

# On The Social Construction Of Emergent Worlds:

## The Foundations Of Reflexive Autopoietic Systems Theory

### Part 3: Chaotic Social Process Architecture

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#### 1. Abstract

This paper attempts to lay the foundations of reflexive autopoietic systems theory as a specialization of general systems theory. An autopoietic system is a closed cognitive-living system as defined by Maturana and Varela. A reflexive autopoietic system is by definition social. It can look at itself and act upon its organizational processes. Where the autopoietic system is homeostatic maintaining its own organization as a variable; the reflexive autopoietic system is heterodynamic, meaning it is ecstatic in its variety production. This essay seeks to provide a framework within which the relations between these different more specialized kinds of Systems may be understood in relation to each other.

#### 2. Keywords

Autopoiesis, Reflexive Social Theory, Formal-Structural Systems, Virtual Reality, Software Methodology, Self-Generating Component Systems, Worldmaking.

#### 3. Disciplines

General Systems Theory, Theory of Emergent Worlds, Software Engineering, Systems Engineering, Ontology, Theoretical Sociology, Constructivism, Artificial Intelligence, Artificial Life and Artificial Intersubjectivity, Social Phenomenology, Computational Sociology, Autopoietic Sociology.

#### 4. Autopoietic Sociology and Sociology of Gnosis

Having in previous papers in this series defined the foundations of Social Phenomenology and Computational Sociology we will attempt here to explore the intersection of these two disciplines formulating a sociological theory of work processes and generalizing that into a more encompassing sociological theory of process architecture in general. This attempt will revolve around our attempt to build a minimal Artificial Intersubjectivity Simulator the idea of which was first put forward by Ben Goertzel. Thus our theory is constructivist in the sense that it is based on our attempts to build the A-IS simulator which has been discussed on the *socsim*<sup>1</sup> electronic mailing list. On that list we have considered many different worlds and the forms that an A-IS simulator might take. This essay will take off from part of that conversation that considered what form the minimal implementation of Goertzel's magicians and anti-magicians model might take. This occurred in conjunction with my reconsideration of why I liked Goertzel's model as a basis for work process modeling. That consideration led directly to the series of insights that will be presented here that will attempt to drive toward a new sociological theory based on constructivism.

We begin with the observation that work processes are another way of describing what marxist sociology calls praxis. Praxis is action guided by ideology or theory. Work processes are guided by ethno-theories of all kinds applied to the lifeworld as mundane typifications developed in the context of everyday life. These ethno-theories held by participants are written down and agreed upon and then used to judge practice within a field like engineering. Thus there is a phase of work process definition and then a phase of enactment leading to the refinement of definitions and the adaptation of behavior to correspond to descriptions. This is necessary because the descriptions can be intersubjectively agreed upon and mutually enacted for the purposes of coordination and reduction of unnecessary variety within the organization. Normally this kind of social control of work is only done when there is some detrimental condition that makes freeform work unacceptable for some reason. We claim that work (praxis) has a privileged character in that it is the manifestation of social coordination of action based on language. In relation to work we can say that there is normally the distinction between the mundane and

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sacred and the distinction between work and leisure. Work is normally considered to be mundane. However, some rare work is considered sacred in our society. One normally expects work to be identified with the mundane and that any sacred work would take place in ones leisure. An example of sacred work during ones leisure might be proselytizing for ones chosen religion. However, not all these categories are so well defined as to exclude the possibility that some work might be seen as sacred and playful instead of mundane. I posit that there is a special class of work called autopoietic work that at once manifests the qualities of the playful and sacred within the context of the mundane. We could call this autopoietic praxis instead. It is work that occurs only rarely but organizes the whole field of mundane work. The fact that what is rare might organize the whole field of work is from a sociological standpoint a strange idea. It is this strange idea that is what differentiates autopoietic sociology which appears at the intersection of social phenomenology and computational sociology and makes it so different from normal sociology theories. Our theory does not attempt to start with the ideologies or other frozen images that society has of itself or some segment of society. It does not attempt to deal with statistical patterns like most modern sociology. It does not even try to deal with structural discontinuities within society. Instead our sociology attempts to deal with the structures that can appear on the edge of chaos that are given over to Wild Being. Autopoietic forms in society arise as a rare event. Those forms actually mimic the structure of the emergent event and give us an image of the unfolding of the four kinds of Being. It is these rare events that structure our experience of the social field of tendencies and give structure to our socially constructed emergent world. All work, all praxis, point toward the autopoietic social forms that appear in the intersection between social phenomenology and computational sociology. Social phenomenology is the extreme position of basing everything on the social as the embodiment of the emergent.

Fundamentally the theory of the cultural unconscious as posited by social phenomenology is like the causal theory the Buddhists call storehouse consciousness (Alaya-vijnana). That is the unconscious storehouse of the seeds that fructify into the world as we know it that is the foundation of the socially constructed world. Computational sociology is the other extreme of reification of the social into something simulatable in simulations that embody social theories. It is the extreme of objectification of the social into distributed artificial intelligent life. It takes the social out of the lifeworld and hands it over to the alien intelligences we create. Whereas social phenomenology goes beyond what is phenomenologically given to postulate the embodiment of the collective

unconscious as the basis for our worldbuilding. The sociality of the alien intelligent creatures and our own sociality growing out of our being-with others are equally mysterious. The intersection of these two is autopoietic sociology which deals with the closed reflexive autopoietic dissipative embodied systems. Closure may be our own closure, even closed to ourselves, or the closure of the computationally alien creatures we invent. In either case we are talking about social constructivism that allows us to discover who we are by seeing how we construct our emerging world. We must approach these phenomena by construction because of their closure with respect to us. There is not direct access to these phenomena. We only find out about how they work indirectly through our constructions.

We mentioned the concept of the storehouse consciousness developed by the Buddhists to explain how Karma works. In that theory all actions lay down seeds which fructify in the next moment. Those seeds are said to be like a perfume which taints the next successive moment and allows Karmic influences to promulgate. This perfuming reminds us of the tendencies which are equally unsubstantial that we see as the basis of all social intentions and thus social actions. It is the buddhist answer to how causes are subtly propagated from instant to instant within the universe allowing Karma to manifest despite the fact that there is nothing but emptiness of every thing which cannot really carry any causation. Storehouse consciousness is an unconscious and social repository of the seeds planted by actions. Likewise we posit that the social unconscious underlies all the schizophrenic and crazy variety that appears and must be channeled by society. When A. Schutz and other theorists speak of typifications or abstractions operating within the social realm they are missing the point. All these abstractions and typifications are in fact the ways the basically schizophrenic social “matter” is repressed. The matter of sociology is the endless unfolding variety that is repressed by socialization and organizational forms. The modes of repression are only of secondary interest. Of primary interest is the production of endless wild variety. Social phenomenology studies how for humans this endless variety arises, differentiates and finally fades away regardless of its channeling. Computational sociology studies the dynamics of minimal social machines which attempt to embody the essential nature of threshold of minimal complexity at which the social arises as a reification. Computational sociology studies the Li of society thought embodiments whereas Social Phenomenology studies the Chi of the social as it gives rise to endless variety. Autopoietic sociology connects these two. You must look at the Li and Chi of society together. Autopoietic sociology talks the minimal social machines and treats them as autopoietic networks. Autopoietic sociology

understands the closure of the world based on the advent of rare autopoietic structures within society. Such structures are more likely to arise in work/praxis than theoretically. Autopoietic systems must be embodied they cannot exist as purely theoretical objects. Social autopoiesis is embodied in the structure of work/praxis as teams of co-workers that “click.” When they “click” they become very efficient in every sense of the word and can accomplish tremendous things far beyond the capacity of the sum of the members. These teams manage some how to playfully embody the sacred in the mundane work environment. The sacred nature becomes visible in the closure of the autopoietic team. The playful nature becomes evident in the high efficiency of these teams based on the embodiment of neg-entropic life-forms. Such teams are a joy to participate and make work a meaningful activity for a change. The possibility of the autopoietic team or work situation structures the entire field of work and generates the distinction between work and leisure and sacred and profane. The anomalous case of sacred and playful work as opposed to drudgery and profane work is what gives all work its essential form. The field of praxis is not generated abstractly. It is generated by the experience of autopoietic work which produces the distinction between itself and allopoietic (other producing) work which embodies all the other normal aspects of the field of all possible kinds of praxis based on the difference between those other kinds of work and the anomaly of the emergent event of autopoietic work arising in that field.

Our culture is dominated by the assumption of the value of work or production. Baudrillard in The Mirror of Production showed that this is the fundamental assumption shared by both Marxism and Capitalism. But all production is considered to be basically the same. The model of all theory seems to be the production line and manual labor. Production is goal directed human behavior that has some kind designated-as-real social outcome. When we study work we see that not all work is the same. Some work, for instance engineering work, produces the designs to be produced by manual labor later. Software work has no real production phase but what is designed and prototyped is basically just copied during the production phase. So some kinds of engineering work do not lead to production or assembly lines kinds of work. Other kinds of work are basically managerial. When you study kinds of work that exists in engineering you see that there are many kinds which are not related in any serial fashion but are instead extremely non-routine. They can be very specialized types of work or very general types of work or even idiosyncratic and unique work. Coordination and management of these highly non-routine kinds of work is very difficult. It is for this reason that the field of

engineering work process is starting to grow beginning with the attempt to understand and control software engineering work. Software engineering work is highly non-routine at the beginning and end of the development process and fairly routine in the middle. Systems Engineering work is completely non-routine. As has been shown in a previous paper<sup>1</sup> Software Engineering and General Systems Theory are dual meta-disciplines and Systems Engineering is the point of reversibility between them. The relation between Hardware and Software Engineering is between that of a Technology and a Meta-Technology. Software integrates various technologies into a system in the context of a meta-system. Hardware Engineering also has many non-routine aspects. Management work is also a mixture of routine and non-routine work. All these kinds of work are not normally considered by the sociology of work which has traditionally been enlisted as a bulwark of the establishment to control manual labor. But as our society becomes information based then information and knowledge workers become increasingly important. It is these socially defined higher level workers that essentially shape our society.

I have had the opportunity to study engineering work as a participant observer for a number of years and this eventually led to the professional study of work in the context of work process and enactment facilitation as a chairman and then member of our Software Engineering Process Group. Being the only trained sociologist that I know of in this field I began exploring its theoretical foundations and found them wanting. The field was based on the work of Demming in Japan where he applied process control techniques to assembly lines. Watts Humphrey attempted to re-import these techniques and reapply them to software work resulting in the Capability Maturity Model developed by the Software Engineering Institute. The model is based on the fundamental assumption that software work forms a continuous stream that can be managed and quality controlled like an assembly line. This seems to work for the parts of the Process that are routine but not for those parts that are highly non-routine. Pava described the difference between routine and non-routine work in the context of office work. When you move to engineering the non-routine aspects of work become more extreme in nature. Therefore another model that would describe the characteristics of non-routine engineering work was needed. I had great difficulty finding such a model until I chanced upon the CHAOTIC LOGIC by Ben Goertzel. His model works very well as a basic model of non-routine work. One of the objects of this paper is to explore how this model

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1. "Software Engineering Design Methods, General Systems Theory, Artificial Intelligence, and Systems Engineering." (manuscript)

can be used in this way to support work process modeling. A brief summary Goertzel's model as it applies to social work processes has been given in the first part of this series of papers. That model will be clarified and expanded in preparation for approaching the construction of an Artificial Intersubjectivity simulation.

But a second outcome of this work was to formulate the model of Autopoietic work process as an alternative to the other models of software and systems development which are prevalent. There are basically three approaches to the description of work processes: life-cycle, causal activity template and kinds of work. These form a spectrum with the two ends representing temporal and atemporal descriptive methods. The life-cycle describes black-box activities performed in a series of abstract phases that generally represents the sequence of the essential transformations of production. There are several different variations of lifecycle ranging from waterfall to evolutionary styles. The waterfall performs a production sequence of essential phases of work on all parts of the product. The Evolutionary life-cycle performs these phases on each part of the product in sequence. Evolutionary life-cycle is usually the basis of prototyping. The Spiral lifecycle combines the two extremes into a single model. In thinking about these types of life-cycle and the performance of efficient teams I devised the concept of the autopoietic lifecycle which is basically a closed ring of essential transformations around which information flows in both directions instead of as a sequence. Products are the result of this dual flow which creates an interference pattern of information in each phase of the ring. The autopoietic ring is composed of a set of essential kinds of work that naturally form a series. When this series is arranged in a ring then it becomes a closed autopoietic system of work which is the basis on which the efficient team organizes its production. The autopoietic process combines the atemporal kinds of work into natural formations which though the flow of information around in both directions assumes a temporally stable structure. In that structure the team locks into a harmonic resonance that allows them to be very efficient in their coordination and self-management of processes. The main work of the team becomes self-production maintaining the ring structure against the perturbations of the environment. The team maintains its own structure of essential work processes homeostatically. As a side effect the autopoietic process is also allopoietic and produces products that are built by a more efficient process than the evolutionary or the waterfall life-cycles. In the autopoietic process the products accrue though the confluence of information directed by the team as a whole. These confluences of information only become products when taken out of the

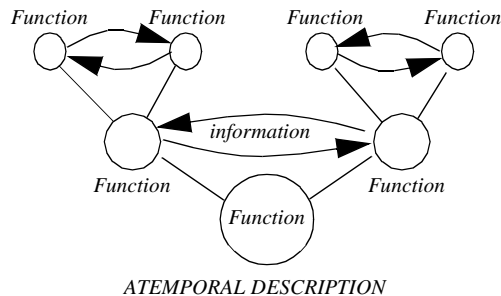
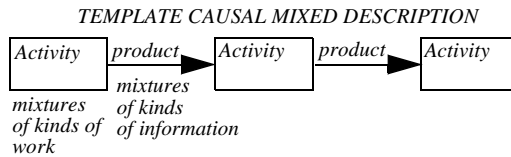
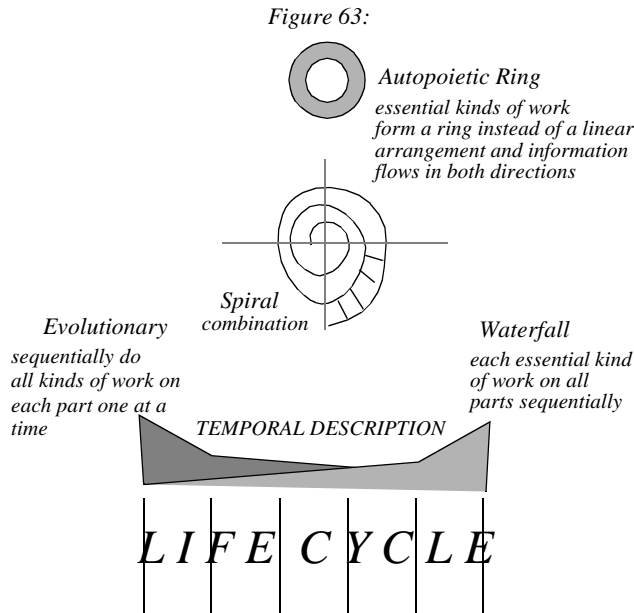
autopoietic ring. In the autopoietic ring kinds of work did not have to be mixed because each kind maintains its atemporal independence even as the information is cycling through the ring. Thus the autopoietic ring process solves the problems of mediating the relation between kinds of work and life-cycle without having to resort to explicit external enforcement of products and Activities that pre-mix information and functions in a causal chain. In the autopoietic process there is a continual adaptivity that allows the information and kinds of work to be efficiently formed into products without scheduling separate reified activities with intermediate reified products. Everyone who has worked on a team that “clicked” knows that they are much more efficient at producing quality outputs from highly non-routine enactment of sets of essential processes than any external controlled process could possibly produce. This is because the products and activities are dynamically adaptive though continuous feed forward and feedback of information in a set of optimized essential transformations that are enacted by an extremely non-routine strategy by the individual members of the team working together. It is a complex dance within a structured chaotic attractor. The autopoietic ring forms the harmonically stable platform for this dance. The dance is like a conversation which the team members engage in using the work products as the medium of exchange. Like any conversation the team members can re-enter the subject tree of the dance together at points they keep together in group memory. Thus very little information is lost when the team is stable and not interfered with often. It is an amazing thing to participate in -- a work enactment that is simultaneously playful and sacred. Sacred because it is taboo because of its social closure to the rest of the organization or world. It is a sub-culture of its own. But it is playful because high productivity seems effortless within its bounds. It is anomalous work. It is structured like an emergent event. It conditions the field of all other forms of work. In all other forms of work production drains us. In the autopoietic ring of an efficient team work is a pure joy.

We have learned through this series of essays that the opposite of the homeostasis of the autopoietic is the heterodynamic social reflexive autopoietic dissipative system. The social is inherently heterodynamic which means that it is endlessly producing variety of every kind. Teams that operate in an autopoietic ring and are engaged in a complex dance on the edge of chaos can become ultra-innovative and creative. In essence they start discovering things together than none of the participants knew previously. This is the true meaning of the Platonic dialectic. Such special social groups tap into sources of endless variety and cause novel solutions to emerge from out of their interaction. Thus the team is not just a neg-



## Reflexive Autopoietic Systems Theory

entropic system with a dynamic self-maintained boundary, it is also based on a closed autopoietic ring of essential transformations (kinds of work) and it embodies the heterodynamic basis of the reflexive social system. In other words what Deleuze and Guattari call the schizophrenic basis of the social is channeled by the group to produce novel solutions within the work process.



This anomalous configuration of work has the structure of the emergent event. This is to say that all the different kinds of Being are represented in a stable interrelation

within the enacted autopoietic ring. Normally emergent events disrupt social patterns. Genuinely emergent events must pass through all four meta-levels of Being on their way to incorporation into the social system. But social autopoietic structures themselves are rare standing waves of processes that balance all the different aspects of manifestation giving equal weight to homeostasis and heterodynamics within the dissipative context. One might say that the whole purpose of society is to produce these harmonic social structures or prevent their appearing. Instead of a sociology of knowledge one might speak of a sociology of gnosis. Knowledge is a static structure embodied in language which is available and retrievable. Gnosis is the relation of knowledge to experience. You can know everything about some subject but having not experienced it you are really ignorant of it in some basic way. What we really need to understand is how society manages its gnosis rather than how it manages its knowledge. An autopoietic structure is really a subject of gnosis and not knowledge. The autopoietic system does not exist if not embodied. As knowledge there is nothing to it. You can know all about an autopoietic system from the outside but unless you have experienced one you will not know anything because it is essentially closed and knowledge of the kind that is in books does not capture it. It is only really known through thought experience. The gnosis of the autopoietic system exists mostly in tacit knowledge instead of explicit knowledge. That tacit knowledge is the result of experience. At most all you can say about such a system is phrases like “the team clicked.” You either know what that means from experience or you do not. Society manages gnosis even more carefully than knowledge. Gnosis can only be obtained through Heuristic Research. It cannot be obtained through any method that distances you from your subject of inquiry. Gnosis arises from experience where one is not separated from what one experiences in any way. Thus to have a gnosis of what an autopoietic social process is one must jump right in and fully immerse oneself in the work of the team. If the social harmony is achieved then suddenly there is a qualitative difference in the “work” atmosphere. The Li and Chi of the team become qualitatively different. For instance things seem to slow down and flow naturally even though one discovers that productivity is unusually high. Everything appears as if it is exquisitely ordered even though from the outside everything looks like total chaos. Autopoietic sociology is the search in society for a very rare species of harmonious social interaction which conditions all other action within society. It can only be approached through a sociology of gnosis which combines experience and tacit knowledge instead of a sociology of knowledge alone. Society as a whole attempts to foster autopoietic forms or social self-organization in some sectors and repress it in others. Knowledge can be allowed to flow more freely than essential gnosis that

can make it possible to activate that knowledge. This is why experience is counted more highly than mere knowledge of it. This is why graduates from college really know almost nothing of their chosen field until they undergo on the job training and apprenticeship which unfortunately in our society does not occur simultaneously with book learning. Autopoietic sociology must be a sociology of embodied gnosis. Autopoietic systems are only known through experiential gnosis. One unaware enters a team that has achieved an autopoietic stability and is exercising the complex heterodynamic dance on that dancing ground. Suddenly one locks into a new way of interacting with a high degree of harmony. From then on one longs for this experience. It is incredibly addictive and leads directly to workaholic problems because time seems to stand still and space contracts to the team alone which becomes integrated like some highly trained military squad. The result is almost always success unless there is overwhelming environmental disturbances. The whole team thinks better than any individuals within it. It has unleashed its creativity and innovation but controls this socially and channels it into the project in a well regulated way.

Social Phenomenology and Computational Sociology set the stage for the advent of Autopoietic Sociology and the Sociology of Gnosis. We are not any longer looking for general social features. Instead, we are looking for very rare social formations that make all other formations possible. These are embedded in tacit knowledge that cannot be made explicit in most cases. Thus we must apply Heuristic Research in the context of our four distancing methodologies in order to get a handle on these features that can only be apprehended by our own gnosis. Social Phenomenology sets the stage by directing our attention at the social matter of chaotic tendencies that make up the social fabric and drive the social system. Social Phenomenology reveals the importance of the collective unconscious in everyday affairs. Through the collective unconscious we can resonate with the behavior of others and get in sync following their indications in the complex heterodynamic dance on the dancing ground of the structurally stable autopoietic ring. The collective unconscious functions exactly like it is described by the Yogacaraian Buddhists as the storehouse consciousness (alaya-vijnana). The collective unconscious is active in the social milieu. The perfume of the tendencies allow the karmic causality from discrete socially designated as real specious present moment to moment. The karmic causality in this case is the movement around the ring of the information and the non-routine dance of the social machines. You see there is a basic problem that the Yogacaraian philosophers found a neat solution for which confronts us as well. The problem is that if the social ground is inherently chaotic how does the extreme

regularity of the autopoietic ring appear. If each aspect of the social matter is fragmented then where does the unity of the autopoietic processes come from. The answer of the Yogacaraians was that there was a perfuming by which each moment actions plants seeds for the next moments actions. There is no real connection between moments but only perfuming of one moment by the next. In our case this perfuming will be seen as occurring via Goertzel's magicians model. We shift from actuality to possibility between the separate moments. The propensities or tendencies connect the possibilities between moments to the actualities in adjacent moments. The category that Johansson identified of tendency is crucial to this perfuming by which individual actualized moments are created in the model of chaotic processes. If the category of propensity did not exist then individual moments could not be connected via the layers of possibility between moments. Propensity represents a new dimension orthogonal to both actuality and possibility that allows their intrinsic indirect connection. Goertzel calls the result of this perfuming collusion which is essentially a social phenomenon that arises out of chaos and fragmentation to provide the basis of illusory continuity.

Computational Sociology also sets the stage for autopoietic sociology by defining the minimal social machines that arise out of the intersection of desiring machines and the socius of Deleuze and Guattari. This is the ultimate reification of the structural aspect of society which allows us to define computationally abstract social structures. It is the computational social structures that we wish to see interacting via Goertzel's model so that we can attempt to discover social phenomenon via computer simulations and visualizations of complex dynamic patterns similar to those that have been so successful in other disciplines for improved appreciation of complex dynamical systems. Autopoietic and Social systems are further specializations of dissipative systems. They have very regular and harmonic forms which can be modeled effectively on computers as simulations. By searching for the minimal thresholds of social complexity as we did in the last essay in this series then it is possible to see autopoietic systems in their simplest forms and explore their dynamics at a threshold close to that of a genuinely "social" system. We can see how the alien intelligences we create as artificial living creatures function socially together and watch for emergent phenomena which will help us understand the nature of the social emergent level better. Since the emergent is inherently social every example of emergent phenomenon gives us further insight into the inner nature of the social itself. Since the autopoietic has the inner structure of emergence that is what keeps it so stable. We can further study emergence by studying the structure of autopoietic social phenomena and simulations of

autopoietic structures. Computational Sociology reifies the social away from the human to the ultimate degree and merges it into the alienness of artificially intelligent life. Social Phenomenology on the other hand merges the social into the most mysterious aspect of our humanness which is the collective unconscious. These two extreme perspectives allow us to approach the interface between them which is autopoietic sociology which must be explored through the sociology of gnosis based on the principles of Heuristic Research. Heuristic Research is presented as an individual methodology. Gnostic Sociology is based on group experience and group knowledge as people work in teams. All kinds of groups that do not work together are studied by sociology. But the study of working teams is relatively rare considering how many working teams that function as part of industry. Since production is a major assumption by all western societies regardless of ideology it would seem like teamwork would be a major research emphasis. But the number of protocol studies of design teams and other teams doing highly non-routine work are very few. The number of phenomenological studies of such teams are almost nil. This is because to do them you must have the specialities necessary to join into the group work processes. It is then only occasionally under special circumstances that such teams achieve social harmony. Thus the key phenomena of autopoietic work processes are completely missed by sociologists. Sociologists need to get to work, literally. Setting in ivory towers make them miss all the most interesting social phenomena. There may be other such phenomena out there besides autopoietic rings that have been missed by sociologists. Sociology of science and technology need to be carried on by scientists and technologists. Unless we become radically interdisciplinary we will not be able to explore these anomalous social structures that are crucial to our understanding of the society as a whole -- which will force us to re-vision it and change our paradigms fundamentally. The split between practicing engineer and social scientist probably hides many fascinating phenomena. We can only enter this wilderness by being more than sociologists or more than practicing engineers. They do not appear in reified social structures. They do not appear in statistical studies. They only appear through participatory research -- that is through a total ongoing engagement with the actual enacted society. If sociology has stalled in the quest for knowledge it is because what is needed is gnosis -- the mixture of experience and knowledge. As Kant said understanding comes from the mixture of experience and reason. Disconnected theory or empirical studies from afar do not "cut it" any longer.

