsic Pathway. Differential Regulation by Tissue Factor Pathway Inhibitor and Antithrombin III. *J.Biol.Chem.* 279(17):17241-17249.

16) **Mann,K.G., Brummel,K. and Butenas,S. (2003)** What is All that Thrombin For? *J.Thromb.Haemost.* 1(7):1504-1514.

17) **Matthew** 10:29-30.

18) **Chan,M.K., Kim,J. and Rees,D.C. (1993)** The Nitrogenase FeMo-Cofactor and P-Cluster Pair: 2.2Å Resolution Structures. *Science* 260(5109):792-794.

19) **1 Corinthians** 2:9.

20) **Senghas,A. (2003)** Intergenerational Influence and Ontogenetic Development in the Emergence of Spatial Grammar in Nicaraguan Sign Language. *Cogn.Dev.* 18(4):511-531.

21) **Senghas,A., Kita,S. and Ozyurek,A. (2004)** Children Creating Core Properties of Language: Evidence from an Emerging Sign Language in Nicaragua. *Science* 305(5691):1779-1782.

22) **John** 17:22-23.

23) **2 Thessalonians** 3:14.

24) **Abu-Mostafa,Y.S. (1995)** Machines that Learn from Hints. *Sci.Am.* 272(4):64-69.

25) **White,E.G. (1888)** The Controversy Ended. Chapter 42. In: *The Great Controversy.* Pacific Press Pub.Assn., Mountain View, 662-678. Quotation from page 669.

26) **Matthew** 18:20.

27) **Lewontin,R.C. (1978)** Adaptation. *Sci.Am.* 239(12):212-230.

28) **Revelation** 20:1-3.

29) **Genesis** 39:8-9.