It is necessary to computationally model dynamic social systems based on minimal social machines in order to get a picture of the workings of society as a complex

dynamical system. It is necessary to engage in social phenomenology in order to understand the active workings of the collective unconscious as the basis of all social action. It is necessary to engage in social phenomenon actively thought Heuristic research. It is necessary to study the workings of teams engaged in active praxis thought participation in order to gain tacit knowledge of anomalous social structures like the autopoietic rings that form the basis for heterodynamic dances within production. Sociology treats production as if it were an evil. This is because sociology produces very little considered of value by the rest of society. But production is a fundamental form of manifestation in the world dominant Western worldview. We must understand production as it exists in an information and knowledge based society if we are to understand our worldview in any fundamental way. This is why we concentrate on the sociology of work. That work may be scientific, engineering, skilled or manual work. But Sociology has concentrated on the two ends of this spectrum too long. Sociology needs to try to understand engineering work. Following Foucault's principle that the work of the most brilliant minds of the era do not always tell you the most about basic phenomena of the society we can see that an archeology of engineering gnosis is necessary. Engineers apply what scientists discover. They find workable "satisficing" solutions that are given over to skilled and manual workers to produce in quantity. The creativity and innovation in engineering work does not normally have long term value in the society at large. But that regulated creativity and innovation has a peculiar form that is socially controlled and may tell us more about society than all the discoveries of the scientists. This is because the things the engineer work with are proven as intersubjectively valid and practical. Scientific ideas are not in themselves completely finished. Instead it takes a team effort bringing many different kinds of work to bear to turn the many scientific principles into a solution that works within the world. The manual and skilled laborers merely follow the frozen pattern of the designs laid down by the engineers. But in engineering itself those design patterns unfolded. It is that unfolding that occurs within the context of the autopoietic social system or many variations that attempt to achieve that social harmonic but usually fail. Only scientific projects that engage engineers or where scientists themselves work as engineers in teams is a similar dynamic set up. For the most part the autopoietic social system forms around sets of essential kinds of work that form rings where information flows both ways in a closed manner around the ring. It is a rare and anomalous phenomenon but one that organizes the entire field of work and indeed the entire social fabric because of the centrality of production to the Western worldview.

## 5. Chaotic Process Modeling

Goertzel's chaotic process model has been generally explained. Here we will go into more detail to show why this model is a good one for attempting to understand chaotic socially enacted work processes. But specifically we will focus in on how such a chaotic process model would be applied to model the social itself. We begin by re-presenting the aspects of Goertzel's model this time with an eye toward its embodiment in as simple a form as we can think of and then show how this simple form is also inherently social. The result is a premise that the chaotic process model is inherently social in nature.

Goertzel's model begins with a set of self-generating processes. These self-generating process nodes interact until an appropriate spawning time. At that spawning time they all individually produce a plethora of virtual self-generating process nodes which each one thinks should exist in the next specious present moment. These virtual self-generating process nodes are thrust into the realm of possibility. In that realm there is a cancellation process that is carried out which allows self-generating process nodes with opposite qualities to annihilate each other. What is left over from this cancellation process will be actualized in the next moment. But the cancellation process is governed by the collusions between different self-generating process nodes which taken as a whole greater than the sum of the parts may produce random input into the process in the form of extra positive or negative self-generating process nodes. These extra self-generating process nodes are called magicians and anti-magicians because they make self-generating process nodes appear or disappear and thus change the final result. Whatever self-generating process nodes survive the cancellation process including the existence of magicians and anti-magicians in the soup will exist as actualized at the next specious present moment. Then these will interact until it is time to spawn again. The important thing about this model is there is not actual connection between specious present moments. They are only connected through the generation and destruction of possibilities in a dimension orthogonal to the present. But the possible and the actual are not really connected except by propensities which is in yet another orthogonal dimension. It is the propensities of self-generating process nodes that cause them to generate potentials. It is the propensities of self-generating process nodes that are the basis of their being weeded out in the cancellation process. It is the propensities of the whole cloud of self-generating process nodes, actual and potential, that cause the generation of the magicians and anti magicians that attempt to skew the cancellation process. It is the propensities of certain self-

generating process nodes to cooperate that allows collusion to exist between them. And finally it is the propensities of actual self-generating process nodes that determine their mutual interactions prior to spawning. These propensities are like to perfuming that connects one moment to the next across the abyss of discontinuity between moments.

This model well represents the different kinds of Being. The existence of the self-generating process nodes in a particular moment and their seeming persistence through time is where Pure Presence enters into this illusorily continuous process. The interaction of the self-generating process nodes within the moment and the temporal gestalt of all the self-generating process nodes that is greater than the sum of the parts is where Process Being enters into this statistical process. The discontinuity between moments and the cancellation process are the points where Hyper Being enters into this discontinuously punctuated process. The propensities of the self-generating process nodes both alone and together is were Wild Being enters into this fundamentally chaotic process. This model is sculpted to balance all the concerns of each kind of Being in a single process model. Because of that it can be seen to provide a model that can span all the different kinds of manifestation. But we call it a chaotic process model because that is the deepest level of manifestation it covers. Most process models either model work as illusory continuities or as statistical phenomena. Very few process models deal with breakdowns in work processes.<sup>1</sup> No process model that I know of attempts to model chaotic processes. But it is exactly a model of chaotic processes that we need if we are to understand non-routine work which is essentially chaotic in its execution during enactment. So it is readily apparent why Goertzel's model of chaotic processes is of interest. But how do we fit this model to our conception of work process.

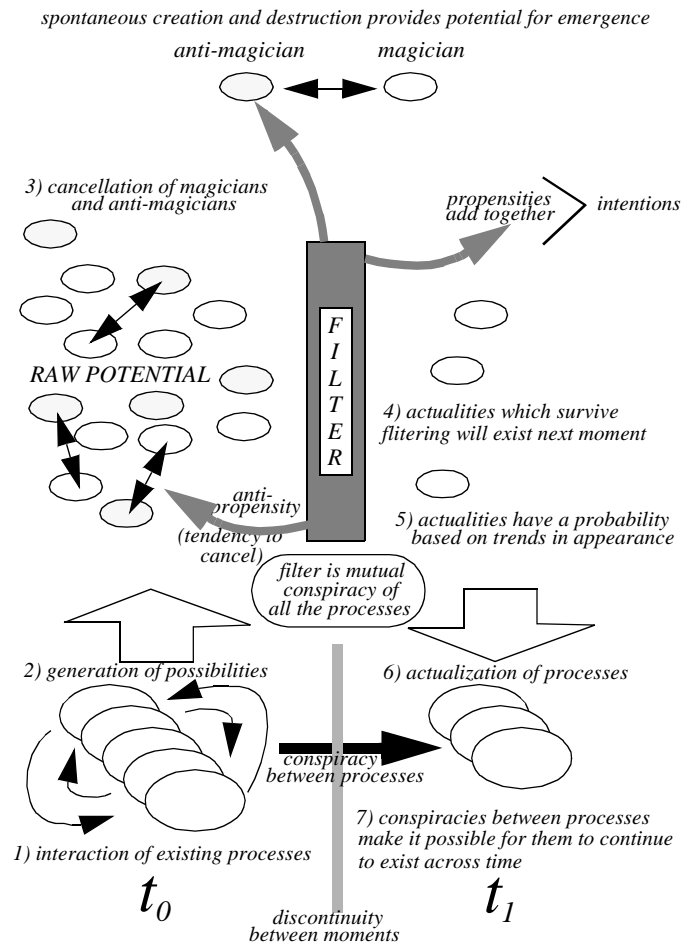
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1. The model of Walt Scaachi is the exception here.



## Reflexive Autopoietic Systems Theory

Figure 64:



Let us think for a moment of the Congress of the United States. The periods in question are between votes on bills. In these periods the congressmen are lobbied by professional representatives of interest groups and their constituents. Each congressman has his propensities on every issue. But before the vote there is generated a myriad of possible votes for different reasons for each congressman. As the pressures are brought to bear and the deals between congressmen are made then these different possible votes for different reasons begin to be cancelled out until in the end each congressman casts a single vote which is his actualized vote. During the bargaining and negotiations under pressure from all sides the various interests at play represent the sum total of all the propensities as they impinge on a single congressman. But in the end the congressman must sum all these expressions of interest or opinion or propensity and add it to his own to manage to discover what his final vote will be. We can model this as a cancellation of virtual votes for

different reasons. The bargains or deals trading votes can be seen as the collusion between the self-generating process nodes which lead to certain collusions maintaining themselves from vote to vote. If we do not think of the congressmen as people but as holders of power and expressions of interests the we can see that the total pattern of power and interest embodiment is constantly changing throughout the history of voting so that the self-generating process node on one side of the vote may be very different from the self-generating process node of the other side of the vote. Perhaps in a vote the congressman loses some essential block of support and thus alters his power base considerably as a result of a vote. Thus Goertzel's model forces us to understand voting in congress as a field of propensities (interests and opinions) which manifests discontinuities that frame virtual self-generating process nodes (votes, power centers) which in turn exhibit possibilities (votes for different reasons) which ultimately must cancel to produce a single actualized vote. From the field of tendencies we see a structure of attraction and repulsion which is dynamic so that it exhibits energy and flowing movement. These nodes within the field are related to possibilities which may be actualized. The propensities are the drivers of actualization for these myriad possibilities. The congressman is merely the locus of the cancellation of possible courses of action and the caldron in which these propensities seethe.

This example shows that it is not impossible to understand how the model of chaotic processes apply to concrete real situations. But congress is an exceptional kind of place in which all the pressures from the whole country are focused causing chaotic turbulence within a single unique institution. What we are saying is that there are many other places in our social fabric that is similar to congress in the intensity of social interaction so that the chaotic process model is appropriate. Our point is that we should always use this model because it supports all other kinds of Being as layers of reification on top of the basic chaotic processes. This model can emulate discontinuous models, statistical models, and continuous models of process when these different models are appropriate. However, when chaotic processes are present then Goertzel's model shows its real worth because it makes these intelligible in relation to all the other kinds of process models. We must remember that work process is a kind of manifestation so that all the different kinds of being are relevant to the description of that presencing that occurs in work. Work is a more fundamental kind of presencing than occurs in literature for example. This is because work is rooted in a broader spectrum of behavior, not just writing. So work is a more robust spectrum of phenomena than literature which is normally studied by literary criticism as a kind of presencing. Artistic presencing is a specialized

kind of work. What we need to do is consider all the different varieties of work done in our society. Within those we find that certain kinds, especially science and engineering change the fabric of interactions among other kinds of skilled and unskilled work by providing technology based on scientific insight. Through technology we can do things in different ways and those ways are always changing. Production in our society is the basic form that manifestation takes. Some kinds of production change the way production itself occurs. Science does this by understanding phenomena better. Engineering does this by applying the insights of science with practical wisdom or cleverness or cunning (which the Greeks called *metis*). The production of changes in the ways to produce is meta-production. Engineering meta-production has a special place in our society. And one of its characteristics is that meta-production is very often highly non-routine. We need a model of chaotic production to understand that non-routine aspect of Engineering. Goertzel gives us such a model. It should be the fundamental model underlying all our efforts to understand all work processes (behaviorally coupled kinds of manifestation).

When we look at an organization we should imagine it as a very complex chaotic behavioral attractor. When we approach it we can begin to understand it by mapping out atemporally the kinds of work done by such an organization. Now we will find that some of the work done is routine and can be described by continuous flows of information or materials along predetermined paths. We will find associated with these flows certain processes by which the information or materials are transformed. We may even find that there are certain well defined discontinuities within the flows where no one quite knows what happens or where something different happens each time depending on circumstances based on intuitions. But within the whole panoply of kinds of work there will be many instances in which sets of kinds of work are performed together in an iterative and recursive manner that appears random from the perspective of an outside observer. These are strange attractors within the field of all the kinds of work performed in an organization. These strange attractors have a special relation to the whole field. They are the generators of the field. And at times they can manifest autopoietic harmonics. By looking at work atemporally we are able to map the large complex attractor or cluster of attractors that generate the field of kinds of work and represent it at different levels of abstraction by a hierarchical functional decomposition. The decomposition of kinds of work provides us with map that is independent of the time domain in which execution occurs. We can consider what kinds of work a particular individual has been assigned and how he jumps between

these kinds of work in order to complete his tasks. We can consider the way the different kinds of work are apportioned or negotiated during the process of setting up the activities to be performed. We can consider how different individuals coordinate their activities with respect to the different kinds of work they perform together. We can consider how they communicate within the process of performing their different kinds of work. There are a myriad aspects of the relation between enactment and the map of the kinds of work territory within an organization which might be studied fruitfully. However, once you realize that this basic map of kinds of work is central because it maps the chaotic strange attractor that organizes the field of work within an organization, then you begin to see that chaotic process modeling is the first step in the understanding of the social dance of jointly executed work in an organization. The mapping of that into a time domain is secondary in importance.

But let us go further and consider the fact that this basic structure of kinds of work in a hierarchy is perceived by different individuals differently within the same organization. Not everyone knows the whole tree of kinds of work. Different people have different degrees of knowledge: some have gnosis or experience plus knowledge of particular kinds of work. Some only have knowledge because they have studied it but never done it. Some only have observed others doing it but never done it themselves. Some kinds of work may never be seen because one does not interact with the parts of the organization that do those things. Thus each individual has their own partial map of the hierarchy of kinds of work. This means that the kinds of work hierarchy is social and intersubjective. It is socially constructed in that it is constructed by everyone acting together as a community of self-generating process nodes. But it is also intersubjectively projected in that it is really the sum total of what is in everyone's head. This is to say we can see the hierarchy as something outside of everyone which is formed in the forge of collective unconscious action. Or we can see it as a summation across all the individual viewpoints on the hierarchy where each individual only has partial knowledge of the whole of the hierarchy. Using the internal view we get something like society as the summary of the intentions of everyone taking everyone else into account to infinite reflective meta-levels. Johansson presents a calculus like this to explain intersubjectivity in terms of summaries of intentions. Goertzel has expressed a similar view. The opposite of this view is that there is a collective unconscious outside the heads of everyone which produces the coordination of the conscious views of everyone participating in the same behavioral dance. One view says we can render all the social processing explicitly and perhaps reify it into an

intentional calculus that can be computed like computational sociology would produce. The other view says that there is a collective unconscious that is closed to us that has the real model which informs all the partial models that each participant is conscious of separately. Now what we really need is a model that allows both of these possibilities to coexist and that is the goal of autopoietic sociology. Social behavior is obviously partially conscious coordination and collusion and partially unconscious dance of actors bound by synchronicity into the same manifold of action in ways they do not consciously comprehend. What is interesting about Goertzel's model is that it allows either of these interpretations on the same basic structure of the model. These different interpretations appear as the dual ways of looking at the dual networks. In the psychological model the heterarchy is associative memory and the hierarchy is control. In the social model the heterarchy is lifecycle control and the hierarchy is functional decomposition of kinds of work. Now we understand that switching from one of the dual interpretations of the dual model to the other is the way we transition from the idea that the hierarchy is ultra-conscious (subject of reification into a calculus of intentions) to the idea that it is mostly in the collective unconscious. Individuals are obsessed with their own jumping from one function to another. This is represented as a control hierarchy of program that encompasses their behavior. The heterarchy is the memory of work functions done in the past associated through images. By learning different kinds of work we can immediately return to those kinds of work and process new work based on associations. The skipping around is under conscious control and we consider it as a linear program that the self-generating process node executes. Multiple self-generating process nodes process their own programs concurrently across the field of all remembered kinds of work applied by association. This view lets us think we can create temporally locked process programs to control the actions of self-generating process nodes and make them dance together. This view breaks down when non-routine work is necessary, but it works for all routine work with simple coordination demands. When we take the dual of this viewpoint on the dual networks we get the social viewpoint on the hierarchy and heterarchy. Here the hierarchy is the intersubjectively common kinds of work seen as an atemporal field within which the different self-generating process nodes hop around in a random or chaotic manner. The heterarchy is transformed into the lifecycle of the intersubjective cohort in which the different self-generating process nodes attempt to roughly coordinate their behavior in an external way instead of by internal programming. The heterarchy becomes the mode of control. It is a heterarchy because the phases of the lifecycle are not necessarily connected to each other. They may be arbitrary discontinuous breakpoints (milestones) in the flow of execution of

the work. They merely give an external coordination sign to allow independent self-generating process nodes to keep track of where they are in relation to everyone else. It is in the execution of kinds of work in relation to the execution of other kinds of work by others that allow this coordination to be honed into a fine tuned dance of mutual cooperation.

The associative heterarchical network of the individual is the way that the individual relates to the socially grounded hierarchy of work. He does not know it as a whole as it appears socially but he only knows the parts he has learned in the past and can reinvoke via associations. The control hierarchy (process program<sup>1</sup>) of the individual is the way he maintains control given the external signs of coordination in the lifecycle. Thus we see here that the two dual networks actually work together to define the social and psychological perspectives on chaotic process. We might realize that what we have here are two intervals between the same limits. Given one interval the limits look one way (psychological) and given the other interval (the dual) the limits appear different (essentially social). The dual images of the dual networks function together to give us a model of the relation between the social and the psychological interpretations of the chaotic process model. This leads us to say that we can see the chaotic process model from two perspectives as well. We can see the self-generating process nodes in the model may be looked at from the point of view of agency or functionality. This is to say we can view the functionally decomposed elements of the chaotic attractor as self-generating process nodes or we can view the autonomous agents within the lifecycle as self-generating process nodes. When we see functions as process nodes then we are basically making the social active whereas when we see agents as process nodes then we are seeing the psychological aspect as predominant. We should expect our model of chaotic social processes to have both of these aspects. The actual work functions will produce the work processes to be executed in the next moment. Simultaneously the agents should produce the set of agents to be processing those functions in the next moments. Both of these productions should operate concurrently to determine the set of work functions and the set of agents that will exist in the next moment together. Psychological processes obviously operate concurrently with social processes. The sum of psychological processes produce the social context and the sum of social processes produce basis of the psychological. These two participate in what the Buddhists call dependent co-arising. It is important that our model represents the dependent co-arising between

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1. See the work of Lee Osterweil on Process Programming.

agent and functional viewpoints. Once we have realized that the agent and function viewpoints exercise Goertzel's model in opposite ways simultaneously then it becomes clear that all the things we said about agent and function in our section on computational sociology become applicable. Agent and Function viewpoints become the basis of autonomy and intentionality. Strangely the autonomous is associated with the psychological and the intentional is associated with the social. In other words what is seen as autonomous within the social has its own interior that is psychological and what is seen as intentional from the point of view of the psychological is from the outside seen as functional in the social arena. Thus the two simultaneous chaotic process models based on the two viewpoints operate in a yin/yang fashion to give each other what they each cannot achieve on their own. As a result of this simultaneous execution of the two chaotic process models based on the duality of the dual networks we see that everything we were saying about the derivation of the minimal methods and their embodiment now apply in this new arena. Now we have a dynamical system that corresponds to the static structure presented in the last essay in this series.

What we are saying ultimately boils down to this. We need not one but two models of chaotic processes. One allows functions to self-generate while the other allows agents to self-generate. Each moment in the evolution of the system is the interaction between the functions that happen to be actualized in relation to the agents that happen to be actualized. This allows us to process the society from two angles at the same time. We process society as the collective unconscious and external determiner rooted in hierarchical function. We also process society as the calculus of intentions of multiple individuals. The first processing derives from the insights of social phenomenology. The second processing derived from the insights of computational sociology. The result of the dual chaotic processing is an autopoietic sociological model. That model tends toward the limit of the social from two directions based on the two interpretations of the dual networks applied at the same time. The interference pattern between these two simultaneously enacted chaotic process models is where the emergent phenomenon of the social will be seen to arise.

Ultimately we would like to embody in such a model the six vectors and the six methods as they play around the interaction surfaces. But this is not feasible in the short term. Therefore we will explore some simpler embodiments of the chaotic process model and attempt to understand the general outlines of a dynamic implementation of our insights developed based on the confluence of social

phenomenology and computational sociology as they define autopoietic sociology.

## 6. A Minimal Social Process Model

Now let's consider how a minimal chaotic process model might work. It is clear that it is composed of agents and functions. Each plays a dual role. The functions map the organizational complex chaotic attractor in a fractal manner modeling its structure of lobes. The functions also are what individual agents recall through the associative heterarchical network. In this latter case the functions are associated with images retained in long term memory of the individuals. That long term memory is within the unconscious of the individual agent. Associations allow the agent to access these memory images instantaneously. The images like all patterns are directly related to the algorithms that can produce such patterning. Therefore each image is associated with a function or algorithm or behavior that can be executed to process the image or produce it. We can see these behaviors as parsers that either produce language-like patterns or are acceptors for them.

The agents also play a dual role. They consist of control structures within individual agents and they exist as global coordinating state variables by which groups of agents can coordinate their activities within a life-cycle. Notice that either control is implicit or explicit in the way it is exhibited in the model. Now we could go on to say as we have before that the interaction between function and agent produces petri nets or state machines as the fundamental dual control mechanisms and we could also say that agency and function entail each other so that they must always exist together. Within the agent the control is expressed as a hierarchy (program) and outside the agent control is exhibited as a heterarchy which is what allows multiple agents to coordinate by mutually perceptible signs (like milestones). Notice here that our model is poised between system and meta-system. The agent itself can be seen as a system within the meta-system of the environment in which multiple agents operate. The functional hierarchy can be considered as a single system but there may be many functional sub-hierarchies within the heterarchy (rhizome) of the associative memory. That heterarchy is like a meta-system of functionality. It is in fact analogous to what Deleuze and Guattari call the rhizome (anti-tree) which has no beginning or end or root but only a middle that can be entered at any point. The meta-system of functions is completely different from the meta-system in which agents cooperate but can act independently. It is the combination of these two meta-systems that has the nature of the social. The social is an arena within which autonomy is exercised and it is through socialization a set of learned



behaviors that unfurls the social landscape.

Now if we think that the functions and the agents are operating according to the chaotic model then we have to postulate a certain amount of internal structure and external structure that will allow that to be realized. We will posit that this is the same as embedding and wrapping the system and meta-system layers with the other layers from our ontological emergent hierarchy. Thus both functions (mappings of the complex chaotic social attractor) and agents (as control hierarchies) will be found to be composed of object-like and primitive-like constructs. Similarly the functional meta-system of associative memory and the agent meta-system of the life-cycle have imposed upon the structures drawn from the levels of domains and worlds. We will not dwell upon this embedding and wrapping except briefly point it out. What is important instead is that actualized functions produce potential functions and actualizing agents produce actual agents via Goertzel's model. This means that there is no continuity from specious present moment to moment from either the agent or function perspectives. Everything is up for grabs at each recreation of the world.

Let us note for the moment how this model attunes with those metaphysical models that appear in Islamic and Buddhist philosophy that posit that the whole universe is recreated in each moment. Here a similar statement is being made where the world of our agents and their functions is completely recreated for each specious present moment and this is the underlying reality of manifestation which is more basic than any of the other more superficial views of manifestation -- namely that flow from moment to moment is continuous. What appears as simple continuity has an elaborate substructure that makes that actualizes that illusion of continuity in each moment.

Now functions will need to produce potential functions. They may do that something like this. Let us assume that there is a master functional tree (Yddrasil) in the collective unconscious which each agent only has a partial picture of in their memory. Each agent has a cluster of functions that are the leaves of this tree which are in his short term memory as possible next steps or as steps he has visited recently. In his longer term memory he has gnosis of all the leaves he has previously performed and knowledge of all the ones he has heard of from other agents. There are a large number of leaves he has never heard of or experienced that are not in his internal representation of the communal tree. In a spawning each agent goes up the tree and votes on which functions at each level are the most

important for him at each level until he reaches the root of the tree. He votes using the Analytical Hierarchy Process technique which compares each function to every other function at the same level and mutually ranks them on a scale of importance from one to ten. Then the eigenvector and eigenvalue of the permutation of rankings is computed for each level in the tree to give the final rank of everything against everything else for that agent. The eigenvalue represents the consistency of that agent's rankings of functions. When all the agents have gone through the ranking process traveling up the tree of functions then they each are allotted resources and they travel back down determining which leaf nodes they will actualize in the next moment based on available resources and the priorities that appeared from the rankings at each level. At the end of this process the agent has his new set of functional hierarchy leaves that will be held in short term memory and which will be executed according to his internal program until the next spawning.

Now we need to make explicit how agents are produced from one moment to the next within the chaotic process model. Like our tree of functions we can imagine a tree of agents which all agents in the system are part of. This tree of agents has various levels of coordinated action. The highest level is equivalent to the meta-system which allocates all processing resources. We noticed that in the last mechanism resources came into play as a means of helping to determine how many functions an agent can handle at one time. Here our goal is to produce a set of agents that will exist in the next moment. We do this in a different way. Each agent plans what he thinks needs to be done by all agents in the next moment. He produces simulcra of all the agents he believes should exist to do work including new ones that do not exist now. All agents produce similar plans for everyone. This extends the hierarchy of actual agents with layers of potential agents operating at first as if they were independent domains. Then the environmental constraints of the next moment are projected by each agent on the entire set of virtual agents. Each agent determines his votes as to which potential agents would be needed given the projected environmental conditions. Next the goals of the next moment are projected on all the existing potential agents. Then each agent votes as to which potential agents would be needed to achieve the projected goals. Next the agreements that agents have with each other are projected on all the existing potential agents. Then each agent votes as to which potential agents violate existing compacts. This list of criteria could be multiplied to include any relevant criteria that the population of potential agents should meet. In each case a voting on all potential agents is done by each agent. At the end all the votes are allowed to cancel out by working down from the meta-systematic root of the tree toward the leaf

agents. Those agents that embody the most needed functions based on the limitations that the environment can support are allowed to exist in the next moment. All other potential agents vanish in cancellation. Individual agents from one moment do not continue in the next moment except by surviving the voting process.

To each of these voting procedures we must add propensity. Chaotic tendency or propensity is the disposition toward certain outcomes based on chaotic variances that cause certain potentials to be actualized rather than others. In both cases above we have described more or less deterministic mechanisms for voting. However, at each stage voting needs to be governed by propensities which is to also say habit. Habits are self-maintaining and self-propagating structures. But within habit there is some chaotic shifting based on tendencies which cause actions to differ based on some Brownian motion that influences which habit will be activated in each instance. So it is with voting. Votes occur according to habits and invoke the mechanism of increasing returns so that once a vote or action has been done it is more likely to be repeated except when the chaotic tendencies cause a deviation. Thus the agent must act from memory of his past votes in spite of the fact that he may not of existed in the last instant. Thus he either draws on his own memory or communal memory as a basis for his habits and his tendencies.

Now to this mix we must add the fact that the functions and the agents act communally not just as individuals. This can be done by allowing them to discuss their votes prior to voting. Or this can be done by making the root of the agent tree and the root of the function tree an independent guiding agent. It would probably be best to do both of these strategies together. Agents could write their votes to a blackboard and allow other agents to comment on their votes. Or agents could selectively discuss voting among themselves according to patterns of socialization or power relations. However, we might want to have some supra-social nexus behind the scenes adding and subtracting functions or agents from the soup in the style of magicians and anti-magicians. This supra-social nexus would of course in our scheme be the Catalyst viewpoint. That viewpoint would be looking at the two voting procedures and attempting to influence the outcome of both in order to gain an integrated set of agents and functions for the next moment.

Another consideration is that when agents make planed virtual agents they could do so using a genetic algorithm that combines the plans or programs of two or more existing agents to produce a new program by cross-over and mutation of existing

programs ala Koza. Using a genetic algorithm to generate new plans from combinations of old plans allows the agents to evolve. Similarly new functions might be added or subtracted from the communal hierarchy in order to allow the complex chaotic attractor that is the basis of action to evolve over time. However, it is unlikely that these new functions would be built up using Genetic Algorithms.

Internally the agents would be virtual layered machines which embody their own programs which are executed based on petri nets or state machines. Agents could also order the machine based on some AI control mechanism like expert systems. In the latter case the rules for firing instructions would themselves be candidate genetic material. Within the lifecycle produced by global variables the agents would coordinate using message passing based on the DARTS construction of communication channels that connect worldlines. Ultimately there must be maintained an implicit mapping between agent and function which the catalyst viewpoint attempts to maintain as coherent by its behind the scenes influence. The communication between functions is based on a dataflow model of what data each function needs and how the functions interact with multiple pieces of data to create information that is then written to datastores as products of information processing. Thus all the methods come into play here. These methods are based on the minimal embodiments so that this dynamical system is naturally an embodiment of all the aspects of the turing machine and so all the results are fully computable.

This structure is, I believe, the simplest embodiment of a social simulation based on the model of chaotic processes. Twin chaotic processes must be modeled in the agent and function domain simultaneously and these must be connected via explicitly social communication and implicit coordination by the Catalyst viewpoint. This structure turns the static picture of the unfolding stages by which General Systems Theory and the specialized systems theories presented in the last essay into a dynamic system that is computable. Just because a structure is built to function at the level of chaos does not mean that it is not necessarily computable. This system as Goertzel says is quantum computable. What is unique here is the way the two chaotic process models interact. That interaction is similar to the social interaction of minimal social machines in which turing machines use their tapes as communication channels. This is the macro model that corresponds to that micro model of sociality. The two together produce a meta-model that operates at all the emergent ontological levels from world down to primitive.

## **7. Actors and Groups**

What you will notice about the proposed dual chaotic model of social praxis is that it has two important limitations. Movement only occurs with respect to time and cancellation is universal. In order to make this model more robust we need to extend it so that movement also occurs in time and so that cancellation can be limited. This will be done by appealing to the distributed parallel processing model of Agha called “actors” and to the mathematical category of Groups.

In voting cancellation is applied on the basis of each against all at every level of the functional hierarchy and for every criteria that potential agents might be judged against. In order to model our functions and agents as macro quantum eventities we need to limit and at the same time strengthen the cancellation process. This is done by considering each species of agent and kind of work to be an element of a group. In this case we will consider closed finite groups but semi-groups and rings could be considered as well. Group theory supplies us with an explicit mechanism for cancellation. Any two opposite group elements when brought together under the group’s operation will cancel leaving only the identity element of the group. Any element under the operation with the identity element yields that element again. Other operations that combine two elements will always yield one of the group’s elements. So finite groups are closed and this closure we can use to model the closure of the autopoietic system. In a group of this kind cancellation only occurs against certain defined opposite members of the group. Other members of the group may transform under the operation but do not cancel. Also the group gives us a natural definition of opposites. Every element of a group has an opposite. Thus when agents or functions are defined using groups they have natural oppositions which can be used to further define the members of the population of agents or functions in relation to each other.

The model defined in the last section evolves through time but does not move. Because of this it cannot be embodied in spacetime. In order to address this shortcoming we will use the actor model for parallel distributed processing. Actors are agents that do not have to be tied to processors. Actors can move and leave their forwarding address on another processor. This ability of actors to roam around the network of processors at will shows that agency is not tied to processing power. An actor moves by leaving his forwarding address with the local post office within the universal namespace. An actor is an object with its own thread of control. It responds to messages in a queue. It processes messages in the order of arrival and has the power to change modalities making only some of its operations active at any one time. When it decides to move it sends a message to the post office of the node

it wishes to move to create a copy of itself there. When that copy is working in the new environment then it sends a message back to its old self to deactivate. The old self forwards all messages in its queue, notifies the post office of its new address and then deactivates itself sending a message to the new self that it is now in control. Using this means the actor can roam all over the territory of the network and it will always be found by whoever knows of its existence because leaves a trail of forwarding addresses. Actors are capable of inhabiting worldlines of causation in spacetime and participating in scenarios of asynchronous communication with other actors. Actors contain operations that can be controlled by its own internal programs or expert system.

Now let us consider using the actor distributed parallel processing model in relation to the model of chaotic social processes. The actor obviously unites both agency and functionality. The agency is its independent thread of control. The functionality is contained in the operations contained within the actor. But actors do not just do their processing in one place. They can move from computing environment to environment across a distributed network of linked processors migrating according to the availability of computing resources. We extend the actor model by postulating that the actor can produce multiple potential copies of itself when it moves to a new site within the network. If we have a swarm of actors moving together we posit that on establishing foothold in the new site they each produce multiple potential copies of themselves and that these potential copies cancel out before being activated to carry one as the actual actors that have abandoned the old site for the new site. What we notice here is that built into the migratory mechanism of the actor is exactly the kind of mechanism we need to support the movement from actual to potential through propensity back to potential and finally into actuality again that occurs in the chaotic model of social processes. The movement of the actor out to the new site, establishment at the new site, notifying the old site of establishment, and the abandonment of the old site is exactly fitted to represent the situation where potential agents and functions are posited by and cancelled before replacing the agents and functions of the last moment. So if we fold these two models (actors and chaotic social processes) together we get an interesting situation in which as actors the dual chaotic processes can roam through spacetime fully embodied. If we consider that the functions are mapped into the operations of the actors and that the agency is mapped into the control loop of the actor then we can see how the migration of the actor can be seen as a production of new agents and new functional operations each time they swarm to a new place in the network. Functional parts of the hierarchy of virtual layered machines can be armed and

disarmed by using the modality aspect of the actor. Actors themselves may appear as multiple copies of the same actor at the old site or they may appear as genetically bred combinations of two or more actors using a genetic algorithm to generate new copies with different combinations of functionality or rules for applying functionality.

Having identified the Actor paradigm as our way of embodying agency and functionality we can begin to speculate on what would happen if we applied this paradigm along with group theory to augment our model of chaotic social processes. First we can see that actors are inherently migratory and as they migrate they socially interact to reproduce as a colony at the new site. So we will posit that not one but a whole group of actors will migrate from site to site together across the distributed network. As they are migrating they are also transforming themselves through the self-generation of both agency and functionality. So the swarm of actors will interact with each other in a particular computing environment. Then when resources get tight or for some other internal reason they will decide to spawn. They will send out frontiers men to the new environment. They will report back environmental conditions. Then if it looks good for them as a new home they will send out colonists. The colonists will be genetically bred based on the old population at the old site but will represent a population of potential actors with potential agency in the form of rules and potential functionality in the form of operations. The colonists will undergo a process of cancellation based on group theory until the new actual population for the new site is determined. Then the new population will send back messages to their parents to abandon the old site at which point the parents will die leaving the new population of the at the new site to carry on until it is time for them to swarm.

Now when we imaging such a situation it immediately becomes clear that we might have multiple species or multiple communities of these actors inhabiting the same network and vying with each other for territory and thus migrating in relation to each other across the network. In fact such communities might inhabit the same processing node and interact in various ways. Such interaction might have some causal ramifications which use the migrating actors as a medium and move through the medium of the actors around the network. We will call such causal ramifications that move perhaps faster or slower then the actual migrating populations karma after the Hindu and Buddhist notion of causality that moves from life to life for a single individual or population. We posit that karma is the equivalent of collusion only for the global population of all communities of all species of actors. Karma is a

social phenomena where the social processes propagate causes even where the agents and functions that generated those causes have long vanished. Thus collusion has not just a synchronic but also a diachronic aspect. Similarly cancellation is not just synchronic. We can posit that there can be a dialectical relation between different species of actors that causes them to change based on their interaction at each new site. Thus dialectical interaction between communities or species of actors shall appear as a diachronic aspect of cancellation within the network of migrating swarms of actors.

Now let us consider the role that groups might play in limiting cancellation. In the prior model cancellation was all against all voting for both agents and functions. We posit that such all against all voting does not embody any real structure of opposition or cancellation within the model but merely allows us to imagine the simplest case where there is not internal structure imposed on the population of agents or functions. Instead we will imagine using finite groups as a means of imposing structure wherein each agent or each function is represented as an element in a group that might cancel with its opposite if its opposite should appear in the same population with it. Now let us imagine that each species of actor is composed of two or more sexes which mate through genetic algorithms to produce potential actors at the next site. Let us posit that each sex is governed by a different group structure of the same order of group. Now we will see that it is possible to use the model presented by W??? in Change where group theory and logical types are combined to produce a model of psychological change. Here we will instead be using this same idea to produce a model of social change. Instead of just positing that moving to a higher logical type is an escape from the dynamics of opposites in groups we will posit that each level of higher logical typing has its own group structure and that the levels of logical typing form a ring. This ring is composed of each sex of the species of actor which we are using as an example. So for instance there are five groups of order twenty. Each sex of a species of actors would do its cancellation using one of these groups. There would exist a hypercycle between the groups which would determine with sexes mated to produce how much of the new generation. In this way the hypercycle of groups would give structure to the autopoietic network which was constructing itself. The groups of each sex of the species are closed and the hypercycle of the species is also closed. Thus the closure of groups allows us to emulate both the autopoietic ring and the closure of the autopoietic network.

In this way we see that the actor model organizes the outward relation of the



simulation of chaotic processes toward other embodied species while group theory organizes the inward relation between sexes within the embodied species which allows self-production to occur in a structured manner which naturally emulates the autopoietic rings in relation to the autopoietic network. Adding movement in space allows outward differentiation. Adding the constraints of group structure allows inward differentiation. Together these two kinds of differentiation allows us to complete our imagined simulation of chaotic social processes giving a new dynamic dimension to artificial living intelligences which is clearly social based on the foundations of reflexive autopoietic systems theory within the context of general systems theory.

## **8. A Theory of Work as Social Action**

Given this model of chaotic social processes the next question is what it tells us about the world which we would not know otherwise. Our point has been to develop a model of processes that do not assume continuity. Goertzel's model does this by allowing each function or agent to interact with all other functions or agents to determine as a self-generating system what functions and agents will occur in the next specious present moment. We noted that if both the agent and function aspects of the self-generating system were chaotic, i.e. non-continuous, then the model would be implicitly social. This means that function could not be used as a substrate for agency or vice versa. Thus the self-generating system would be completely self-destroying/self-producing from moment to moment. In this sense it must take on the character of the emergent event which is the basic construct of genuine novelty within our worldview. The fact that the four kinds of Being exist implicitly in the model of chaotic processes makes if possible for every instant to be seen as a possibility of the emergence of genuine novelty. Thus the discontinuousness of the genuine emergent event underlies the model of chaotic processes which will allow at any moment fundamental changes of interpretations of Being, epistemes, paradigms, theories or facts (anomalies). All continuities are built up as collusions between functions or agents but have no ontological necessity. In this model all continuities need to be explained not the discontinuities (as with the process based models). If we understand that species of agents or functions may interact such that waves of causality pass through these various communities then it is possible to see that karmic and dialectical effects across the intra-social medium are also possible within the illusory strata of continuities that are projected upon the substrata of chaotic change.

This model of chaotic social process gives us a fundamentally different perspective on work and other social phenomena. It first tells us that emergence is the fundamental phenomenon which organizes all other phenomena. When an emergent event occurs we are seeing down through all the strata of illusory continuity to the bedrock of existence where the whole world is re-created anew in each moment. What we have to explain is why each moment is not a genuine emergence that repatterns the whole of our worldview or some part of it. The fact that genuine emergences are rare is a problem for this theory rather than the other way around where genuine emergences are impossible to explain for process theory. Our explanation why genuine emergence do not occur at each moment is that social repression channels the energy that would allow that to occur in such a way that creates illusions of stability and continuity. Deleuze and Guattari discuss this in their master work Capitalism and Schizophrenia<sup>1</sup>. It is the channeling of creativity within Western society which is the major dynamo for change within this society. Creativity takes endless forms and is subject to sanctions if the forms it takes are not acceptable in a particular context. This is why many times artists are not appreciated in their lifetimes. What they are doing is so far out that the creative worth of their “work” is not recognized until dominant patterns shift sufficiently to make it possible for many people to see the value of what they have done. Yet many creative works of others who remain unrecognized may continue to be eclipsed kept under the sanction of being labeled crackpot or kook. Schizoanalysis removes all these labels and looks at the works of everyone under same lens: How does it work? How does the work of the everyday mundane worker, the recognized artist, the nobel laureate, the crackpot or kook function within their lives as a conduit for their life energies. Never mind what it means. Never mind how we label it. How do “works” work? This word can be both noun and verb. As noun we see it as the reified result or product of work. As verb we see it as the production process itself. It is this “working” that is seen, as Baudrillard says, as the fundamental assumption of all Western ideologies. And normally working is thought of as a process. It is seen as praxis or the illusory continuity of actions that supports the illusory continuity of words that is ideation. Instead we posit that the stream of actions are not an illusory continuity of process but that “working” is rooted in primary process which is the unity of non-dual thought, action and perception. That “working” is intrinsically empty. But that at its base we apprehend it as it appears as a secondary process in terms of self-organizing or autopoietic processes which are at their foundation chaotic processes based on tendencies, propensities, or desires. These

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1. Anti-Oedipus; Thousand Plateaus

“workings” are intrinsically social and emergent. Social construction of reality basically turns the “workings” in on themselves in order to produce self-repression which we call reflexivity. We orient our variety production to the expectations of the other. As a result the illusory continuities of the social world are built up step by step until we see that most people live their lives in a very uncreative fashion according to the multiple constraints of the expectations of others. However, there are certain sectors of society where creativity is unleashed. These sectors where creativity is allowed are tightly controlled who is allowed to function within their domains. One of these is engineering. We concentrate on engineering because it is one realm of working which has been little studied by the sociological community. The sociological community playing their role as a repressive agent of society concentrates its study normally on manual labor. Or they may concentrate upon the sociology of science in order to understand the elite knowledge workers. What exists in the middle is pretty well ignored. But without engineering the two extremes would have nothing to do. Scientists must use engineering to build their elaborate experiments and skilled and unskilled manual laborers are directed in their work by engineers who design the products and the production lines. Engineering is not the most sublime work nor the most mundane but resides in the middle of the spectrum. And we posit that the best model for this kind of work is the chaotic process model we have developed based Goertzel’s Chaotic Logic.

When we look at engineering work we see that it is highly non-routine. Skilled and unskilled manual labor is very routine and can normally be formed into a production line kind of organization. Engineering work designs the processes and products of the production line and for this reason has a different character which we call non-routine. Hardware and Software engineering are partially routine and partially non-routine whereas Systems engineering is almost wholly non-routine. Scientific work tends to be episodic as well as non-routine. Engineering work is not episodic in the sense that it tends to be project oriented and set on applying scientific results. Scientific work seeks to add to our store of knowledge and what will add to that store of knowledge is almost never known before hand. Scientific work cannot be patented but only kept secret. Engineering work attempts to formulate applications in specific situations for scientific knowledge. It normally approaches such application not as an episode of knowledge production but as a project of application building. We might define the episodic nature of scientific production of knowledge in terms of Feyerabend’s dictum that “anything goes” as a means to finding new knowledge. A scientific project would be broken into a series of episodes in which different things were tried to attempt to gain new knowledge.

If a scientific project is run like an engineering project the likelihood of new things being discovered is probably close to nil. (Which is not to say that most scientific projects are not run this way.) An engineering project seeks to apply known methods and known knowledges to an application development. It does so based on estimates of the man power and time it will take to accomplish the task. In such projects a special kind of environment may be set up in which teams, completely oriented toward the production of a product, concentrate their effort toward a single which must be brought into being step by step. The steps are called essential transformation from intermediate product to intermediate product. Within this context basic kinds of work arise and are recognized. My basic postulate is that these kinds of work become self-organizing rings of autopoietic processes. Such rings are not as prevalent in skilled and unskilled manual labor or in scientific work. Scientific work normally concentrates on bringing knowledges into existence not things. Manual labor concentrated on bringing things into existence but does not treat that as a praxis guided by theory or if guided by theory places most of its emphasis on the things not the theory. It is engineering work that blends equally theory (as design) and practice (as prototyping) to achieve a balance in embodiment which then may be produced on a production line to embody scientific knowledges in embodied applications. It is interesting that manual labor tends to be somewhat episodic as well and that is why manual laborers are hired by the hour instead of being paid a salary. Manual laborers are seen as mutually replaceable. Scientists are seen as having name recognition that goes with their contributions to the treasury of knowledge. Engineers are effaced in our society in that they do not get name recognition like designers of clothes but on the other hand it is recognized that they are not mutually substitutable for other engineers because they are not all equally creative or as intuitive in the dance of their non-routine attention within the different kinds of work they perform. We might say that in our society the Scientists are the full subjects who's prestige is legitimized by their name recognition. Manual laborers are fully repressed non-subjects who are as anonymous as the things that travel down the production line from the point of view of social recognition. Engineers stand between as anonymous creative agents who produce designs for things and thus bring them from the realm of ideas into prototypes that can be reproduced on a production line. Engineers are socially allowed to be creative in their embodiment of things but are not expected to contribute to our knowledge store. Thus engineers do not have to read and pay attention to what is happening in their disciplines. But engineers are denied name recognition and social prestige. Thus, the subjectivity of the engineer is blunted but not denied. Therefore they are more capable of forming teams in which creativity is possible as a group activity.

Slowly as scientific projects get bigger and need multiple people to accomplish the goals it is this form of creativity that is tapped in scientific projects as well. When the science demands large scale engineering then this kind of teamwork that occurs on engineering projects becomes the order of the day in science as well. But science itself is not oriented toward teamwork as engineering is in our society.

Because engineering work is based on teamwork more than other kinds of work in the spectrum of work between science and manual labor we can best look there to understand the nature of teamwork -- which is basically goal directed small group (social) work. Today the buzzwords to describe this are Integrated Product Development (IPD) Teams or Concurrent Engineering Teams. Such teams attempt to integrate work functions which traditionally would have been separated by organizational boundaries. These teams are directed at a specific product and all the kinds of work necessary to produce the product are focused to that end without regard to organizational boundaries which enforce functional separations between major kinds of work. On an IPD team systems, software, and hardware engineers would work together sharing work responsibilities in order to most efficiently produce the product under construction. Artificial separations between these functions are no longer possible for economic and efficiency reasons. In this kind of environment stable rings of essential transformations to products form and non-routine sequences of enactment of these kinds of work are performed by teams of cooperating systems, software and hardware engineers. Artificially separating software in its own isolated process enclave makes no sense in this kind of environment. It obscures the context within which software work is done which is interpenetrated with systems and hardware work.

The chaotic (social) work process model gives us a new perspective on engineering work and thus on all work and through that on all social action. It shows us that at its base every action is patterned on the emergent event. Each action must be able to transform into a genuinely novel thing within our worldview. It is effective social repression that prevents that from occurring. Thus all continuities are not given but are the result of a social collusion or conspiracy. Kinds of work have real discontinuities between them and they can be enacted in any order that the engineer's intuition deems appropriate. It is sequential and linear action sequences that need explaining because at core all actions contain within them their own designs as theories embedded in praxis. It is this fact that all social actions contain theories that allows work to be self-organizing. Actions must be designed first in order for the products that result from actions to be designed. The realization of the

importance of process is this. Let us design the actions that lead to the designed products so that the products can have higher quality. If the actions are ad hoc that produce the designed products then the execution of the design within the product will be poor. Products are only the accumulation of reified actions so process looks at the actions and attempts to organize that in order to improve execution of the products that are the result of actions. However, this does not mean that we want to limit creativity within engineering. Creativity is socially sanctioned in engineering and underwritten by the institution of patents. We do not want to make engineering work any more non-routine because it is its nature to be driven by intuition not procedures. However, what can be procedurized should be to get rid of unnecessary variety and to assure uniformity in all those aspects of engineering work that can be routinized. In this way the routine parts will act as a solid basis for the non-routine and creative parts of the work. The endless unnecessary variety clouds the issue obscuring the necessarily creative parts of the work. The ad hoc is applied to everything instead of only those things that call for it. It is the fundamental concept behind engineering work process that by clarifying the work that higher quality products will be the result.

But in order to understand how to apply processes to work we need the model of chaotic (social) work process that will allow any one action to become an emergent event if necessary but then applies different amounts of repressive pressure to reduce variety when it is not necessary to allow the illusion of continuity to appear within the work as it is being done. In the autopoietic theory of work it is not the external organization applying this repressive pressure on the inherent variety of human production. Instead it is the team itself that exerts this repressive pressure. This is how the team creates the apparent illusory continuity of its own continuity through the work project. It is how the team unleashes individual and group creativity when necessary in order to innovate or solve problems. The team is self-organizing through the exertion of repression on itself. Repression is the organization that takes the normally unfolding variety and exerts external controls on it. But the unfolding variety of the production of the team also has its own internal ordering which may need to over turn the externally imposed order occasionally. Thus the interaction between the repressive order and the spontaneous order is what allows the team to be just creative enough to solve their problems without being so creative that the product is never done and finally produced. In another section we spoke of this in terms of the interaction between *Physis* and *Logos*. The internal ordering of embodiments can be seen as *Physis* and the repressive ordering of designs exerted by the team can be seen as a modern

equivalent of logos. We saw before that there was a physis to the logos and a logos of the physis. The physis of the logos is the ultimate non-representability of the design due to the hidden presence of the Essence of Manifestation or the unconscious of the design. The logos of the physis is the expressibility of the unfolding of the physis which many times runs counter to the prevailing facts, theories (designs), paradigms, epistemes, and interpretations of Being showing up as anomalies. We noted that the split between physis and logos was unknown to the Chinese who saw internal and external as mirrors of each other instead of as different. Thus these two phenomena in the West appear as Chi and Li in Chinese science. Thus we can see that primary process, as seen in work process, is primarily a kind of manifestation endemic to Western culture. It is a kind of manifestation that is bent on destruction. It must destroy in order to create anew. That new creation takes place as an emergent event. Every action in work process is potentially an emergent event of the arising of genuine novelty. However because Western culture splits internal from external creating the illusion of a material world of the practico-inert over against consciousness we get the separation of physis from logos. The physis is seen as the spontaneous ordering of assemblages, the autopoietic formation of desiring machines, which acts against and is controlled by the logos of repressive control by ideation in the form of design and theory. These two springs of ordering from writing via difference and from the logocentric are really mutually complementary as the existence of the crossover categories show. The physis has its own logos that appears in the anomalies that it throws up in the process of embodiment against theory. The logos has its own physis that appears as the mastery by Language itself of those who speak. In the dialectic between upwelling variety produced by humans because of the resources implicit within the structure of manifestation and the repression by logos there appears the actual enacted work. Logos by attempting to describe the enacted work not just the product has made new gains in its repressive will to power and domination of production. But every thing that is described shows us more and more the limitations of language for control. Too much knowledge is tacit and non-representable in language. Thus the strengthening of the logos implies an equal strengthening of the physis. Either we discover more about the underside of language which controls us rather than the other way around as we might imagine; or we discover that the physis itself is actually more self-organizing than we thought. Autopoietic theory claims this in its constructivist moment. It claims that theorizing and controlling through explicit representation actually prevents us from seeing the implicit organizations of things themselves. We can only really discover by constructing. Likewise we can only find the right processes for work by

constructing them as we work. Thus work must be inherently self-organizing and cannot be effectively organized from the outside. This means that contrary to a basic assumption of the SEI Capability Maturity Model, generic organization wide processes are not efficient but are actually an interference with the operation of the autonomous team who needs to be empowered to organize themselves adapting directly to the work to be done and not applying standard work processes. The point is that this organization of processes needs to be as conscious as the organization of products. It is this awareness that has been missing before. The autonomous team needs to be aware of the consequences of its process organization just as it attempts to be as conscious as possible with the consequences of its product organization. In engineering there is a constant tension between creativity and practicality that process needs to help balance. It can only help maintain that balance by realizing that human beings are inherently creative and that whenever they are not creative this is because of the effectiveness of social repression. Thus every action has the potential to bring down the whole worldview changing facts, theories (designs), paradigms, epistemes, or interpretations of Being. What is left to be explained is why this does not happen at each moment. How do illusory continuities become socially constructed to repress this inherent creativity. That inherent creativity is there because every moment is the assertion yet again of the entire Western worldview. That worldview is based on creativity and dynamic clinging to things. Thus every action must have the entire substructure of manifestation all the way down to the bedrock of primary process available to it as a resource. The model of chaotic social processes allows us to theorize self-generating systems that do have this entire substructure of manifestation built in. So this model may serve as a theoretical guide for studying work processes as the epitome of social processes. What we get that we did not have before is a theoretical perspective on work or any social action that shows us the entire substructure of manifestation that underlies it. Processes that assume continuity are repressive of discontinuities and anomalies which are an inherent part of manifestation. Chaotic processes give us a full picture of the depth of manifestation as it appears in work. People who are working are manifesting things everyday. Enacted processes must be able to address the full range of manifestation including creativity and innovation as well as breakdowns in processes. Stopping at statistical control makes no sense when trying to control non-routine work. Non-routine work is many times unique or its execution is done by a unique path. We need to approach it using deeper fuzzy and chaotic mathematical techniques that correspond to deeper layers of the meta-levels of Being.



## 9. Macro Quantum Mechanics

Now I would like to breach an important theoretical question. Goertzel describes self-generating systems as quantum computable. We have seen that we can construct a model that is fundamentally social if we take two such self-generating systems and make them operate in tandem. Similarly we saw that we can take two turing machines and make them communicate across a light tape and produce a minimal social machine. Those minimal social machines may be represented by actors that embody the chaotic agents and functions that swarm from moment to moment within spacetime. But we have not related any of this to what we actually experience. We constructed social phenomenology as a means of understanding how the world unfolds from the collective unconscious but that remained a vague promise of a solution to the problem of intersubjectivity. Now we will attempt to make that promise come true by exploring the depth of the model of chaotic processes and looking closely at its quantum computability. Quantum mechanics is the most proved theory in existence. Myriad engineered products in our culture operate on the basis of quantum effects. These are engineering wonders based on a very solid scientific foundation which is counter intuitive within our worldview. Things ought to be particles or waves but they remain undecidable until we look at them. Thus we are involved through our observation in the way the phenomenon manifests to us. We say that the observation disturbs the phenomenon under observation. We go on to erect a wall between ourselves and this fuzzy undecidable realm which is too small to see. This wall is called the Copenhagen Hypothesis that states that quantum things operate on different principles than things in our macro environment. In this way we attempt to preserve our worldview from crumbling in the face of overwhelming evidence from physical sciences that the whole universe in every aspect manifests according to quantum mechanical laws. Here I propose to eliminate this wall and the discontinuity in the universe that it attempts to produce. It is clear that the whole universe is quantum mechanical and the fact that we do not experience this in our lifeworld is in fact an illusion. In effect we see illusory continuities papering over the natural discontinuities in existence that occur at the macro level as well as the micro level. The case for this is made very well by Robert G. Jahn and Brenda J. Dunne in Margins of Reality. In this book they explore paranormal phenomenon based on the theory that quantum mechanics describes the macro level of reality within which we operate in the everyday world as well as the micro scale phenomena. They propose that reality is the interface between the internal (realm controlled by Logos) and the external (realm controlled by Physis). It is information that passes across this boundary between the realms of physis and

logos. They go on to postulate that consciousness is not just a particle isolated in certain kinds of bodies within spacetime but that it also acts as a wave. Thus they adduce that consciousness has the same undecidable nature as things. This is a very thought provoking postulate. Accordingly consciousness is not completely confined to the potential well surrounding the body of the living organism imposed by the *Physis* on the *Logos*. Like quantum mechanical waves it consciousness waves can escape and act beyond the potential well of the body. Let us refer to this action beyond the body of consciousness as the aura. They speak of probability-of-experience waves instead of probability-of-observation waves.

Our proposition, then, is to represent consciousness in terms of probability-of-experience waves, posed in generalized consciousness coordinates, in much the same spirit as the probability-of-observation waves employed by quantum mechanics in physical space-time. In the absence of environmental constraints or interactions, these consciousness waves range freely over their own space-time domains, somewhat like the physical waves that ride the open ocean surface or those that propagate sound or light over large unbounded regions. But if a particular consciousness wave is confined to some sort of “container,” or “potential well,” representative of the environment in which that consciousness is immersed, characteristic patterns of standing waves, or eigenfunctions, will be established that represent the experiences of that consciousness in that situation.

The dominant features of this environmental container are assumed to be associated with the living physical body upon which, for one mortal span, the particular consciousness wave has come to be centered. The basis physiological components is embellished by various proximate environmental details, both tangible and abstract, including physical surroundings, social context, other nearby consciousnesses, and to a lesser degree, by more remote or global factors. Since all of these components are subject to change as the physical corpus matures, moves about, or interacts with other consciousnesses, or as the physical or social contexts change, and since the consciousness itself is continually changing, the eigenfunctions of experience are also constantly being altered. Nonetheless, at any point in this evolution they represent the tangible consequences of the consciousness/environment interaction, in much the same spirit as the atomic eigenfunctions of physical theory represent the observable properties of those systems. In other words, they define the consciousness atom.

In this view, any community of interacting personalities, rather than resembling a gas-kinetic ensemble of sharply localized and impenetrable particles [Lebniz's Monads], takes the form of a complex interplay of consciousness standing wave patterns, each centered in one of the corresponding myriad of mobile environmental containers. Every one of these wave-mechanical consciousness atoms is capable of interacting with its neighbors and with other aspects of its environment by all of the means available to the analogous physical wave systems, including wave-mechanical collisions, interatomic radiation, evanescent wave tunneling, or escape

to free wave status. Each of these forms of interaction bears its own metaphorical correspondence to various facets of normal or anomalous communication.<sup>1</sup>

What we notice about this analogy is that where it uses Quantum Mechanics to extend our understanding of consciousness beyond Leibniz's monads to help us understand its wave-like nature it still sticks to the assumptions that subjectivity is tied directly to the body. If we augment the insights of Jahn and Dunne with autopoietic theory especially one that strives to understand reflexive autopoietic systems then we get a different and perhaps more interesting picture. Let us not assume the tie of consciousness to the body. Let us instead assume that it is the social group that creates the potential well and that the individual consciousness is just a deformation within the social potential well. Now we see that the atom that they are describing is naturally part of a larger molecule of the socius. Let us also extend down a level and assume that each individual consciousness potential well also has deformations within it which can take contain standing waves. These lower level deformations could be identified with Deleuze and Guattari's desiring machines. At this point we realize that the surface of the potential well is important. What is the nature of that surface? Is it perhaps a configuration of tendencies, propensities, and desires? If that were the case then we would see that this model unifies the levels of desiring machines, individual tied to organism and socius tied to embodied group. Thus we get a more natural fractal patterning of the well of consciousness. At the level of desiring machines there is the actual workings of the machinery that connects together autopoietically into networks that exhibit the workings of autopoietic rings. At the level of the individual there is the internal talk of thoughts and feelings studied by introspection which gloss over the fragmentation of desiring machines and attempt to forge the ideal unity of the subject. At the level of the socius there is the lostness in the chatter of the They (das Mann). Some individuals can rise up and assert their subjectivity over against the group becoming the tyrant but this eventually turns into capitalist structures which are the nihilistic war of the all against the all economic means that sometimes turns into actual warfare. Capitalism is the sign of the impossibility for any tyrant to hold sway over the whole of the group indefinitely. It manifests as democracy or the rule by the lowest common denominator. All this is explained in excruciating detail in Anti-Oedipus.<sup>4</sup>

Here we are concerned with the implications of this quantum model of consciousness which by our fractal elaboration shows us how individual

1. Margins of Reality pages 242-3

consciousness appears out of the socius and differentiates into desiring machines. The model of social machines is merely the realization that the level of the socius is not disconnected from the psychological level but that they are two sides of the same coin. Desiring machines organized themselves in a social field spontaneously. The individual may be seen as an illusory point of tension between these two levels of the articulation of the same field. Or we can say that all the levels of the field's articulation are equally important. Deleuze and Guattari merely devalue the individual level because it has been traditionally overvalued as the seat of subjectivity (illusory ideal unity). Given this field interpretation then it becomes more clear how the collective unconscious plays against the individual unconscious. Due to the tunneling and overflow effects which can occur when the intensity of consciousness rises, the consciousness of a desiring machine may overflow or tunnel into that of another desiring machine. The sum total of all overflow and tunneling from desiring machines is the apparent wholeness of consciousness over and above the connections of desiring machines. Due to the tunneling and overflow effects which can occur when the intensity of consciousness rises, the consciousness of an individual autopoietic (living/cognitive structurally homeostatic being) may overflow or tunnel into that of another autopoietic machine. The sum total of all overflow and tunneling from individuals is the apparent wholeness of the consciousness over and above the connections between individuals. Likewise we can imagine that society is itself a fractal formation with many levels all the way up the planetary man<sup>1</sup>. The complete intersubjective cohort of all living individuals on the planet. The collective unconscious is all the interaction that the individual is not conscious of but which they are unconsciously party to through their own overflow and tunneling of consciousness outside their bodies. And if consciousness can overflow and tunnel out then it must be possible for it to inflow and tunnel in. This is why anthropological and psychological literature is replete with examples of possession and hypnotic suggestion. Our barriers by which we manage our selves to make them appear unified and coherent are very strong. But persons with less well defined boundaries would be more susceptible to overflowing and tunneling phenomena of probability-of-experience waves. The individual awareness moves from desiring machine to desiring machine. These lower level "fundamental particles" of consciousness stick out orthogonally from the unconscious. They are connected, disconnected and reconnected in autopoietic networks and through that the boundary of the individual is formed as an autopoietic cognitive/living closed system. But closure from a

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1. See Desan; [Planetary Man](#)

particulate view is balanced by the openness from a wave point of view. Thus the autopoietic system as dissipative appears as openly-closed. Closed monads that Leibniz identified from a particulate viewpoint and open and communication despite closure from the wave viewpoint. Within the potential wells of desiring machines standing waves may be created. These standing waves are repeated patterns of behavior -- obsessions or habits. When the network of desiring machines is restructured then the standing waves will take on different formations depending on the structure. These are like the modalities of the actors. Thus habits are not fixed completely but depend on the configuration of the network of other desiring machines and their habits. When we move up to see the whole network as a gestalt, a showing and hiding system, then we see the whole individual as a field of consciousness. Remember consciousness is merely another way to say manifestation that is viewed from the point of view of a subject. We do not have to assume that the individual is unified as idealistic metaphysicians normally do. We do not have to assume that only material causes have any reality as materialistic metaphysicians do. Both logos and physus are a single non-dual manifestation to us. Thus we posit that within the potential well of the individual that occurs within the boundaries of the autopoietic cognitive/living system there is another level of standing waves. These standing waves are the major cycles of consciousness that forms the background on which attention wanders from figure to figure within the gestalt of manifestation. Consciousness is divided into conscious and unconscious. But this merely signifies the difference between figure and background. In truth all the desiring machines are operating concurrently. Attention wanders sometimes serially sometimes erratically from desiring machine to desiring machine. All the desiring machines that are not the center of current attention or within short term memory for immediate acquisition are in the unconscious ground upon which all the figures appear. When we say that each of the desiring machines stick orthogonally out of the unconscious we are really referring to the quantum discontinuous structuring of consciousness in which every desiring machine appears as a figure from the ground of all the others. The desiring machines are not all available at once. They are not present-at-hand. Instead they may lie at different levels of manifestation being instead ready-to-hand (in the short term memory), or in-hand (in long term memory which must be accessed and discontinuously jumped around in) or out-of-hand (inaccessible). Thus the network of desiring machines takes on the structure of what Goertzel calls the dual network. It is a network of micro probability-of-experience waves that represents either a control hierarchy or an associative heterarchy.

When we look instead out at the socius we see the opposite. There we have no access to the desiring machines of others. Thus the associative connection does not work. There we have no control over others by direct means as we do over our own body. Thus the control mechanism does not work. Instead the whole scheme is inverted. What we see within the socius are standing waves of kinds of work or social action. Those standing waves may appear as a complex chaotic attractor in which multiple individuals are conspiring to recreate themselves moment to moment through a complex reflexive autopoietic dance. The different individuals are accessing communal experience by acting on the basis of those predefined forms of action. When they do this dance together it forms a lifecycle or ritual performance where multiple participants are dancing together a complex interwoven and perhaps improvised dance that enacts shared experiences by moving from one configuration of the standing wave within the potential well of the socius to another. In this way we see why the two ways of viewing the dual network are necessary. From the viewpoint of the socius it is the kinds of work, or social action, that map the chaotic attractor that is important and is thus hierarchial. On the other hand to the individual attempting to assert his coherence as a subject it is control that is important and must be operated in a unified way as a hierarchy. For the socius the actual coordination in time can be lax and so it appears as a lifecycle where phases give rough coordination between individuals. Exact timing is not usually possible without entrainment through mutually coordinated action that resonates harmonically. It is entrainment that allows mutually coordinated standing waves within the socius to be built up over time. It is through entrainment that autopoietic rings are produced in teams. Such entrainment causes a mutual social trance to engulf the individuals within the socius and this makes communication highly efficient because the entropy is reduced as soliton like waves circulate within the closed trough of the reflexive autopoietic system.

Now slowly we begin to see how the concept of macro quantum mechanics of consciousness begins to bring together many of the models we have been dealing with in this series of essays. We further note that intention and embodiment appear on every level of the fractal potential well of consciousness (manifestation). This means that the dual chaotic process models also apply giving a dynamic aspect to our static model of the macro-quantum mechanical system. Desiring machines have intention and embodiment. In fact we can say based on our analysis of Johansson that what desiring machines do is take fields of tendencies and produce intentions. It takes an embodiment of a machine to produce an intention out of a field of tendencies. There must be a mechanism to do the vector addition. When we take

desiring machines together we get the matrix algebra of intention vectors. That matrix algebra may either be arithmetic or logical as we have seen. So embodiment and intentionality go hand in hand. The embodiment is the means of processing the intention producing it out of tendencies. Or the embodiment produces actions out of sets of intentions. In this second step it is possible to take into account the intentions of others in the calculus of intentions as G.H. Mead suggests we do taking the reaction or intentions of the other into account and even averaging the reactions of the others into a generalized other. The generalized other is our internal picture of the socius. It does not need to be a continuous average but may be discontinuous lumping people into typifications as Alfred Schutz suggests. At each level autonomy and intention play against each other so we can apply the model of chaotic self-generating systems to every level. But we do not have to stop at considering them only as systems we can consider them to be any level of the emergent ontological hierarchy -- primitives, objects, systems, meta-systems, domains, worlds, universes and pluriverses. Thus each level of the ontological emergent hierarchy can be used as a means of interpreting the self-generating things that appear at each level of the fractal potential well that descends from the planetary man down to the socius, then the individual, and finally to the desiring machines.

For example, borrowing the physical nomenclature, consciousness collisions can be catalogued as

- a) elastic, wherein two interacting partners, after some transitory distortions, return to their original configurations with no permanent influence on the state of either participant;
- b) inelastic, wherein the interaction permanently alters the state of one or both of the participants; or
- c) reactive, wherein the basic character of the colliding system is altered, as in the formation of a composite consciousness “molecule” displaying quite different experiential characteristics from its atomic constituents [like marriage, for instance].

Similarly, a consciousness “radiation” metaphor may be developed, wherein “photons” of information are transmitted from one individual to others throughout the community, to accomplish normal, or anomalous, forms of communication.

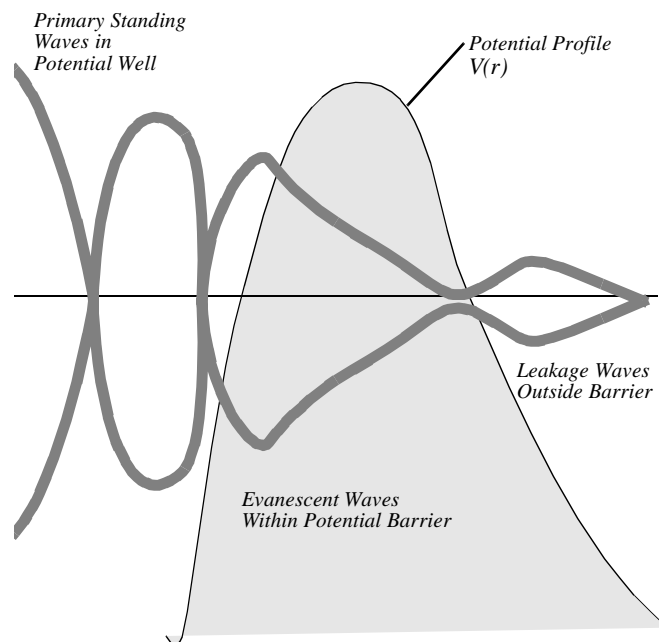
The process of evanescent wave penetration or “tunneling” may also represent various types of anomalous information acquisition, including remote perception or remote PK effects. As sketched in Figure IV-3, standing wave patterns in the finite potential wells are accompanied by some disturbances in the adjacent regions, even though the waves cannot propagate there. These evanescent waves can nevertheless convey limited information to and from other portions of the external environment,

## Reflexive Autopoietic Systems Theory

to a degree dependent on the details of the particular wave systems, and on the extent of the barriers separating them.

If any of the standing wave systems acquires sufficient energy to be elevated from the cavity-bound to free-wave status, it may gain access to all consciousness space-time and interact with any other center in the configuration via that mode. Thus, this route could accommodate a variety of anomalies, including remote perception and remote man/machine interactions, as well as more extreme and controversial phenomena such as mystical union, out-of-body experiences, mediumship, and spiritual survival.<sup>1</sup>

Figure 65: Evanescent Wave Penetration of Potential Barrier<sup>2</sup>



Through this series of possible interactions we see that our concept of a desiring machine or an individual autopoietic system or any reflexive autopoietic socius is probably not fluid enough. We tend because of our language to think of things that are either nouns or verbs. Things do actions. There must be a solid particulate core to the dynamics. But noun-verbs like “work” may cover more wavelike formations. When we look at the workings of work at-work on the various works we may consider that any kind of “work” may take on any of these relations to other kinds of work or social action. Two works might interact elastically as when we have a meeting to discover what everyone is doing and we all find out that what we are

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1. *Margins or Reality* pages 244-5

2. *Margins or Reality* pages 245



doing severally makes sense. But at such a meeting we might discover that what we are all doing does not make sense so the configuration of work is changed. Or we might completely reconfigure who is doing what in which case the interaction might be seen as reactive in which the very field of work is changed. In work the transmittal of information symbolically or semiotically is continuous. When what we do is computable we can see this is as analogous to the two turning machines establishing a protocol across a light path. In an autopoietic standing wave within the socius the transmission of information packets moves around the ring of the kinds of work in the ring in both directions as a closed loop. This leads to very efficient information exchange and processing because the information packets flow like soliton waves in a circular channel. All other forms of communication degenerate from that pinnacle of efficiency in which there is complete harmonic resonance within the field of information flow. It is only with tunneling that we begin to see anomalous effects that we have difficulty explaining in terms of work processes. Tunneling is information leakage for one kind of work to another where it does not necessarily belong but on the outcome it still has an effect. For instance, a rumor that there is going to be a reduction of staff by 30% will effect all kinds of work very detrimentally. Tunneling might be seen as analogous to rumors at the social level. At the level of the individual it may be seen in terms of random thoughts about other non-work related subjects. Lots of tunneling causes high background noise and makes it impossible to concentrate. Controlling tunneling is important both within the individual and in the socius. In trance it is possible for groups of people to have a mutual hallucinating. This overflowing of the boundaries of the self is the phenomena studied by Cannetti in Crowds and Power and indicated by Heidegger when he talks about lostness in the They (Das Mann). Group consciousness is also studied by Sartre in Critique of Dialectical Reason. In all these cases the hunting pack or the revolutionary social group is seen as the basic unit of society where the social predominates over the individual. In Sartre's revolutionary social group individuals act like nodes in a constantly reorganized autopoietic network. He sees this as the basic social structure underlying all other social forms that are seen as reifications of this exemplification of Wild Being within the social emergent level. Likewise we posit that the social is prior to the individual and that the individual reifies itself from the social group as a socially constructed entity. Thus we cannot say that the calculus of intentions within the individual is primary as Goertzel, Johansson, and G.H. Mead suggest. Instead we say that the collective unconscious prior to the formation of individuals is primary. As Deleuze and Guattari suggest the social field acts first directly on the level of desiring machines by inscription on the body directly. Then out of that the

subjectivity is forged as the body of the tyrant arises in the social field of bodies. This then degenerates into complete deterritorialization of the capitalist system where all the tyrants vie to be king of the mountain and none can hold it or perhaps degenerates occasionally into totalitarianism where tyranny appears again in a systematic form as with fascism or Stalinism. The overflowing from the individual into the socius is a natural occurrence because the socius is primary as an economy of desiring machines which disregards at first the economy of bodies. The socius can also overflow into higher levels of the social fractal as when small groups are engulfed in nationalism or some other ideology.

When we apply the model of dual self-generating systems to our model of consciousness (manifestation) as a potential well between the physis and logos domains we get an interesting picture of how both autonomy and intentionality would act as self-generating systems at each fractal level. At the lowest level we have autonomous desiring machines producing intentions out of tendencies and producing intentional actions out of tendencies. The intentions would be self-generating and the desiring machines would also be self-generating to provide a completely chaotic non-continuous model. At the level of the individual we would get the intentions of the individual and the autonomous actions of the individual as separately self-generating systems. The repertory of actions available are constantly self-generating and the set of intentions being realized in a coherent manner is constantly self-generating. At the level of the socius it would be the roles of the individuals and the social goals that would be self-generating independently. The interface between these two self-generating systems at each level reveals the catalyst viewpoint which is the source of the endless variety. The catalyst viewpoint is opposite the essence of manifestation that never appears. One is the extreme positive intensity of the system and the other is the extreme negative intensity of the system. The essence of manifestation is identified by Sartre with the practico-inert (matter). Deleuze and Guattari call matter the body-without-organs degree of intensity zero. As the intensity rises we move from the essence of manifestation to the Catalyst viewpoints. Both views make the physis a blank substrate for human action. Instead we see that physis and logos are two sides of the same upwelling that defines the surface of the potential well of consciousness (manifestation). All that really exists is the surface of the well itself where the sparks of tendencies appear as virtual particles continuously being created and destroyed. This continual creation and destruction of opposites that cancel via group-like operations at the surface where logos and physis interact, the surface that Jahn and Dunne call reality, is normally perfectly symmetrical and conservative. This symmetry is

the hallmark of the unconscious as Matte Blanco points out<sup>1</sup>. It is when asymmetries through symmetry breaking occur that manifestation which is conscious occurs. The individual unconscious (Id) and the collective unconscious are merely different depths of this symmetry that Deleuze and Guattari call the body-without-organs. By depth we mean different levels of the fractal pattern in the potential well circumscribing the realm of logos. But we may say that both the physis and the logos are mysterious and it is only at the surface between the two that we get the effect of lighting that allows us to see what lies in the potential well as a clearing in being.

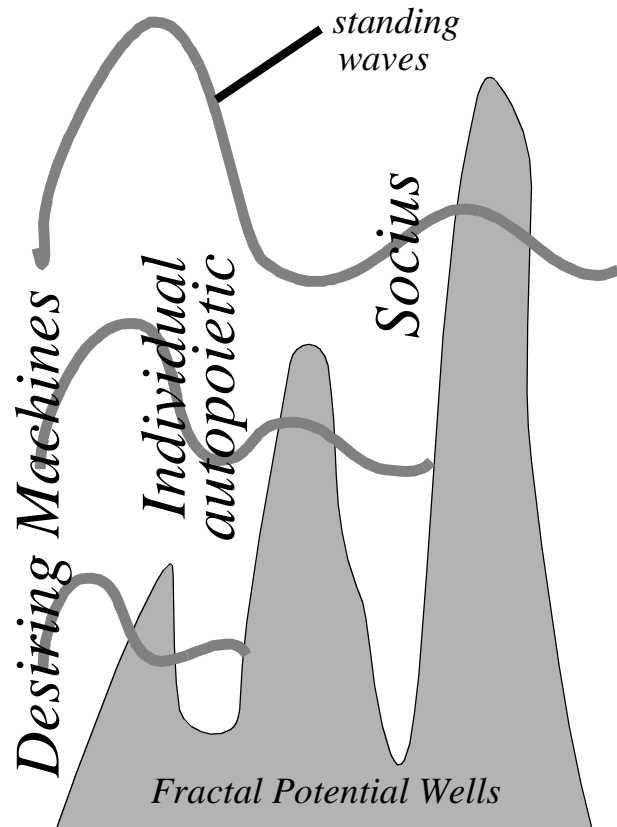
As has been said before we take Thebes as paradigmatic for the socius. Thebes suffers under several terrible and inauspicious anomalous phenomena. It has the plague that effects its physis. It has the oracles of Teresius and Apollo that are manifestations of the pure speech of the Gods that reveal the future and the fatedness of its King in a logos from beyond this world. It has the Sphynx that who is a monster that speaks and asks riddles. That monster might be seen to be a combination of logos and physis. It has the mystery of the murder of the king which is slowly revealed through words the roots of action. Both the riddle and the mystery are half-way houses between logos and physis. The revelations to Oedipus take place within the context of the city which is in turmoil and is fated to be the place where the fundamental taboo is broken. The breaking of the incest taboo and the taboo against killing the father are mirrored in the anomalies that occur within the city. Those anomalies occur in such a way to define the difference between logos and physis. They also highlight the physis in the logos (riddles) and the logos in the physis (mystery). In our model ordeal of Oedipus is completely bound within the situation of the city. The connection between the situation within the socius and the self-discoveries within the lifeworld of Oedipus is that they are a single potential well so that the anomalies for the city are the manifestation of the broken taboos within the family of Oedipus and the two fields are completely bound together. What are normal desires for Oedipus as a king are discovered to have manifested in perverse ways unknown to him -- in fact even as he has attempted to avoid that perversion foretold. Those perversions in private with his mother and in the wilderness with his father caused perturbations in the field of the socius long before anything was noticed to be astray by Oedipus and Jocasta. Oedipus is the one who is able to pursue the truth even to his own destruction. He delves into the truth of his own actions in the context of his lost genealogy. Likewise he answers the

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1. Ignacio Matte Blanco; *The Unconscious as Infinite Sets: An Essay in bi-logic*; (London: Duckworth, 1975)

riddles of the Sphinx. In both cases he is the answer, himself. He is a man transforming from four to two to three legged. And he is a club-footed one who carries the sign of his birth that hampers his walking. He is the criminal that he swears he will find to end the plague of the city. He is the fated one who will fulfil all the oracles. All the questions that impinge on the socius point back to him. This perfect fit between the questions that impinge on the socius, the city of Thebes, and the way they find their answer in Oedipus is an example of the total embeddedness of the individual within the socius as within a field. The individual operates within a field of tendencies. In the case of Oedipus the field of tendencies have turned in on each other to form a singularity. But this only serves to define the limiting situation where the field collapses in on itself. That collapse can be identified with the emergent event. In this case it is the advent of Oedipus at Thebes that is the emergent event. Oedipus appears at the gates of Thebes and confronts the Sphinx. Then he enters and takes the place of the recently killed king. Then the plague descends. Then the oracle arrives and Oedipus the new king swears to find the one who has broken the taboo which has caused the plague. Finally self-discovery occurs that leads to exile from the adopted city. Oedipus arises as a phenomena that enters the gates of the city and flourishes and then declines to leave the gates of the city as a blind exile. But the city as an intersubjective cohort -- the socius -- exists as the context in which this emergent phenomena appears. That field develops an anomaly that Oedipus steps into and fulfills the conditions in a perfectly reciprocal manner that displays vividly the difference between logos and physus and the mixtures of these two fundamental kinds of manifestation that have from the beginning conditioned the Western view of reality. Even Deleuze and Guattari do not recognize the way in which the myth of Oedipus support their theory of the socius even though they have delved deeply into the Oedipal Complex in their study.

Figure 66:



## 10. Quality and Quantity

The model of Jahn and Dunne of Macro Quantum Mechanics which posits that the laws of Quantum Mechanics apply to the macro-world as well as the micro-world and denies the Copenhagen hypothesis has a fatal flaw. When we read it we see that the attempt to define metrical concepts for consciousness similar to those applied to physical phenomena appear ridiculous. These metrical concepts are necessary in order to make a complete isomorphic transformation of the theory from the realm of physus to that of logos. What Jahn and Dunne do not realize is that the theory in the realm of consciousness must be the dual of Quantum Mechanical theory and not an isomorphic rendering. There are no basis for metrics within consciousness. Consciousness cannot be quantified because there is nothing to lay down the marks on that make metrics possible. The Buddhists, masters of introspection, have long realized this by saying that there are five Skandas that make up consciousness. Four of these (sensation, synthetic objects, will, and cognition) are Arupas (without form) while only one are Rupas (forms). They say that the Arupas are like space

itself, i.e. it has no place to put marks for measurement. We must use physical things or forms to create instruments for measurement of space. Without instruments even space on which we project real number lines is immeasurable. The problem of the Arupas of consciousness is that there is no way to construct such measurement instruments which would render consciousness measurable in a quantitative way. We can measure brain waves from the outside but there is no way yet discovered to measure consciousness from within. But this really only means that our concept of quantitative measurement does not apply. Instead the dual of the micro-quantum that is partially susceptible to quantitative measurement is a macro-quantum theory that is based on qualitative instrumentation. We cannot really call this qualitative instrumentation measurement so we will call it qualitative reckoning. As with the external micro-quantum theory this realm within the clearing of being where logos reigns is only partially susceptible qualitative reckoning. The qualitative reckoning of probability-of-experience wavicles is the dual of the quantitative measurement model of probability-of-observation wavicles.

The exploration of Quality except for the work of Pepper<sup>1</sup> has not been pursued with any vigor within the Western tradition. Persig<sup>2</sup> points to it as a fundamental category who identifies it with the Greek Arte that is derived from Rta the fundamental Indo-european concept from which derives our concept of what is Right. Pepper associates Quality with the act which elaborates on the work of G.H. Mead and contrasts it with the Concept.

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1. Stephen C. Pepper; Concept and Quality (La Salle: Open Court, 1967)

2. Zen and the Art of Motorcycle Maintenance

## Reflexive Autopoietic Systems Theory

*Table 22: <sup>a</sup>*

Qualitative Categories	Conceptual Categories
<p>A. Categories for a single qualitative strand (e.g., drive quality).</p>	<p>A. Categories for a single complete act of purposive behavior in “objective” terms.</p>
<p>1. Felt quality with dynamic surge for action.</p>	<p>1. Bodily Action and tension pattern arising from internal bodily chances, or environmental stimulation (the drive impulse).</p>
<p>2. Duration of the quality yielding a continuous qualitative strand.</p>	<p>2. Continuity through a period of time.</p>
<p>3. Intensity of quality felt as dynamics of activity.</p>	<p>3. Energy of measurable quantity observable as kinetic energy in overt action or conceived as potential energy in states of bodily tension.</p>
<p>4. Reference to goal felt in the dynamic quality.</p>	<p>Vector character of bodily energy indication along with bodily changes conditions for dissipation of energy or its maintenance in a steady state.</p>
<p>5. Blockage from environmental strands.</p>	<p>5. Interaction with environmental activities.</p>
<p>6. Splitting of dynamic reference to charge instrumental strands with their felt references to instrumental goals towards attainment of goal of drive.</p>	<p>6. Vector changes due to interaction with environment, and channeling of energy for shortest path through response mechanisms for final discharge of energy, or maintenance of steady state.</p>
<p>7. Selection of instrumental strands towards attainment of final goal.</p>	<p>7. Selection of response mechanisms for discharge of energy or maintenance of steady state.</p>
<p>8. Positive feeling of satisfaction in terminal act or quiescence pattern (and, in blockage, negative feeling of dissatisfaction).</p>	<p>8. Quiescence pattern of responses of energy for the drive impulse.</p>

a. Concept and Quality pages 28-30

## Reflexive Autopoietic Systems Theory

*Table 23: <sup>a</sup>*

Qualitative Categories	Conceptual Categories
<b>B. Categories of context of qualitative strand.</b>	<b>B. Categories of physical structure.</b>
1. Simultaneity of diverse strands.	1. Body of organism.
2. Articulation of successive strands in an integrated total act.	2. Articulation of behavior of organism in an integrated act.
3. Anticipations and apprehensions as felt dispositions for action.	3. Dynamic Dispositions such as physiological sets available for action upon proper simulation.
4. Fusion -- the merging of qualities of diverse strands into a new distinct quality instituting a qualitative strand in its own right.	4. (null)
Specious present -- field of immediacy.	5. (null)

a. Concept and Quality pages 28-30

*Table 24: <sup>a</sup>*

Qualitative Categories	Conceptual Categories
<b>C. Categories of qualitative range.</b>	<b>C. Categories of physical environment.</b>
1. Actual present and Real past and future.	1. Space-time
2. Controlling environment of strands -- for any qualitative strand in action -- the actuality and reality of the situation.	2. Configurations of matter in space-time.

a. Concept and Quality pages 28-30

Pepper uses the purposive act as his fundamental metaphor for building his synoptic view of the world. He sets up the quality of consciousness of the act over against the intersubjective conceptual objectification of the act. For every category within consciousness he has an objective category except where he finds there is no objective correlate which occurs in two cases. Basically we can say that what Pepper calls “conceptual” is the treating of consciousness from a behavioral point



of view which we can say is a reduction of logos to physus. What this does do is focus our attention on embodiment of consciousness in acts of the body. He is taking as his reference the social behaviorism of G.H. Mead and the psychology of Wm. James not the crude behaviorism of Skinner and other proponents of complete objectivization of psychology which is what destroyed introspectionism as a valid approach to understanding consciousness and set back psychology for many years. With the discovery of altered states of consciousness the pendulum started swinging in the opposite direction and transpersonal psychology was among other similar directions that attempted to deal directly with consciousness. What Pepper realized is that the internal experience of the act via strands of quality is the dual of the external view of the objectified act. His categories attempt to establish the grounds of that duality. The act moves through an arc from the disposition to act through to quiescence in which it either succeeds or fails from the point of view of the actor. Externally we only see the quiescence and do not know what feelings are associated with that quiescence. One problem with Pepper's schema of the act is that it only considers the potential and the actual. He conflates dispositions with possibilities in his analysis and does not separate out the propensities to act from the possibilities. Also his external description is deterministic and does not take into account probabilities. Thus the different kinds of act which have their basis in different kinds of Being and should be described with different kinds of mathematical tools are not separable for Pepper. Also he takes as his paradigm the purposive act and does not consider the non-purposive acts or meditative non-actions.

*Table 25:*

Pure Presence Being <sup>1</sup>	Purposive Act with goal
Process Being <sup>2</sup>	Flow of Action without goal. Performance for its own sake.
Hyper Being <sup>3</sup>	Invocation of states moving from action complex to action complex across discontinu- ities of action types. Bound- aries between kinds of action defined.

## Reflexive Autopoietic Systems Theory

Table 25:

Wild Being <sup>4</sup>	Playfulness. Spontaneous gift giving. Innovation and Creativity. Radical anomalies and jewels of rare and exquisite order.
Emptiness -- the unthinkable	Meditation -- stopping thought -- non-action -- non-dual thought, perception, and action.

If we expand upon Pepper's list of acceptable kinds of action aligned with the kinds of Being then we begin to get a picture of what is missing in his presentation. What we can say is that as we go down this table of kinds of acts then dispositions become more and more important. In the purposive act the dispositions appear as a raw potential out of which the act arises. But when we realize that it is possible to have actions that are pure performance like Tai Chi movements then we see that when goals disappear then dispositions that appear in the course of the act itself become more important. When we move to the next more basic kind of action at the meta-level of Hyper Being then it is the discontinuities between kind of acts that become important and the dispositions are the what make us move from one kind of act to another specific kind of act across the discontinuities between actions. Finally if one goes on to define acts that operate at the meta-level of Wild Being then we see dispositions as pure tendencies in the field of the socius which have a playful quality. This kind of action appears right on the border line of meditative non-action that is purely spontaneous with no tendency whatsoever. Play is reaction purely to tendencies. We see it in animal cubs playing. Each action is the pure expression of a tendency without any constraint even to move from one kind of act to another. For instance Tai Chi is a set performative pattern. It is composed of many different kinds of moves. One learns the dance from beginning to end just in order to experience the quality of the moves. The actions have no purpose apart from the joy of their execution. But Tai Chi is a kind of action among others that one moves into or out of and within it there are the discontinuities between separate actions. If one concentrates purely on the movement between kinds of actions within Tai Chi or between Tai Chi and other kinds of actions then one is at the level of Hyper Being that emphasizes discontinuities between kinds of action or kinds of work. However, if one begins to move oneself making up ones own sequences and moves then one enters into Wild Being. In Malaysia there is a martial art called Silat where one does not impose the form on the body but discovers which animal forms one naturally are inclined to and one polishes ones actions to bring out those kinds of actions one

has natural inclinations toward. Learning Silat is not so much the imposition of an external form of movement as a discovery of ones own natural forms of movements which the master then helps you polish. The highest form of action is non-action. It is the form of action that is described in the Tao Te Ching. It is an action that is purely spontaneous and does not even express tendencies. It is action as if one were moved from the outside like a hand moves a pen expressing the perfect unity of Chi and Li. In non-action the difference between inside and outside vanish. Physis and Logos are no longer dualistically split. When there are tendencies there is still the surface between physis and logos were the tendencies exist. But at the level of Wild Being nothing but the surface exists. When we move up to Hyper Being then that surface is just a discontinuity between the realm of physis and logos. Both of these realms are broken into quanta. The realm of physis is broken into particles and the realm of logos or consciousness is broken into qualities -- what Pepper calls strands of quality. When we move up again to the level of Process Being then we see dasein ecstatically projecting the world. The overflowing of logos and physis are part of that ecstatic projection. Performance is a dance for joy that expresses that ecstasy. When we move up to the level of Pure Presence then all acts are inhabited by purposes and we see production as the primary kind of action. This is the level at which we do our work. But our work is supported by all these other layers of Being. When we tap into these other layers of Being then the states or the quality of our experience changes. When Jahn and Dunne talk about probability-of-experience waves they are applying wave mechanics to experiences. Instead we need to talk about determinants-of-experience, probabilities-of-experience, possibilities-of-experience, propensities-of-experience and dependent coarising experiences (which are empty). The different kinds of acts control these experiences. As Powell (?) suggests actions control perception. Thus the interface between physis and logos that define the potential wells of conscious within the body and the socius are really controlled by our actions or non-actions in the environment. We only tap into non-dual thought, perception and action if we meditate. Since meditation is non-productive there has been until recently strict censure of meditative practices. We only tap into the creativity and innovation possible from Wild Being if we are playful. We only tap into the inherent differences of the qualities of experience if we manage our crossing between experiences thought different kinds of work or action we perform. We only tap into the flow of actions if we suspend our goals. We only experience goals if we actively project them as the targets aimed at by actions. Every action springs out of emptiness purely spontaneously. It immediately is deflected by tendencies into particular kinds of action or work that yield particular qualities of experience. Those kinds of work are hopped between to produce strands

or braids of qualities of experiences that form a seeming continuity from beginning to end of segments of the act that add together to make up the whole act. That act is seen in relation to the projected ideal act leading to the projected goal of action. But we do not live in that illusory continuity. We live in the process sporadically and erratically jumping between kinds of work so that statistically everything necessary for the ideal act is accomplished. If in that jumping around between kinds of work we take a playful approach to what we are doing then we have a chance to be creative or innovative in our tasks. However, the whole act from beginning to end remains empty at least in the minimal sense that goals once achieved have no lasting value. In the end there is no difference between the purely spontaneous act and the purposive action built up carefully from the many substrata of kinds of action supported by the different meta-levels of Being.

When we recognize that what jumps between kinds of work (agency) is just as empty as the kinds of work (functions) themselves, then we have realized the necessity of Goertzel's chaotic process model as we have come to double it applying it both to the agency and the function simultaneously. Nothing remains from moment to moment. Each moment is a new creation and has the possibility of giving rise to an emergent event that will repattern the clearing-in-being at some level (interpretation of Being, episteme, paradigm, theory or fact). All continuities are suspect. But because of that we are taking nothing for granted. Each moment we start from a clean slate following the lead of Hume who suspected all causes. But we do not reject built up illusory continuities. Instead we explore the substrates of discontinuities and pure tendencies that these apparent flows and ideal continuities are built upon.

We recognize that within the clearing-of-being defined by the surface between logos and physis there is on the side of logos no landmarks to measure consciousness except very crudely. But there is to every state of consciousness a quantum structure where qualities pervade it completely. We can describe these qualities using various heuristics from traditional sciences such as the Chinese. If we understand that the core of consciousness is a pervasive symmetry which is completely unconscious and that we are only actually conscious when shards of asymmetry break off from this central symmetry that connects the individual unconscious to the collective unconscious. Then we see that the shards of asymmetry within the desiring machine, autopoietic individual or socius each has its own specific quality which over time, say within the specious present, forms a strand as identified by Pepper. We can understand these qualities if we realize there

dependence on the central symmetry. In other words there is a progressive bisection as the central symmetry fragments into finer and finer grained shards. This progressive bisection follows the form 1-2-4-8-16-32-64-128 etc. until some third thing enters to engender chaos. So for instance just as Jahn and Dunne realize the basic splitting is into Yin and Yang moments. The central unconscious symmetry is Yang and all fragments or shards of consciousness with quantal quality are Yin. When the next level of progressive bisection or symmetry breaking occurs there appear what are called the four major qualities which are named major and minor Yin and Yang. The central symmetry is identified with the major yang. Deflected from that are four qualitative moments or qualia. These are minor yang which is yang mixed with yin where yang predominates. Minor yin is the opposite of minor yang. And then there is Major yin. Major yin relates to all phenomena that appear in consciousness which are passive and acted on by consciousness. Minor yin might be seen as those phenomena that arise in consciousness from the outside that are active. Minor yang might be seen as those phenomena that arise in consciousness from the inside that are somewhat passive. Here the core of consciousness that is unconscious is seen as the epitome of activity. We think of this in terms of the parallel processing of the mind/brain which we are unaware of from moment to moment in our experience. This is pure activity but it is hidden from us. What appears active in our consciousness is actually from the point of view of consciousness itself passive. Sense perception is informed with order by its processing by the concurrent mind/brain. Thus sensation is pure content that is ordered by a hidden organizer in consciousness. The unconscious is incredibly active organizing perception into a coherent whole. We have seen previously that this occurs actually as a backward processing which is reversed when presented to the conscious mind. Between the passivity of sensations and the activeness of the unconscious there are partial combinations of activity and passivity. We might follow Husserl and identify these with Noesis and Noema. No noesis or cognitive activity in the mind no matter how rarefied goes without content of some kind. No noema or thought content grasped is without some kind of action of consciousness. And all of these noesis and noema have their own qualities as shards off of the central symmetry as we move out toward total asymmetry. These different qualities of the shards of consciousness are obtained by further progressive bisection first to trigrams then quatragrams then quintagrams then hexagrams etc. The trigrams and the hexagrams are explicitly defined by the Chinese as heuristic patterns. The quatragrams correspond to the geomancy of the Arabs called *Ilm al Raml*. These have become purely an oracular occult science and has lost its heuristic basis as a way of describing qualities of dynamic opposites. However, by studying The

Meaning of Man<sup>1</sup> it is possible to recover this lost philosophical basis for this science of the sands. The qunitagrams are related to the five hsing or transformations of Chinese medicine. It is this structure that our understanding of autopoietic rings is based upon. It is a description of a hyper-cycle of essential transformations. The hexagrams are described in the Chinese classic the I Ching. All of these structures can be treated as rings or doubled operator groups. It is in this way that the structure of groups enters the picture as being important for the description of consciousness. Once the shards of qualia are formed within the well of consciousness (which from the outside looks like a tree and thus through inversion between logos and physus unifies the primal scene of the Indo-europeans) then these different qualia have interactions based on the structuring of groups. Change occurs when we move from one group structure to another through a series of higher logical types which have different group structures with the same number of elements. These series of higher logical types can themselves can form hyper-cyclical rings and thus give rise to autopoietic ring structures which organize the autopoietic networks of desiring machines, individuals or sub-groups. The science of probability-of-experience waves that has been inaugurated by Jahn and Dunne needs to graduate to developing this qualitative dual of quantum mechanics of the physus within the realm of logos. We need to realize that we will not have a science of process that has any rigor until we give up external statistical measurement of non-routine work and adopt qualitative measurement methods of qualia instead. The achievement of autopoietic harmony on a team is experienced as a quality which cannot ever be measured by any objective observer. Only the participant observer tuned into this quality of social interaction can detect its occurrence. We need to look at work as the teams doing the work do from the inside as an experience based on and conditioned by their own action together in a complex dance around the dancing ground of the autopoietic ring of essential kinds of work. Unless we participate in the dance we will never experience it and autopoietic sociology will never be born out of the different distancing methodologies prevalent in the social sciences. Only Heuristic Research can give us access to it through our complete immersion in the process of group dynamics and engagement in mutually conditioned work.

Notice that assuming that consciousness fragments internally into qualia via progressive bisection and not limiting consciousness to the individual but allowing it to be seen as manifestation within the desiring machine or in the socius produces

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1.Sidi Ali al-Jamal (Diwan Press)

a way for us to understand the emergence of the autopoietic rings and the dynamic transformation of those rings. We have said in an earlier part that the autopoietic ring has the form of the pentahedron in four dimensional space. This pentahedron is equivalent to the fifth level of progressive bisection where the Five Hsing appear. At this level there are thirty two qualia which are articulated between pure yang of the symmetrical center and the pure yin of sensation. At the next level of differentiation the sextahedron of five dimensional space arises as the dynamic transformations of the pentahedron. This level we have identified as inherently social and we see that it is identified with the I Ching that has 64 qualia. These qualia also range between the pure yang or the central symmetry of the active unconscious out to the pure yin of sensation. This level of differentiation of qualia within the formlessness of consciousness is more closely associated with the socius than the last level of 32 qualia which is more associated with the autopoietic system of the individual. We can speculate that the level of sixteen qualia may be more associated with the level of desiring machines. Higher levels than sixty four may be associated with higher levels within the fractal differentiation of the socius working up to the level of the planetary Mann. Differentiation occurs progressively until a third thing appears to cause chaos to arise. We notice that in bifurcation maps of chaotic attractors that chaos will occur and then clear and then progressive bisection will start over again. Thus progressive bisection takes place in an environment surrounded by phases of chaos. Thus there is a dialectical alteration between chaos and progressive bisection. Our chaotic social process model covers the ground state of chaos. What we are now positing is that within that chaos there appear clearings where the relation between physis and logos becomes clear and within which consciousness begins to progressively bifurcate. The progressive bifurcation is a dynamic play of jumping between qualia within consciousness. This jumping between qualia is the dual of the quantum mechanical model that governs the physis at the micro level. It is the quantum quality state changes of consciousness that is rendered accessible by various heuristics that allow the differentiation of the clearing-of-being between the central symmetry of consciousness and the periphery which appears as myriad flowing sensations. The bifurcation of qualia allow us to assign value to these sensations as they form strands within the specious present of consciousness. It allows us to understand their workings according to group operations within an arena of closure. This means it allows us to understand the clearing-of-being as dissipative (level 16) then autopoietic dissipative (level 32) then finally reflexive autopoietic dissipative (level 64) system.

In this scenario we can say that there is an alternation between the dual chaotic

social process model which represent the regime of chaos and the progressive bifurcation within the clearing-of-being. The self-generative system produces the regime of chaos for however many moments of the specious present that the chaos lasts. Then the self-generative system as a fundamental model of the purposive act achieves quiescence. At the point of quiescence the chaos clears and the basic distinction between physis and logos that defines the reality interface between consciousness and the world is re-asserted. The center of this clearing-in-being is the symmetry point of the active parallel distributed processing of the unconscious. The periphery is the interface of reality between physis and logos. This is the point where information is passed back and forth between consciousness and the designated as real practico-inert world. The center of the practico-inert is the essence of manifestation. The symmetry point is the Catalyst viewpoint. These are the opposite poles of manifestation that we can associate with the positive fourfold (Heaven, Earth, Immortals and Mortals) of Heidegger and the negative fourfold (Night, Covering, Chaos and The Abyss) of Aristophanes<sup>1</sup>. The distinction between the realm of logos and the realm of physis is not clear and there is the anomalous areas that emerge where the two are mixed with one or the other being dominant. Immediately the clearing-in-being begins to fragment generating more and more complex heuristics by progressive bisection through symmetry breaking. This creates shorter and shorter waves of qualia that are shards of asymmetry within the formlessness of consciousness. We can identify the symmetry point with the intentional morphe of Husserl and the surface of the sphere of consciousness with the hyle that is formed by the intentional morphe into forms. At the second phase of progressive bisection the combinations of morphe and hyle are produced called Noesis (yang minor) and Noema (yin minor). These form the major cycle of opposites rolling over into each other that occurs within the clearing-of-being. When Chaos again occurs with the advent of the third thing two additional out of balance states may arise called Yang Splendor and Closed Yin. These represent blockage in the normal rolling over of opposites. They are points where the rolling over of opposites are arrested. If yang and yin major represent one dimension and noesis (yang minor) and noema (yang major) represent a second dimension then yang splendor and closed yin represent a third dimension within which the sphere of consciousness appears around the symmetry point. Jahn and Dunne speak of an emotional axis that lifts us out of the cognitive plain via three coordinates range<sup>2</sup>, attitude<sup>3</sup> and orientation<sup>4</sup>. Instead we would speak of the distance from the

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1. See The Fragmentation of Being and the Path Beyond the Void manuscript of the author.

2. "r: the radial component, indicates the range, or depth of penetration of the consciousness into its environment -- the extent of its attention to it, or of its interaction with it." page 245



symmetry point of pure yang to the sensation as the measure of the constriction or the expansion of consciousness. At right angles to this is the spectrum of the mixture of yin and yang at a particular heuristic level in the progressive bisection which produces the cognitive plane at a certain level of qualitative differentiation. Within the cognitive plane the opposites will normally rollover through group operations as the different qualia are transformed into other qualia via interactions based on group operations. At right angles to the cognitive plane is the plane of distortion due to the blockages in normal rolling over of opposites. Pepper makes blockages of impulses and actions a major category within his qualitative system as well. We will understand these distortions in the terms that Chinese medicine does which we can see is the generation and dialectical interaction of nihilistic opposites. These nihilistic opposites appear as the action of the third thing that produces chaos on the plane of normal mixture and transformation of yin and yang. The turmoil associated with nihilistic involvement might be seen as having an emotional aspect which would allow us to relate the two coordinate systems. However, our coordinates are tied directly to the differentiation of the clearing-in-being itself rather than to hypothetical cognitive factors.

The environmental cavity that houses the consciousness waves and determines their particular standing wave patterns must be represented in terms of these “soft” coordinates. For computational convenience, we assume that its provide depend only on the magnitude of  $r$  (range vector) and not on either of the angular coordinates. More generally forms could be accommodated with greater mathematical encumbrance, but little would be added to the basic conceptualization.

We can proceed from this point to derive mathematical expressions for the hierarchy of complex standing wave patterns allowed in any given confinement geometry. Like their physical counterparts, these patterns are indexed by three quantum numbers that serve on the mathematical side to specify the radial and angular nodal configurations of the standing waves, and on the conceptual aide to quantify the probability-of-experience options. The principle quantum number,  $n$ , specifies the radial nodal structure and  $i$  the physical context is associated with sequence of possible discrete energy levels of the atom. For our purposes, we interpret  $n$  as an indeed of similarly discrete options for the degree of investment, involvement, or attention of the consciousness, in either of the cognitive or the emotional sense, or both. As such, this property bears some similarity to various stratifications proposed in psychological, sociological, theological, and metaphysical models -- “affect,” “attentional energy,” “libidinal energy,” “psychic energy,” “rank,” “hierarchy,”

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3. “theta: the angle of inclination of the range vector,  $r$ , to the polar axis defines the attitude of consciousness and thus specifies the emotional component of the interaction.” page 246

4. “omega: the angle specifying orientation of the component of the  $r$  (range vector) in the cognitive plane defines the cognitive orientation, point of view, or strategic perspective of consciousness.”

## Reflexive Autopoietic Systems Theory

“sanctity” -- where in each case there is some attempt to quantize this elusive dimension. For example, several mystical traditions identify a hierarchy of energy centers, or “chakras,” that underly an individual’s motivations or actions, or a sequence of degrees of enlightenment or spiritual growth. Various psychological theories suggest sequential stages of cognitive, emotional, or moral development, or hierarchies of psychological needs that progress from basic survival and primitive egocentric gratification toward more social concerns, ultimately reaching altruistic domains dominated by spiritual and religious values. Freud proposes a sequence of stages of ego development; Jung explores beyond the ego to deal successively with individual, group, and collective interactions requiring progressively more involvement; Maslow defines a hierarchy of personal psychological needs; Erikson identifies stages of emotional development; Piaget sets a scale of cognitive achievement; and Kohlberg similarly scales moral development. In social contexts, as well, we are accustomed to the establishment of discrete rands -- in the military, in business and industry, in government, in religious and fraternal organizations and cults, in academia -- that attempt to label in some crude way the nominal level of investment or achievement of the individual in the given environment. Without claiming any unification of these disparate stratifications, the quantum atomic metaphor provides a symbolic representation of the common human tendency to quantize degrees of conscious or unconscious commitment or cognizance.

Whatever their psychological implications, these consciousness “energy” levels are subject to quantized change by mechanisms analogous to those of their physical counterparts, for example, by absorption or emission of information radiated from or to the environment, or by inelastic collision with other such consciousness atoms. Also in analogy to physical atomic structures we may presume that beyond a certain level of consciousness energy, the wave pattern can no longer be contained by its environmental well and escapes to free-wave status.

The quantum numbers  $l$  and  $m$  specify the nodal configurations in the azimuthal and polar directions, respectively. In physical applications, these are associated with the total angular momentum of the atomic system and the polar component thereof. (Note that such associations of gross mechanical properties with atomic scale probability patterns are themselves heavily metaphorical, since the wave-mechanical model entails no moving particles.) In the consciousness metaphor, however, these quantum numbers relate to the arrangement of the probability-of-experience patterns in the cognitive-emotional space defined by our spherical coordinate system. Since probability patterns having large  $m$  remain close to the cognitive plane, while patterns of relatively small  $m$  are predominantly localized along the polar or emotional, axis, we conclude that the ration of  $m$  to  $l$  is indicative of the relative amounts of cognition and emotion prevailing in a given experiential interaction.

These metaphors can also accommodate the degree of complexity of the consciousness experience. For mathematical reasons, the angular quantum numbers  $l$  and  $m$  are constrained by the principle quantum number  $n$  to the following options:

$$l = 0, 1, 2, 3, \dots, (n-1)$$

$m = 0, +/- 1, +/- 2, \dots, +/- l.$

Since  $l$  and  $m$  determine the number of angular nodes in the patterns, the more complex configurations can only be generated for the higher  $n$ 's. Thus the analogy predicts that the more complex experiences of consciousness can only be attained with higher investments of consciousness energy. Again the relative extent to which these complexities appear in the cognitive or emotional dimensions depends on the ratio of  $m$  to  $l$ .

One detail remains to complete this metaphorical consciousness atom -- the property corresponding to the electron spin,  $s$ , mentioned earlier. In physical atomic systems this quantity does not contribute directly to the individual electron standing wave patterns., but manifests importantly in their interactions. Given its binary nature, its ubiquitous association with all atomic scale systems, and its central role in the definition and application of the exclusion principle, we propose to associate this spin property in the consciousness metaphor with the fundamental "feminine/masculine" dichotomy, or the so called "yin/yang" distinction of Taoist philosophy. More specifically, we shall use its two options to distinguish the passive/active, receptive/assertive, or enveloping/penetrating modes of consciousness interactions, whose balance is critical in interpersonal bonds.

Our consciousness atom has so far involved only a single "electron" in the individual environmental well. Extending the metaphor into "polyelectronic" structures would be tantamount to subdivision of the consciousness into identifiable components capable of interaction with one another, as well as with other consciousness systems. This multiplicity could prove useful for representation of many more complex features of consciousness activity, such as the ability of some individuals to segregate their patterns of attention and behavior into different sectors, or simultaneously maintain multiple relationships with other consciousness on quite different bases. However, given the greater mathematical encumbrance of such models, we shall not pursue such polyelectronic formalisms here.

In summary, then, we have posed a quantum wave-mechanical model of the rudimentary consciousness atom, consisting of an array of spherical standing waves representing probability-of-experience patterns in a space defined by the intensity, attitude, and orientation of the consciousness in its interaction with its personal environment. The extent and configuration of these consciousness experience patterns are quantized, and are indexed in terms of degree of involvement or attention, the complexity and balance of the emotional and cognitive components, and the assertiveness or receptiveness of the consciousness in the prevailing situation. With this model in hand, we can now explore specific classes of interaction.<sup>1</sup>

This model has many flaws when applied to consciousness. We have already exchanged the coordinate system for one based on the symmetry breaking in the

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1. *Margins of Reality* pages 247-252

clearing-of-being. The next point is that the hierarchical organization of consciousness itself into levels has no firm basis in any kind of objective criteria for differentiating levels. Many different levels have been proposed as Jahn and Dunne suggest. However, the chakra system of the Hindus seems to be the best of these based on number of centuries in active use. The chakras are nodes within the core of the Aura. We have already seen that leaking consciousness outside the potential wells may be seen as the basis for the aura. It would make sense for us to adopt a similar view of the chakras as the basis for differentiation levels of consciousness. There are seven chakras and we have already mentioned the connection of these with the seven stages by which we constituted general systems theory and then advanced it into the specialized dissipative, autopoietic and reflexive systems theories. Thus if we relate the chakras to these stages we see that instead of seeing the chakras as something that merely exists in the individual consciousness it is actually a picture of the levels by which the fractal pattern of potential wells defining desiring machines, the autopoietic system and the socius and beyond are built up. Each of these levels has their own standing wave patterns and each of these overflow into the next highest so that increasing levels of energy move us from one fountain basin of consciousness into the next highest. We will note that the first four stages are our way of reconstituting the clearing-of-being itself while the last three move us up from desiring machine through the individual to the socius. Likewise the highest chakra is hovers over the head of the body of the individual and is thus “beyond” the individual in some sense. This would mean that the lowest four chakras represent the movement through the phases of firsts, seconds, thirds, and fourths to the creation of the basis of embodiment of the general system. It is the top three chakras in the neck, head and beyond the head that produce the lower levels of the fractal potential wells.

If we accept that there are some energy levels by which the envelope of consciousness and the fractal structure of that envelope is produced then we see that it is not necessary to make these directly isomorphic with the energy levels of the atom. We would expect the structure of that energy pattern in consciousness to be different. The key point is that Jahn and Dunne use the metaphor of the atom with a single electron to show that very complex patterns of the electron cloud are possible. For us the important point here is that the individual electron that is forming this cloud can be seen as not moving at all. Instead we can invoke the model of the instantaton which is an elaboration of the soliton traveling not in a channel but around a potential well. An instantaton pops in and out of existence at various points. We posit that this is what the electron is doing. It is not moving

around its cloud but chaotically popping in and out of existence within the constraints of its cloud. When it is not visible it is in a “potential” state out of which it is actualized at one point in spacetime and then it vanishes to appear at another point in spacetime to create its cloud. The crucial question is how an electron can travel forever around its nucleus. This is possible because it is an instantaton moving through a channel which is sometimes in potential and sometimes in actualization. That channel is warped into the shape of the electron cloud by the configuration of spacetime within the atom. Thus the electron never loses energy as it forms the cloud. It does not really move but merely instantaneously pops from place to place within its cloud. This same principle operates in consciousness. The standing waves like the clouds of the electron do not move unless there is some change in energy. The moments of the qualia that make up these standing waves do not move either. They merely pop in and out of existence in such a way that the cloud is created. Thus consciousness is seen as a convoluted channel around which solitons as instantatons move continuously never losing energy. Consciousness is a warpage in manifestation where trapped energy moves without being effected by entropy. This warpage has the structure of the dissipative system which turns in on itself to become the autopoietic dissipative system which turns in on itself again to become the reflexive autopoietic dissipative system. We do not need isomorphism with the atom to produce an interesting model of consciousness. Instead we need to recognize how consciousness as macro-quantum mechanical system based on quality not quantity can be the dual of the physical atom. Logos is the dual of physis not isomorphic with it.

Another point that is worth making is that we have the Schroniger equation for Hydrogen but we do not have even the very next most complex equation for Helium. Thus we cannot use such a model to give exact quantitative calculations of interactions within consciousness even if we could accept the isomorphism between consciousness and the atom. However, what Jahn and Dunne call polyelectronic systems would correspond for us to autopoietic networks of desiring machines or organizations of individuals within the socius. Thus the model is suggestive in the sense that we know something empirically about the interactions of electrons and how electrons form valences as we add them to the atom. Each atom adds one electron and one positron and articulates itself into a series of electron shells. These additions of electrons produce elements that have different basic qualities that differentiate the basic kinds of matter. Thus the addition of electrons produce differences in quality as well as quantity. Likewise we can expect that the addition of desiring machines within the individual and of individuals within the socius

should change the qualities of those emergent levels of reality within consciousness. So our qualitative analysis of consciousness could be taken to another level in which we attempt to explore those interactions of qualitative strands. Notice that Pepper talks about the category of fusion of strands that do not have any counterpart on the conceptual side. Fusion of strands of qualities produce new qualities that can be recognized in consciousness. Changes in individuals and desiring machines in their respective networks will qualitatively alter the networks which have been modified.

The next phase of progressive bisection or symmetry breaking produces the trigrams that occur in Chinese philosophy. We can understand the Trigrams also from the point of view of Sidi Ali al-Jamal's The Meaning of Man where he identifies three sets of opposites inward/outward, sensory/meaning and celestial/terrestrial. These are permuted to give the eight trigrams. This model gives us a completely different picture of the clearing-in-being. It distinguishes between the inward and outward of whatever systemic reference we wish to name. It then says that there are two higher dimensional axes that need to be taken into account. The first one is the axis of meaning that arises from the void to inform what is sensory within the clearing-in-being. The second one is the axis of the Heavens in relation to the earth. Unseen causes occur in the heavens which move everything identified as earth. The atom of consciousness is a geode that is empty at its center. Due to the emptiness at its center meanings can upwell from the void. The atom of consciousness is also seen to interpenetrate with all other things. The heavens is the realm through which that interpenetration occurs. Unseen causes emanate from the heavens as pure yang and effect the things within consciousness. The five Hsing are examples of such unseen causes. What is interesting is that the emptiness at the center of the geode of consciousness is the Same as the interpenetration of all things because as the Buddhists say, "emptiness equals dependent co-arising." Thus these two avenues of effect from "beyond" are really the same in some sense. When we look at the third basis we see that the inward/outward distinction is also merely another analogy for the unseen realm because the inward IS the outward and the outward IS the inward. Everything within consciousness is the all of the outwardness (i.e., all outward things appear in consciousness in some form to another). The outward contains the whole of consciousness (i.e., all consciousnesses are contained in physical bodies within the universe). It is undecidable whether everything is within consciousness or whether consciousness is within everything. This undecidability is another image of the emptiness that is the interpenetration of everything. It differentiates into emptiness which further

differentiates dependent co-arising. So this new level of differentiation of the clearing-of-being acquaints us with the fact that we cannot really pin down consciousness because it permeates everything and is permeated by everything and we cannot really separate things out. This is why we call it formless. The eight trigrams give us a perspective on the relation of the atom of consciousness -- clearing-of-being -- with everything else based on the Buddhist insights into the nature of reality.

The next level in the progressive bisection merely adds one extra pair of opposites to those indicated by Sidi Ali al-Jamal called basic and metaphorical. What is basic is really true. What is metaphorical seems true but is not. Thus we get here an interaction with reality which effects how we see the relation of the self with everything else. This generates now 16 qualia that operate as described by the heuristic forms contained in *Ilm al Raml*. The philosophical significance of these sixteen via the bisection by which these qualia are produced are outlined by Sidi Ali al-Jamal. These operate at the level of desiring machines or dissipative systems. The dissipative systems define inside and outside. A boundary is set up where a negative entropy flow is produced. This is the same as saying that order appears out of nowhere. That nowhere is either the emptiness inside the system or through the interpenetration of all things with all other things. The distinction between inward/outward are basically the means of rendering these two the Same in their belonging together. At that boundary there is a bifurcation between appearance and the real that is produced as a side effect of closure. It is at that boundary the Escher waterfall appears where order from nowhere enters the system organizing it as it disorganizes the environment. That illusion of closure is the basis feature of the dissipative or openly/closed system. The sixteen qualia of *Ilm al-Ramal* are capable of folding through each other like the complex numbers based on the group operations that allow the square root of negative one to equal  $i$  so real numbers can become complex and vice-versa. Desiring machines are all small instantatons of such Escher waterfalls. They build up the boundary of the autopoietic system as a series of such inversions. When two desiring machines mate we get an autopoietic system that is cognitive/living and completely closed. The source of order from nowhere of the one becomes the entropy sink of the other. Normally there are more than two desiring machines in a network but the minimal number of desiring machines that can make up an autopoietic dissipative system is two. We double the complex numbers to get the quarternion numbers. This phase defines the structure that will be preserved by the autopoietic system and destroyed by the reflexive autopoietic system.

The next level of progressive bisection gives us thirty two qualia. These qualia represent the action of the Five Hsing which is the autopoietic hypercycle from Chinese medicine. It is composed of transformations called “earth, fire, water, wood, metal” in a particular sequence. That sequence relates to the pentahedron in four dimensional space. That pentahedron is two mobius strips intertwined. Those mobius strips are like the Escher waterfalls. When two waterfalls work together each being the source from which the energy of the others sink is recirculated then we have a completely closed four dimensional system that can imitate a perpetual motion machine. This perpetual motion machine can only be realized in three dimensional space as solitons moving in a closed ring or channel. In our case one of the mobius strips is the channel and the other is like the soliton wave. The two together give us a closed self-organizing system which conserves its energy completely. At this stage our atom of consciousness becomes a dissipative autopoietic closed system which has thirty two qualia who operate together according to the principles of ring theory with two yin/yang transformation operations. But laid on to this is the set of five groups of order twenty that relate the twenty interface planes mentioned in the last section in this series of essays. The boundary between potential and actual is posited by the dissipative system through the distinction between basic and metaphorical. The autopoietic system allows that boundary to be crossed four dimensionally to bring possibilities into actuality without it actually being penetrated. This is the level at which the Quarternions appear as the doubling of the complex numbers. At this level the Clifford algebras appear. This phase defines the homeostatic autopoietic system that preserves its own structure.

The next phase of progressive bisection gives us the socius. It has 64 qualia that operate together based on ring theory operations. But these 64 reduce to twenty sources beyond inversion and mirroring. This level corresponds to the sextahedron of five dimensional space that gives us the degrees of freedom for the transformation of the pentahedron. We see its heuristic in the I Ching’s 64 hexagrams. These are the qualities that can appear in the socius. The socius is a reflexive autopoietic dissipative system. It appears from the doubling of the autopoietic system. When two autopoietic systems reflect each other they become reflexive and thus social. We can see this in the mutual reflection of the minimal social machines or in the mutual reflection of chaotic process models. At this level the Caley algebras appear. This phase defines the heterodynamic ecstatic system that creates revolutionary new structures.



The next phase of the progressive bisection would be the level of 128 qualia, then 256 and so on. Each level differentiates by adding a power of two. These additional levels refer to levels of standing waves above the Socius which are none the less social in some aspect as more complex social configurations. These levels can be of indefinite extent all the way up to the level of the Planetary Mann. What is of interest here is that defining the levels like this we are using the natural interpenetration of the Pascal triangle to encompass more and more levels of social reality. Thus our model is based on the interpenetration of higher and higher mathematical dimensions. Those dimensions are actually infinite even though there is a practical limit of the number of levels between the raw socius and the Planetary Mann. What this shows is that at some level the Planetary Mann interpenetrates with all individuals being connected to all other individuals within our species. We do not plan to trace those higher levels of interpenetration above the socius or attempt to enumerate them. That would differ from society to society around the world depending on the granularity of social organization. Each heuristic device adds another conceptual pair of opposites by which the new finer differentiation of qualia is made. But practically speaking before the progressive bisection gets too far beyond the socius there enters the third thing which causes us to switch back to the regime of chaos. The third thing appears as a yang splendor lightning bolt of Zeus that appears against the dark clouds of the closed yin system. Closure is a result of the play of nihilistic opposites.

## **11. The Dynamic of Consciousness**

Now our model has become more complex. We have suggested that when chaos clears that there is a regime of consciousness where a progressive bisection due to the asymmetries of consciousness occurs prior to the re-production of chaos. These asymmetries produce a qualitative differentiation of consciousness into states. Thus there is an alternation within the world between regimes of chaos and regimes of clearing within which progressive bisection occurs. This alteration reminds us of the alteration between logos and physis or the clearing-of-being of consciousness and the potential well which restrains consciousness from escape into the cosmic consciousness of Brahman which the Hindus aspired to achieve through asceticism. Through this notion we suddenly get a picture of a more complete model of the operation of consciousness from moment to moment. Within the regime of chaos the dual models of chaotic social processes prevail. Self-generating agents and functions interact producing a cloud of possible agents and possible functions for the next moment of swarming. Then suddenly there is a collapse of the infinite

variety of chaotic states into a single system state. This collapse into simplicity occurs as a catastrophe of the collapse of variety production. We see in this the traces of the essence of manifestation because the one selected state is fated. It is not a random selection but a selection controlled by the unconscious be it individual or collective. This single state begins to bifurcate through symmetry breaking within the clearing-of-being. This produces the various qualitative quanta or qualia that the system bounces around between. This bisection occurs an unforeseeable number of times before the third thing enters the scene to produce another chaotic regime. The third thing is equivalent to the Catalyst viewpoint. It creates an explosion of variety catastrophe which is the opposite of the simplifying catastrophe. At the point when the regime of chaos is created again the set of possible states of the bifurcating system forms a grid over the chaotic region by sorting chaotic states due to proximity to bifurcated states. The system states may be seen as a set of additive waves so that the heuristics are produced by the bifurcation that can be used as a guide in the jungle of chaos. In that jungle the functions that were possibilities in the last regime of chaos now are actualized. Likewise with the agents from the cloud of possible agents. No trace of the original agents or functions from the last regime of chaos are found. The regimes of chaos are like dense and opaque like the physus beyond consciousness. The regimes of clearing in which bifurcation occur according to the Figenbaum constant appear as the analogy realm of logos. In it order is apparent whereas within physus the order is obscured. We note here that the opposition between the Catalyst viewpoint and the essence of manifestation appear clearly in their positive and negative roles with respect to the expression of intensity. The essence of manifestation de-intensifies while the catalyst radically intensifies the situation by bringing back chaos. We can see moments of actuality oscillating between these two possibilities. Through this we can understand why the Western tradition would make the mistake of splitting physus and logos as they appear to have some basis in the expression of manifestation. We can also see how consciousness can be seen as both clear and opaque at the same time. Within the clearing-of-being the progressive bisection of qualia occurs. This produces a grid by which the chaotic states of the system are referenced. Thus an order is produced which holds like an afterimage projected on the Chaos and by which consciousness can deal with the chaos through the fuzzy similarity between fuzzy states and the reference bifurcations that exist just prior to advent of chaos again. When the Catalyst viewpoint hastens the occurrence of chaos then agent and function split and begin another preparation for swarming. But no functions nor agents survive the clearing accept by collusion with other agents or functions in the projection and cancellation process. The agents and functions

interact and begin building up their potential agents and functions ready for the next reduction into simplicity and the next advent of the third thing bringing chaos.

Notice the similarity of the progressive bisection to the functional hierarchy. Notice the similarity of the jumping around between system states in the clearing and the jumping around of the agent from function to function. Both are tree structures activated by execution. In one case it is global execution of the system by actuating certain states. In the other case it is the independent thread of control of the agent activating functions. Notice also that the progressive bisection is an intrinsic ordering whereas the ordering of functions and agents is merely projected on chaos. Chaos becomes the hyle which is formed into a system by projecting form on a chaotic matter. Agent and function become the two hands by which the Catalyst viewpoint form this matter into something useful to the totalitarian system of subjectivity. On the other hand the bifurcation of consciousness or the clearing into states is an intrinsic ordering. It occurs through the production of small asymmetries which turn into our experience of the world. Everything that is symmetrical is hidden from view. For instance the tremendous underlying parallel computing power that underlies consciousness is hidden in background through its inherent symmetry. What little does appear because it is not able to achieve symmetry. The single non-dual state of the system that emerges from the cloud of chaos is a single flaw in the symmetry of consciousness. What occurs in a regime of chaos is that what was hidden from consciousness is made to appear. Thus what we see in the alteration between logos and chaos are two views of the same thing which we alternate between so quickly as to not notice the difference as we switch from the darkness into the light and back like the flickering of a light bulb. We do not care if this lighting is going on in the desiring machine, the individual or the socius. Exactly the same model applies to all three. Instead we see that the quantal model that was forced on us in order that we might understand Quantum phenomena has a dual with respect to consciousness. These two models of consciousness and physical realms alternate making visible the substrate of the essence of manifestation and the Catalyst viewpoint which are the Same in their belonging together. All this occurs in the dance of the complex chaotic attractor. Flashes of order within chaos occur. We project order on the chaos and because of this we can find our way in the chaos. But that order is not metric in the first instance. In the first instance it is an order of bifurcated qualitative states between which the whole system wanders. Later we go on to project the artificial order of general systems theory as we move from first to third and then fourth on two prior to building up the series of specialized systems theories which allow us to understand dissipation,

autopoiesis and reflexivity.

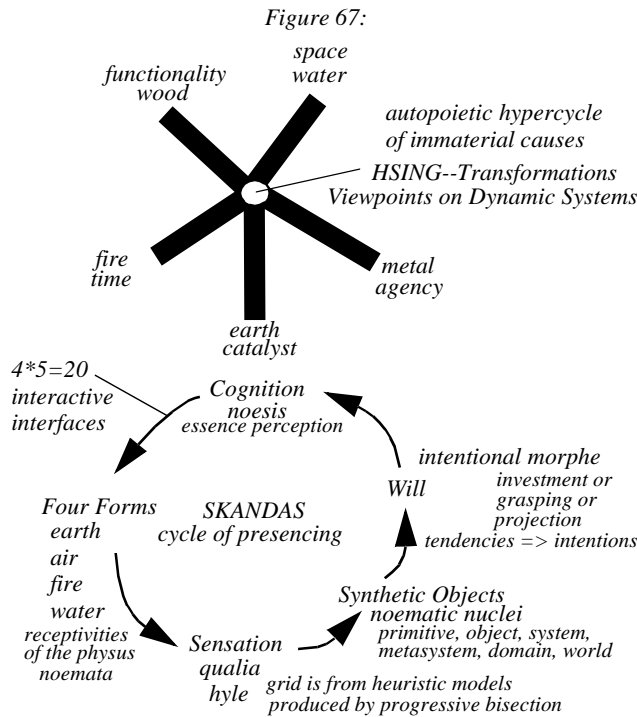
## 12. Presence

Now that we have a picture of the relation of consciousness to what is non-conscious in our expanding model let us treat the question of presence. We will do this by exploring the Buddhist theory of the five Skandas. These are divided between rupas and Arupas or form and formlessness. There is one rupa of Earth, Air, Fire, and Water. These are sometimes interpreted as attraction, repulsion, intensity and movement. However, we do not accept the abstraction of these basic underlying elements. For us these four traditional elements are receptivities in the hyle which accepts the impression of form. That formed impression is built up in stages. *First* there is sensation which is equivalent to Husserl's hyle. Then we get the synthetic appearance of objects as noematic nuclei. Next the will appears and finally cognition itself that is much like the Intentional morphe of Husserl. These five are the ring of basic characteristic of consciousness: forms, sensations, noematic nuclei, will, cognition. The last four are formlessness. They form a ring or wheel. The buddhists have different views as to whether they really exist or not. Most agree that the skandas are just as empty as the self. Now we will interpret the skandas as a theory of presence and place it within the context of our model. We take the skandas from the Buddhists because they have 2500 years of meditations to back up their claim which followed and extensive tradition of Hindu asceticism. We have almost no comparable systematic exploration of the possibilities in consciousness. We note that the five skandas are based on the traditional Indian identification of the four traditional elements: earth, air, fire and water. These are the same elements that appear in the Greek tradition. We notice also that cognition is undifferentiated. We will borrow from the Chinese the concept of the five hsing as a means of understanding the differentiation of consciousness. They used it as a basis for understanding the luminous internal organs of the body. For them the "mind" was distributed throughout the body. If you combine the Buddhist five skandas and the five Hsing of the Chinese you get an interesting picture of a hypercycle. What appears is the twenty (five hsing times four elements) which we discussed in the second section of this paper as the twenty interaction surfaces. Each unseen cause or faculty of the bodymind can be received by all four kinds of receptivity at the border between logos and physis. Through the action the qualia of the sensation are formed into noematic nuclei which in turn are discovered to have essences in the sense that Husserl understands them. These concave instances of strands of qualia are woven into concerts of sensation controlled by the noematic

nucleus that can be recognized directly as an essence or natural complex or kind. To this object the will becomes attached, or we may say out of the tendencies in the sensation an intention is produced. This is the site where the clinging and craving which Buddhism addresses springs up.

When we think about presence in consciousness the first thing we ask is if there is sensations. They can come from inside or outside our bodies. These sensation form qualia that we can control through our action to produce perceptions. We recognize patterns in these strands of qualities which we build into noematic nuclei or coherences. It is through these coherences that we recognize essences (kinds, natural complexes) and we also attach our will to them. It is almost as if will and essence perception were to related phenomena at the same level. We go on to cognize these essences or endpoints of focus of our will to power. In the Indo-European tradition cognition is one thing. In the Chinese tradition cognition was dispersed throughout the body and differentiated into further kinds of their own. These further kinds are the five Hsing. The five Hsing combine with the four elements to produce twenty basic kinds of interaction between mindbody and the physis. Presence is this interaction between the logos and the physis. The twenty interaction surfaces occur as one of the concrete manifestations of the autopoietic ring in its simplest form as the five cell polytope of five dimensional space. Thus by merely combining the insights of the Buddhists and the Chinese in a natural way we generate the autopoietic ring in terms of its interaction surfaces. These are also the twenty sources beyond mirroring and substitution that exist within the I Ching. It is produced by combining the five fold ring of presence from the Buddhists with the internal differentiation of celestial organs within the bodymind of the Chinese. It is clear that cognition in the Buddhist paradigm is related to Yang causation in the Chinese model. When you combine the five essential transformation with the four basis receptivities of matter then you are talking about the twenty fundamental interactions on the surface between physis and logos.

## Reflexive Autopoietic Systems Theory



The interesting thing about this combined model is that it allows us to focus in on the surface between physis and logos. The Chinese system does not split logos from physis. Instead there is just the unitary Chi and Li. In this system of thought there is an essential differentiation of the body into five celestial organs or transformations. The difference between the receptivities in the physis and the actions of cognition are not differentiated. In India the Indo-european system by differentiating the physis from the logos identified the four elements within the physis as opposed to the Arupas or formlessnesses of the realm of the logos. But cognition as a unitary center of consciousness has the same place in the Buddhist system as the celestial causes do in the Chinese system. Thus when we place these two systems in juxtaposition we see that the twenty interactional surfaces or sources naturally arise from combining the unitary with the dualistic ways of looking at existence. Yet ordinarily this combination would not occur because the unitary viewpoint would not see the receptivities in the physis because no physis exists for it and the dualistic viewpoint does not see the fragmentation of cognition because all fragmentation is projected into the duality between logos and physis. So strictly speaking these twenty interaction surfaces or sources do not exist. They are imaginal. If they exist nothing else does and if they do not exist then everything else can exist. They have no Being of any kind. They are the receptacles that are empty through which phenomena overflow out of the void. They are the seeds of the

alaya-vijnana. All creation defines them negatively and from them all creation arises. They are the heart of the social because they arise in the collective unconscious. The imagining of them is the ultimate communal project for from them all emergent things emerge. This is to say that they are the deep structure of the surface between logos and physis which becomes visible when the duality of these two realms collapse. For a moment we see the image of the twenty source forms beyond reversibility and inversion that are hidden at the core of the hexagrams of the IChing. They are the heart of the social matrix of possible qualia. The non-existent source of existence and the existent source of non-existence. Images that appear within the ocean. The point where the birds and the fishes are unified.<sup>1</sup>

The nature of the samadhi, as well as its ability to reveal a truth normally hidden from us, is indicated by the name, which is figurative and meant to indicate its nature. It is said in the Avatamsaka Sutra and several other scriptures that when the surface of the great ocean is completely still, unruffled by the wind, all things can be revealed as images on its surface. One text says, “It is just as when the wind blows, waves arise in the great ocean, but when the wind stops, the water becomes clear and still, and there is not a single image which is not revealed on its surface.” Another text says that the forms of the Ashras dwelling in the sky are all revealed in its surface. It is a simile for this particular samadhi because when the activities of the “normally” functioning mind are stilled, like the waves in the ocean, then all things are revealed to the meditator in brilliant clarity. Since in order to perceive the identity and interdependence of everything demands an extremely radical disruption of the normal categorizing, conceptualizing, symbolizing mechanisms of the human mind, obviously the sagara-mudra samadhi is understood to be an exceptionally profound state of meditation. I have translated the Sanskrit name (hai-in san-mei, in Chinese) as “the samadhi which is like the images in the ocean,” or “samadhi which is like the impressions in the ocean,” in conformity with the simile. Mudra is sometimes translated as “seal,” which is inaccurate in this context because of the connotations it has in some Indian and Tibetan forms of Buddhism.

Thus the Hay-yen teaching derives, according to Fa-tsang, from the Buddha’s samadhi. However, the samadhi also belongs to the Bodhisattva of advanced states for his own activities, which are those of a Buddha, must grow out of his own vision, in sagara-mudra samadhi, of a universe of identical things interpenetrating infinitely. This is why the Hua-yen vision is not available to most of us, who rely for information on sources of knowledge which Buddhism criticizes as erroneous and conducive to anxiety and turmoil. If we wish to share the Hau-yen vision, we need only cultivate the samadhi which is like the images of the ocean. That means to become Buddha-like.<sup>2</sup>

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1. See The Fragmentation of Being and the Path Beyond the Void. Author’s manuscript.

2. page 74, Hau-Yen: The Jeweled Net of Indra, Francis Cook.

When we realize that the images in the sea are fishes we then realize that from their point of view they see their reflection on the surface of the water and the images of the birds as shadows beyond their reflection. So to the birds see their reflection in the surface of the ocean from the air. They see through their reflections the shadows of the fish below. Both the birds and the fish see the same thing from their own viewpoints. What is a shadow for one is a reflection for the other. From this we derive our understanding of the relation between the things of the physus and the formless no-things of the logos. Both of them collapse into the surface when we go beyond duality to non-duality where only Li and Chi are recognized.

What is fascinating is that the lattice of qualia that is produced by the symmetry breaking within consciousness has a structure which isolates the twenty sources beyond reflection and inversion. Reflection and inversion produces the shadows and the reflections of either side on the surface of the ocean. But within the surface itself there are sources of the upwelling phenomena that arise in existence. These sources are the key to the possibility of the reflective autopoietic dissipative systems unfolding into existence. They are nodes that only appear when we switch back and forth between the unitary and the dualistic view of the qualitative structure of the socius. We model them with the five groups of order twenty. Each group acts as a higher level of logical typing that allows catastrophic change from one regime of cancellation of opposites to another. The higher levels of logical typing form a hypercyclic ring. Thus the five hsing are extended to become group structures that interact as a hypercycle rather than as points which occur in the pentahedron of four dimensional space. This more complex structure of interaction occurs at the center of the sextahedron of five dimensional space. This is the minimum expression of the core of the socius or the reflexive autopoietic dissipative system.

Having mentioned the five Skandas as the model for the cyclical dynamic of presencing we can see that the causality from one cycle of the Skandas to the next is karma as it operates in the wheel of birth and death (samsara). That causality occurs through the perfuming of the alaya-vijnana or storehouse consciousness. Storehouse consciousness is intersubjective and not merely subjective.

Now according to the Secret Teachings, what must be understood, seen, felt, is that there does not exist any current which is my mind, and therefore it follows that there is not a plurality of currents which are the minds of other individuals, but only a single current which is Kunji namparshespa, the sum of all mental activity at work without any congizable beginning. It is in this totality that what we call our mind is immersed, our mind which we try so hard to separate and define. Furthermore, this effort is useless. Whether we are aware of it or not, the thoughts, the desires, the



needs which we feel for life, our thirst for it -- nothing of all this is completely ours, for all of it is collective, it is the flowing river of incalculable moments of consciousness having its source in the impenetrable depths of eternity.

Here is found, in another form, the conception of the Alaya vijnana, a mixture of “seeds,” themselves the fruit of acts, determining new acts by the effect of “memories” as the Indians say, or, as expressed by the Tibetans, of “tendencies.”<sup>1</sup>

Seldom is it expressed so directly in Buddhist literature that the alaya-vijnana is a model of the collective unconscious. That the tendencies of one moment are planted in the preceding moment and are seen as seeds of action that fructify given the right conditions in the next moment. These tendencies are the same ones that we discovered through the work of Johansson which appear at the level of Wild Being. They are the social matter out of which the world is made. And we find that there are twenty basic kinds of such seeds. The relation of these kinds of seeds is similar to the twenty amino acids in relation to the dna and rna complexes. The twenty amino acids are the basic building blocks that molecules are built using the DNA templates. DNA is a code with 64 words. Its structure is similar to the I Ching since  $4^3 = 2^6$ . These words describe through a code sequences of the twenty amino acids that are used to build up molecules of different types. So within the DNA structure there is the same possibility of twenty source forms that exist with the lattice of qualia in consciousness. But these express themselves physically as the twenty amino acids that are the building blocks of molecules used by the cell. Similarly the twenty sources beyond mirroring and substitution give rise to a specific set of kinds of tendencies that become the basis of all sociality. In our case these have been isolated and studied by J. Miller in his book Living Systems. There he isolates nineteen building blocks of all living systems. They are as follows:

- 1) *Reproducer*, the subsystem which is capable of giving rise to other systems similar to the one it is in.
- 2) *Boundary*, the subsystems at the perimeter of a system that holds together the components which make up the system, protects them from environmental stresses, and excludes or permits entry to various sorts of matter-energy and information.
- 3) *Ingestor*, the subsystem which brings matter-energy across the system boundary from the environment.
- 4) *Distributor*, the subsystem which carries inputs from outside the system or outputs from its subsystems around the system to each component.
- 5) *Converter*, the subsystem which changes certain inputs to the system into forms more useful for the special processes of that particular system.

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1. Alexandra David-Neel Secret Oral Teachings page 72

## Reflexive Autopoietic Systems Theory

6) *Producer*, the subsystem which forms stable associations that endure for significant periods among matter-energy inputs to the system or outputs from its converter, the materials synthesized being for growth, damage repair, or replacement of components of the system, or for providing energy for moving or constituting the system's outputs of products or information makers to its suprasystem.

7) *Matter-energy storage*, the subsystem which retains in the system, for different periods of time, deposits of various sorts of matter-energy.

8) *Extruder*, the subsystem which transmits matter-energy out of the system in the form of products or wastes.

9) *Motor*, the subsystem which moves the system or parts of it in relation to part or all of its environment or moves components of its environment in relation to each other.

10) *Supporter*, the subsystem which maintains the proper spatial relationships among components of the system, so that they can interact without weighing each other down or crowding each other.

11) *Input transducer*, the sensory subsystem which brings markers bearing information into the system, changing them to other matter-energy forms suitable for transmission within it.

12) *Internal transducer*, the sensory subsystem which receives, from subsystems or components within the system, markers bearing information about significant alterations in those subsystems or components, changing them to other matter-energy forms of a sort which can be transmitted within it.

13) *Channel and net*, the subsystem composed of a single route in physical space, or multiple interconnected routes, by which markers bearing information are transmitted to all parts of the system.

14) *Decoder*, the subsystem which alters the code of the information input to it through the input transducer or internal transducer into a "private" code that can be used internally by the system.

15) *Associator*, the subsystem which carries out the first stage of the learning process, forming enduring associations among items of information in the system.

16) *Memory*, the subsystem which carries out the second stage of the learning process, storing various sorts of information in the system for different periods of time.

17) *Decider*, the executive subsystem which receives information inputs from all other subsystems and transmits to them information outputs that control the entire system.

18) *Encoder*, the subsystem which alters the code of information input to it from other information processing subsystems, from a "private" code which can be interpreted by other systems in its environment.

19) *Output transducer*, the subsystem which puts out markers bearing information from the system, changing markers within the system into other matter-energy forms which can be transmitted over channels in the system's environment.<sup>1</sup>

Miller finds these nineteen functions on every emergent level where living systems operate. We can understand them as approximations to the faces of the twenty kinds of propensity. If we understand them this way they become more than just one man's category scheme for the building blocks of life. Instead, we see that these are expressions of fundamental propensities at the center of the social cognitive living system. When we analyze this scheme of Miller's we see that it can be put into the matrix of the Hsing against the receptivities only if we combine the input and outputs on the various levels together. This shows us that there were some unaccounted for gaps in Miller's categorization of subsystems. He seems to have forgotten about transformations and computational functions, about structural relations that are conserved within the system and about the nucleus of the system that contains the internal self definition (DNA on the cell level). If we fill these gaps then we get a complete picture of the subsystems as they inform the matrix of active principles against receptivities that represent the fundamental kinds of propensities. We can see each of these interfaces between the Yang and the Yin as proto-desiring machines that turn propensities into actualities. Each living system approximates them in some way because each living system is a nexus between an autopoietic ring of essential transformations and the content that is worked by those transformations. Each prototype desiring machine *wants* to do its part. Each is a point of collision between the essential kinds of work in an autopoietic ring and the social matter which is transformed into the substance of the living system.

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1. Miller; Living Systems; page 3

## Reflexive Autopoietic Systems Theory

*Table 26:*

Hsing	Earth Catalyst	Metal Autonomy	Water Space	Wood Function	Fire Time
fire	16) Memory	17) Decider	15) Associator	(compute)	14) Decoder
					18) Encoder
air	(structure)	12) Internal Transducer	13) Channel and Net	(transformer)	11) Input transducer
					19) Output transducer
water	7) matter-energy storage	5) Converter	4) Distributor	6) Producer	3) Ingestor
					8) Extruder
earth	10) supporter	(nucleus; genetic basis)	9) Mover	1) Reproducer	2) Boundary
	[self-support]	[self-definition; internal]	[self-moving]	[self-reproduction]	[self-definition; external]

Notice that the lowest level has the traits of the autopoietic system. Based on these traits then physical allopoietic production is constructed as a supplement to the autopoietic system. The next level added to these is that of transduction of sensory inputs and outputs. And the final level is the information processing level which operates on the basis of the transduction. We notice that Miller's description of the subsystems when organized according to this scheme creates a clear hierarchy that relates the meta-system of the fire level to the hardware of the water level via the intermediary interface layer that supports transduction. All these allopoietic layers are built upon an implicitly earth layer of autopoietic traits. Seen from this perspective it is a very sophisticated model with a lot of assumptions built into the differences between the subsystems.

One of the problems is that it treats humans as if they were information processors which is the normal model of cognitive science. Buddhism has a different model. It

is expressed in the relation between mindfulness, concentration and insight. In Buddhism meditation passes through these three phases. In mindfulness everything that one does is made the subject of awareness. Then on the background of mindfulness one concentrates very hard on one thing to the exclusion of everything else. Out of the dialectic between these two processes appears insight. Insight is into the nature of the self, i.e. the realization that it is empty. So from the perspective of the Buddhists the human being is not an information processor but one who ceases information processing by becoming mindful of everything one does including information processing and then by concentration on one thing to the exclusion of everything else. Out of this dialectic between the inclusion of everything in awareness and the exclusion of everything except the focus of concentration comes an insight into the nature of oneself and thus of consciousness, which is that consciousness and the physus that surrounds it is intrinsically empty. If we extend information processing from data, to information, to knowledge, to wisdom then what Buddhism tells us is that our real data is null, our real information is empty, our real knowledge is of nothing, and our real wisdom is of the void. The ultimate aim of the human being is to cease information processing which is based on cessation of thought. Human beings in their essential nature are not tied to production but to non-production. It is in non-production that insight arises. One can only have insights if one reflects which means stopping thought so that the insight comes to you in a flash of inspiration from out of nowhere. Thus there must be a level beyond the matrix of Hsing and elements which is formless and which supports the development of mindfulness, concentration, and insight. It is this level, the emptiness at the center of the living system which we must use to base our understanding of the actual differentiation and articulation of the living system. It must be the basis of our understanding of the unfolding of social processes. What we have seen here is that within consciousness there is a symmetry breaking in which a progressive bisection of qualia are produced. These lattices of qualia have more and more complex structures. At the level of  $2^6$  the twenty sources beyond mirroring and substitution appear. These appear as subtle kinds of tendency which also manifest within the physus/consciousness boundary as the interaction of the Hsing and the four elemental receptivities. From these arise the fundamental kinds of desiring machines which are more or less those that Miller identified. These appear as subsystems of higher and higher levels of living system beyond the socius. These interactional interfaces only appear at the level of the socius. We project them upward and downward in the emergent hierarchy from the point where they first appear. Thus the interactional surfaces appear as sources and basic kinds of desiring machines. We do not create our desiring machines from nothing and

there is no “god in the machine.” Instead just as with the DNA and Amino Acids the potential structure within the DNA is converted into an actual physical surrogate which is the means for unfolding the information within the DNA. Likewise the sources are the points of entry from out of the void but what comes into existence within an autopoietic system does so through the work of the different kinds of proto-desiring machines which draw from the interactional surfaces. In this way something that appears in potential within consciousness is actualized in physus as an array of specific kinds of mechanisms. These build up the autopoietic system into the allopoietic system on the physical level, then the transduction interface is produced which allows a purely computational level to be defined. The essence of this computational level is software and the turing machines that run that software. We have already seen how minimal social machines can be defined that might inhabit this computational infrastructure within the living system. But all of this revolves around the emptiness at the center of the cognitive/living system which manifests mindfulness, concentration, and insight. That cognitive living system is also social. It is at the social threshold of complexity defined by the reflexive autopoietic dissipative system that the interactional surfaces that indicate sources and kinds of desiring machines appear.

This is why constructivism is the only way to really find out how things work. Constructivism works with the relation of the fundamental kinds of potential which are the basis for the fundamental kinds of desiring machines which appears right at the surface between logos and physus and actually is embedded in that surface. This is the point of arising of all emergent events. Constructivism attempts dwell on this interface and be open to the arising of emergent events. Genuinely emergent events cannot be forced to appear. However, by practicing constructivism one can dwell on their possibility and thus be attuned to their arising when they do occur. Constructivism must be inherently social because the arising of emergent events is social at its core. The social structures that appear around the interface are autopoietic and highly non-routine. They give us access to the socius and the desiring machine levels of the field of consciousness. In the social structures of teams oriented toward the point of epiphany of the emergent system there is a kind of resonance set up so that the reflexive autopoietic system takes on the structure of the emergent event. In this configuration innovation is enhanced and social relations become very efficient between team members. It is these special social structures which it is the charter of autopoietic sociology to study using combinations of methods from social phenomenology (socialized consciousness) and computational sociology (socialized physus).

### 13. Realization

As we explore the structure of consciousness we realize that a fundamental problem which is little explored within the Western tradition is the relation between quantity and quality. Our model taken from geometry using the sphere to represent the domain of consciousness following Jahn and Dunne is based on the geometrical interpretation of numbers inaugurated by the Greeks. This interpretation gives some abstract qualitative understanding of numerical relationships. But geometry and other numerical approaches generally do not allow us to deal with the myriad qualities we perceive within consciousness. Now we can augment the simple model of the sphere by realizing that it is actually multidimensional or by realizing that if identity is its center and reality is its periphery then truth must be its radius. As such we see that the sphere actually represents the three implicit concepts within Being: Identity, Truth and Reality. Once we have realized that we may ask what the nature of the different combinations of these implicit concepts might be. This leads to the understanding that the “sphere of consciousness” has many facets depending on how you combine the implicit concepts. These facets give depth to the sphere of consciousness and produce a model of manifestation in the Western Tradition.<sup>1</sup> A summary of this model will be given here for reference.

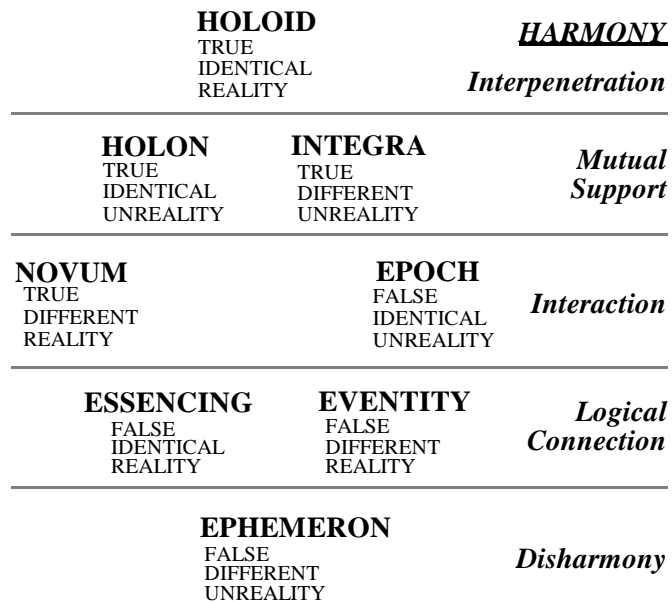
Figure 68: Binary relations between facets

		<u>Real</u> Projected by $\exists$		<u>Symbolic</u> Projected by truth functions	
		REAL	UNREAL	TRUE	FALSE
Imaginary Projected by copula	IDENTITY	Real Identity	Unreal Identity	True Identity	False Identity
	DIFFERENCE	Real Difference	Unreal Difference	True Difference	False Difference
				True Unreality	False Unreality
				True Reality	False Reality

1. See The Fragmentation of Being and the Path Beyond the Void for a development of these facets and an explanation of how they function as a model of Western manifestation.

## Reflexive Autopoietic Systems Theory

*Figure 69: Three way relations between facets*



As is clear from the diagrams one gets different fields of relations if you combine the implicit facets of Being in pairs or in sets of three. When we look at all the possible permutations of the three implicit concepts of Being we see that each combination has a different quality which range from identical true and real through six intermediary concepts to false different and unreal. I have glossed each of these combinations in order to portray its own quality. The sphere of consciousness which is centered on identity and with a boundary with reality contains thought which is made in terms of statements. When the statements are identical with reality then they are designated as true. When truth, identity and reality all impinge together rather than their opposites then consciousness is in the highest possible state of grace which I follow George Leonard in calling the Holoïd. However when consciousness is projecting unreality, is infected by difference with no center of symmetry and where only falsehoods abound then consciousness is in a state of confusion that can be identified with the ephemeral nature of illusion called the “ephermeron.” Each of the other stages exhibit some compromise between the extremes of harmony and disharmony. We use Chang’s stages of harmony to understand the differentiation between these extremes into levels. Starting with the extreme of dissonance we can move up the levels of the differentiation of the qualities of manifestation one level at a time. Each level has two faces. At the second level the difference between individuation and kindness appears as eventivity / essencing. At the third level the difference between novelty and continuity appears as novum / epoch. At the fourth level the difference between



the whole and the uniqueness of the individual appears as holon / integra. Finally the top of the series of steps appears with the interpenetrated holoïd of consciousness. This model serves to underline the differentiation of consciousness where we no longer see it as a geometrical homogeneous plenum. Rather we see it as a differentiation of modes of manifestation on a continuum between identity and difference, truth and falsehood, AND reality and unreality. Seeing consciousness in this way frees us from the naive assumptions of our geometrical model. It allows us to see consciousness as the same as manifestation or Being -- no longer a container for subjectivity but as phenomenology discovers it to be -- a multifaceted model of what can manifest on all planes of existence within the Western worldview. Within the combinations of the three different implicit concepts within Being there are the twelve specific interaction between each of these concepts and their opposites. These also form a field of differences which taken together gives an expanded view of the possible interactions of the different aspects of the field of consciousness.

#### **14. Processes Arising**

Now from theory we will attempt to come back down to ground by talking about how this impacts our understanding of processes. The main thing to understand is that processes are not continuities. They are based on a model that allows discontinuities and focuses on propensities. So we will redefine processes as *horizons* of work. When we start work given a plan we immediately throw away the plan and dive in. When we do this we discover a myriad of things never realized in the planning phase. Work arises as we perform our tasks. A process is a horizon on which work arises. So the processes allow us to orient ourselves to that arising work.

As work arises we place that work in our action list. We can model the individual worker through his action list. We assume that he is applying the basic steps of rational work and that he is executing some part of the overall tree of kinds of work by skipping either routinely or non-routinely between kinds of work. When he actualizes a kind of work he uses the data inputs to that kind of work to generate information that is context dependent. He applies his knowledge and experience. Thus his relation to work is not distanced as we might assume if we saw him as an information processor. Instead it is a full engagement that occurs as the person applies all their knowledge learned in many different forums and their gnosis that is based on the synthesis of knowledge and experience doing work. We might expect that such a full engagement can be mindful as well. That is to say we expect that the

worker will not be sleep walking but paying attention to all aspects of what they are doing. And we expect that within the field of mindfulness they are concentrating on very specific physical and cognitive tasks. Out of the dynamism between concentration, mindfulness, gnosis, knowledge, information processing, and data processing there arises insight. It is on the basis of insight that one “gets the idea” of what best should be done. At that point one may restructure the work entirely or decided that something else should be done perhaps by a different person, or that nothing should be done. Thus it is the interaction or full engagement of the person working with his work that allows the fundamental restructuring of work that causes discontinuities to appear. According to that insight maybe that person will reconceptualize how the work should be done to the extent of producing an innovation that causes all such work to be done differently in the future. Thus we see that by understanding kinds of work as horizons instead of set instructions we may see how what arises across that horizon may be an emergent event, or merely a local innovation, or perhaps merely a restructuring or redirecting of effort. But the concept of work as a horizon allow us to access the full range of options that our chaotic social work process model makes available to us in conceptualizing the flow of work. The plans need to be constantly re-done as we move through the work based on what we discover. The Evolutionary Spiral Process of SPC allow us to have a kind of lifecycle that will allow us to work in spurts and then consider what we should do next at appropriate points along the way. The entire spiral of work is parsed into cycles. Each cycle is composed of Assessment of the Situation, Risk Assessment, Planning, Applying kinds of work, and Synthesis of work getting ready for the next cycle within the spiral. This model allows us to understand work as humans do it in spurts instead as an illusory continuity of effort that appears on schedules. But what we add is a fundamental paradigm of the kinds of work performed in the “working” sector of the cycle. In that sector the team member is intuitively jumping between a set of kinds of work that are leaf nodes on the tree of all kinds of work. The individual may be performing several such roles concurrently in different spirals. Thus agency may be split up within the individual as well as the kinds of work. At each moment he can dynamically re-structure his agency commitment or re-structure the kinds of work he is doing. This re-structuring can be radical so as to produce discontinuities in the stream of work. The most radical is to stop a particularly thread of work completely and to start a completely unrelated one in a different role. Form that there are gradations all the way back up to the illusion of a continuous level of effort applied to some task. As the selected subset of kinds of work being performed are done the individual is continuously discovering new things to do which may get added to the action list of this

individual or be communicated to some one else. As a horizon each kind of work sets bounds on what can be discovered in a particular realm. However, these limits are only guidelines and are not fixed in any way. While doing one thing one may realize that something completely unrelated needs to be done. But for the most part one explores within the context of the kind of work being enacted at any one time. As one explores one finds new things no one thought of that need to be done. This is a process of manifestation. Production is manifestation through action. In Miller's schema production covers transformation and computation as well. But it is better to separate these out and make it explicit which level of subsystems we are operating on within the ring of essential kinds of work. Our normal model for work is routine manual skilled or unskilled. Such work only discovers what needs to be done within a restricted horizon. In engineering work the horizon for discovery of what needs to be done is very wide. It is widest at the Systems engineering level but is also still very wide at the software engineering level. This is what makes the work non-routine. When you discover something new about the work you are doing it makes you switch to some other kind of work to handle that real time or somehow manage the appearance of new work. Management interrupts are mostly externally generated whereas engineering work interrupts are mostly internally generated as one has ideas of what else needs to be done in the course of doing the engineering work itself.

Now when we realize that any really complex task must take a group of people working together one sees that exactly the same thing occurs on the social level for the team. The team through its members executes a set of kinds of work which are all horizons for the discovery of new things which need to be done. As this new work is processed more may be discovered. But in a team there is constant communication about what is being done and what is discovered that needs to be done that cannot be handled at just the level of the individual team member. So these horizons exist within the individual that multi-tasks between roles, at the level of the individual, and at the team level. As the project progresses usually the discovery rate is overtaken by the production rate. However, there is always some level of discovery associated with every kind of work throughout the project as long as a particular kind of work is being done. This is the fundamental nature of kinds of work which is not addressed by current forms of process definition and enactment strategies. It is this basic aspect of kinds of work that needs to be taken into account if our process definitions and enactments are going to be in line with the actual dynamics of work as performed in current organizations. If it is not taken into account then processes will be rejected because it will have the effect of

freezing practice within the organizations and stopping innovation and creativity. In this scenario the processes will have the opposite result of that desired as they will represent a work to rule mentality which refuses to recognize new work, refuses to reconceptualize work, and refuses to grow and learn. Only if we take the chaotic social work process model seriously will we avoid making this mistake. Work processes are not continuous, but shot through with discontinuities and chock full of propensities that can be turned into opportunities if we can only recognize them by thinking about what we are doing before, during, and after acting. The chaos of the physis is the fog of war. That fog clears occasionally as the clearing-of-being appears within it giving us a moment of consciousness within midst of the fog. Out of this clearing comes the qualitative way of looking at process in terms of the flow of Chi and the patterning of Li which forms a grid through which we can get a sense of the quality of what we are doing. It has been said many times that quality of the product comes out of the quality of the process. But how? Well that occurs because the moment of the clearing-of-being occurs in the midst of the fog of war. Quality comes out of this clearing and we can project it as a grid on the fog or cloud of action. When we understand the quality of the fog of action based on this grid that appears within the clearing then we are able to control that action to make it better quality and that causes the products to have better quality as spin-offs of the processes. Quality is something we can recognize in our consciousness which tells us something about the flow of actions that impacts the results of those actions. We cannot put quality directly into products because the quality they have is the imprint of our consciousness on them. If we are conscientious in what we do it shows up in the results we produce. If we are mindful as we do work then we turn it from being a drudgery into being a craft and a skill of which we can be proud when we exhibit mastery. Mastery is the key to understanding work. Mastery means that one has organized oneself in such a way that one's performance is based on insight which comes from concentration, mindfulness that resides at the empty center at the heart of the vortex of action. It is Mastery of the processes as kinds of work that we perform professionally that can only be gained if we understand the nature of our work. Our work goes deep into the nature of manifestation within our worldview. It embodies all the different kinds of presencing which have been discovered by modern ontology. And when we work as teams as we increasingly must we end up embodying the emergent event in the structure of our teams. The emergent event is the deepest kind of change that can occur within our worldview and our work has the continuous possibility of producing an emergent event. When we apply ourselves within teams that "click," spontaneously order themselves, and within that team's kinds of work an emergent event occurs then at that moment some level

of our worldview is changed forever. We have experienced the utter depth of manifestation within our worldview. At that point the social organization and what arises in manifestation to that social organization were in complete harmony. At that moment cancellation of the worldview itself occurs momentarily. We all enter a clearing in the chaotic fog of our worldview. And within that clearing-of-being that cancels completely for an instant the deepest possibility of manifestation within our worldview actualizes itself.

Such an event were the emergent event occurs to a socius organized as a reflexive autopoietic dissipative system, where what manifests and what it manifests to are both in harmony is the ultimate goal autopoietic sociology. Autopoietic sociology uses this measure to understand all other social formations within our Indo-European worldview. Because that advent of the emergent event to the autopoietically organized socius is the actualization of the empty center of the vortex of work within our worldview. It is the moment when everything goes completely dark because one is stunned by the brightness of the light as nihilistic opposites resolve themselves momentarily. Vernor Vinge has called this moment the “technological singularity,” and the brothers McKenna<sup>1</sup> call it the point of the end of history. It is a moment out of time which defines all time. It is a way of working that defines all work. It is a momentary ending which defines all beginnings and all points along the way to our many disparate ends. It is the ultimate object of autopoietic sociology that organizes all of our society. It is the opposite of the always lost origin of Derrida and Heidegger. It is the difficult to find social origin that is always embodied and organizes all embodiment as the process of projecting our world in manifestation. Everything is organized around this possibility which we have a propensity to bring into existence and which is fated for us as a wild point fluctuation within the probabilities that we actualize.

## 15. Conclusion

This series of papers has presented a lot of wild ideas. That was its object because we can only experience the full depths of manifestation within our worldview by entering the realm of Wild Being and attempting to abide there momentarily in repeated elliptical passes and valiant attempts. The ideas presented here are highly speculative and necessarily so because we can only enter this savage territory of thought by groundless speculation. But just because something is the result of speculation and other flights of fantasy does not mean they are not worthy of our

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1. See [The Invisible Landscape](#)

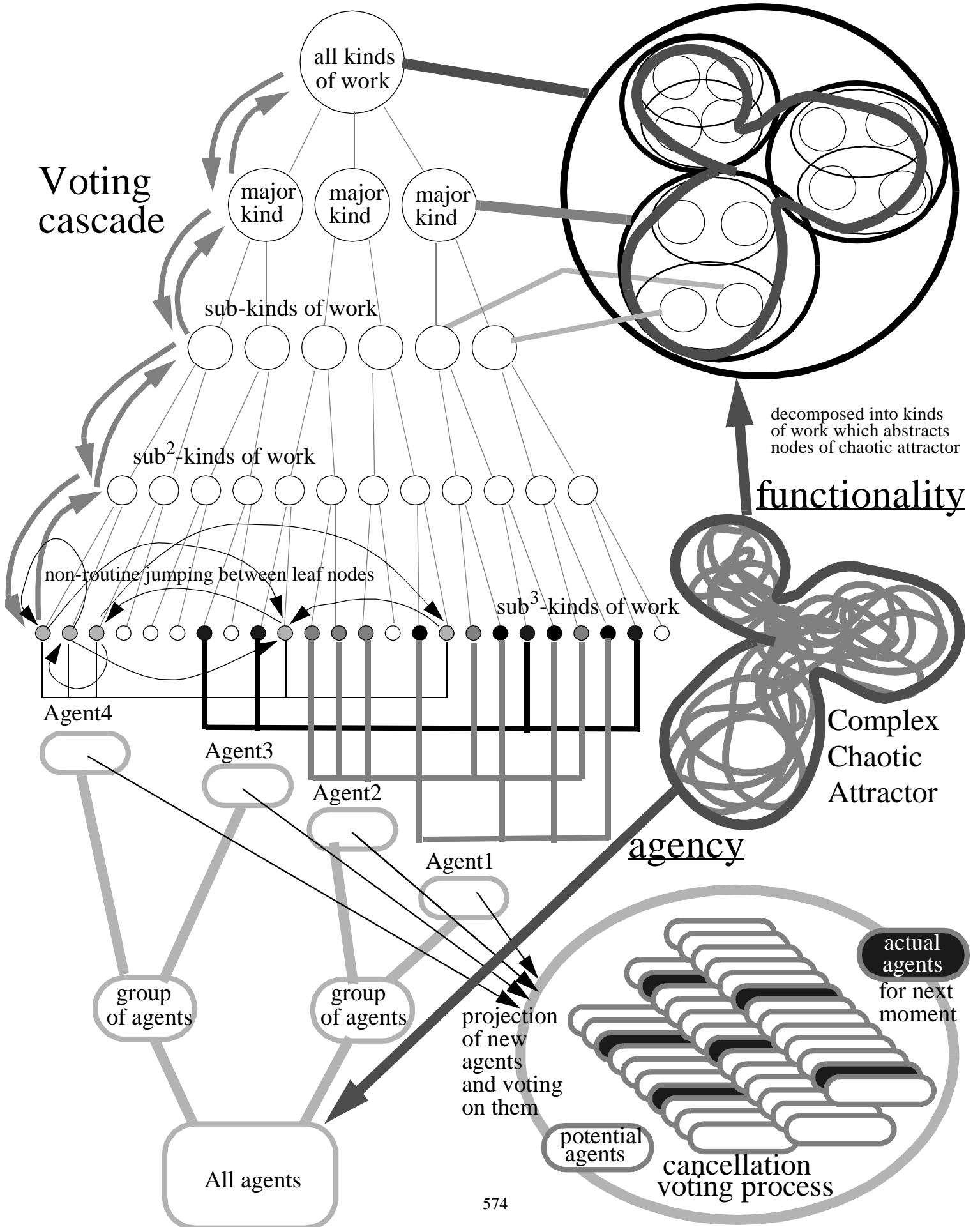
consideration. We follow Feyerabend's dictum "anything goes." So we have sought widely in Chinese philosophy and Buddhism what we need to build a theory of reflexive autopoietic dissipative systems. That is to say a radical theory of the social as the focus of the manifestation of the emergent event. We have looked closely at work (the ultimate locus of presencing within our worldview) and attempted to come up with a new model of work process that is inherently social and is not continuous but based on chaos. This has led us to formulate new kinds of sociology as a sociology of the emergent. We have formulated autopoietic sociology as the interface between social phenomenology and computational sociology. We have done our best to produce a new perspective on sociology by orienting it toward gnosis (experience + knowledge = wisdom) beyond the sociology of knowledge. All this we have done in order that we can understand better the relation between the socius, the individual and the desiring machines that protrude from the unconscious and that make up the individual. The social construction of emergent worlds rests on deep ontological foundations which have been explored. These foundations are explored further in the authors book: The Fragmentation of Being and the Path Beyond the Void where the underpinnings of the Western worldview are made manifest. For if we are really going to understand the social construction of emergent worlds we need to understand the roots of the autopoietic view of social organization and its intimate relation to manifestation. When we build virtual realities as places to do work then we will need all the resources we can muster of every type to understand that bizarre landscape that is constantly changing and getting out of control. This series of papers has been a first attempt to gather those resources from where ever we might find them and proceed by constructivism to throw together a viable socially constructed emergent world within which to try out these fragments of ideas.

That world exists for me in the philosophy and autopoiesis email lists I have founded on the internet. There are universes of discourse some of which take off around which people gather from across the planet to participate in thoughtful conversation. The work that appears in these papers have been nurtured in this virtual environment of the thinknet lists. Many of the ideas have been explored there first. The on-line world net is an emergent event of the first order and if we can get self organizing communities of discourse to form there then the conditions of the event of autopoietic sociology might be fulfilled. It is an intellectual adventure of the first order and we can all be a part of it as we participate in the social construction of emergent worlds together<sup>1</sup>.

## Reflexive Autopoietic Systems Theory

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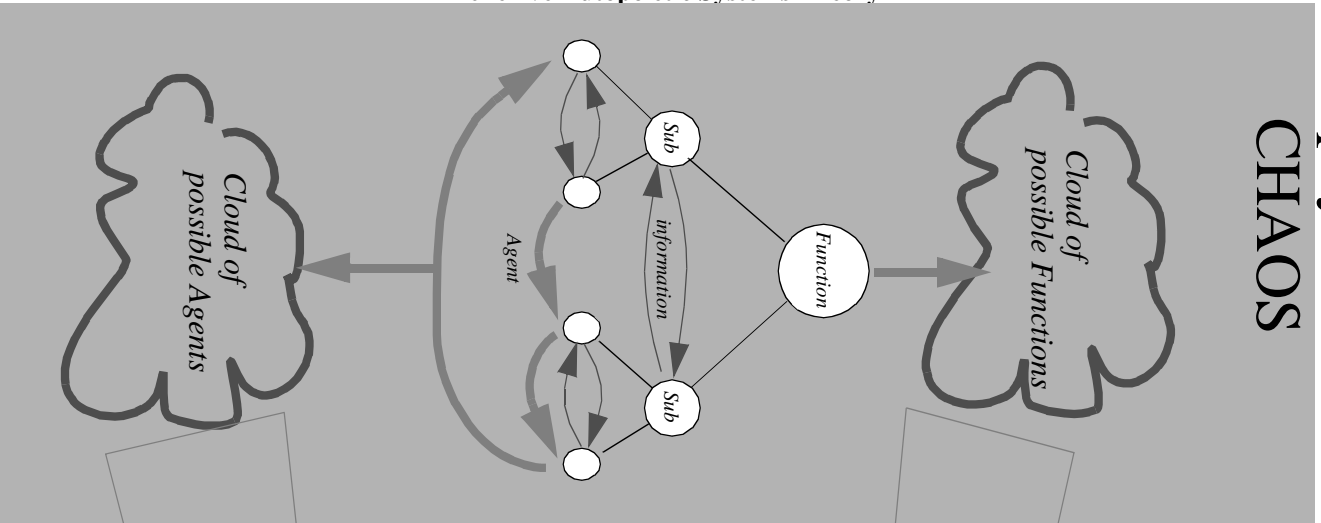
1.To join send a message to [thinknet@world.std.com](mailto:thinknet@world.std.com).





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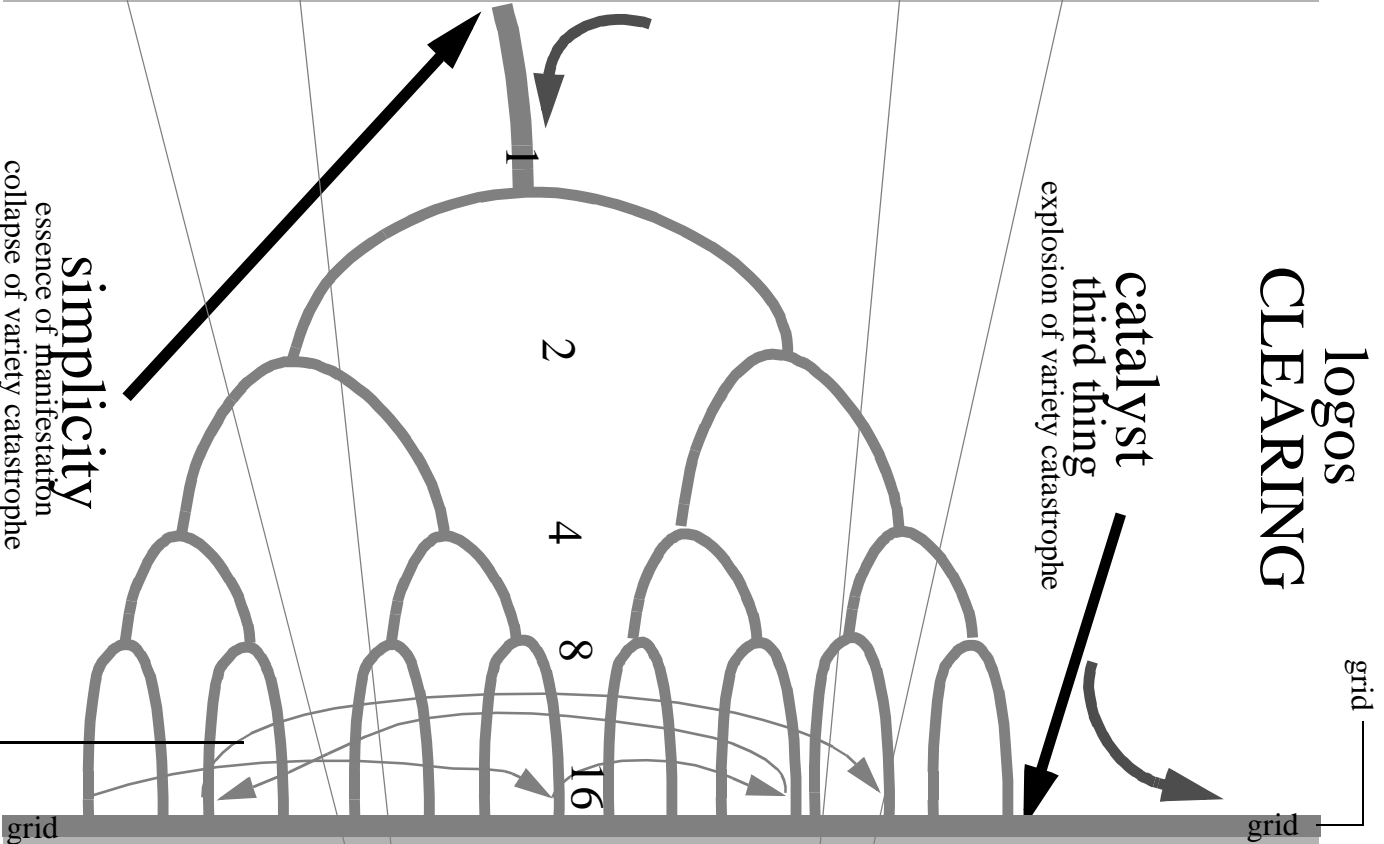
CHAOS



logos

CLEARING

catalyst  
third thing  
explosion of variety catastrophe

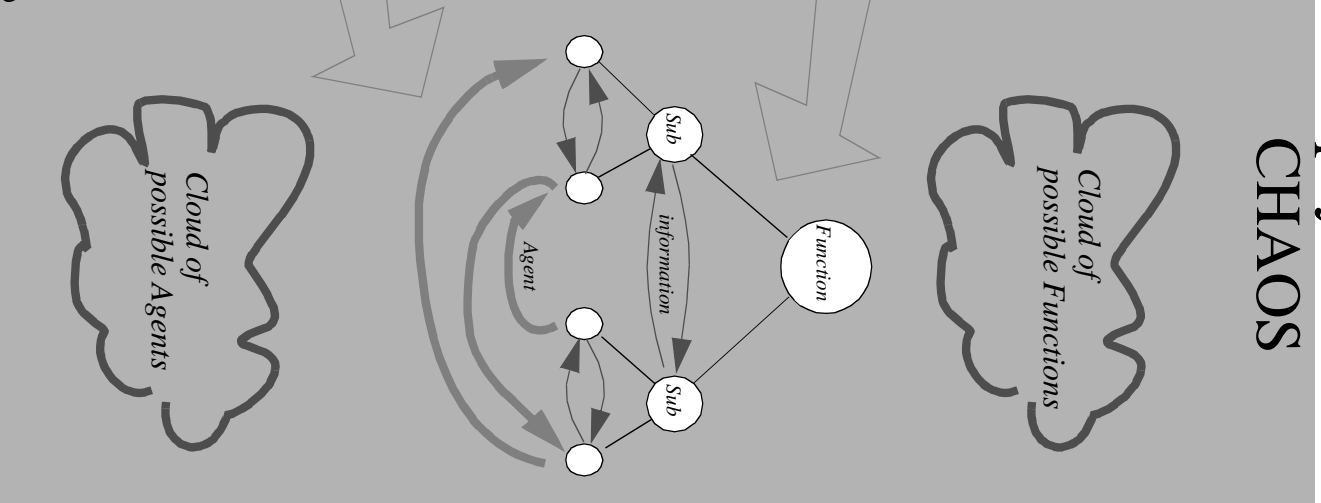


grid

grid

physus

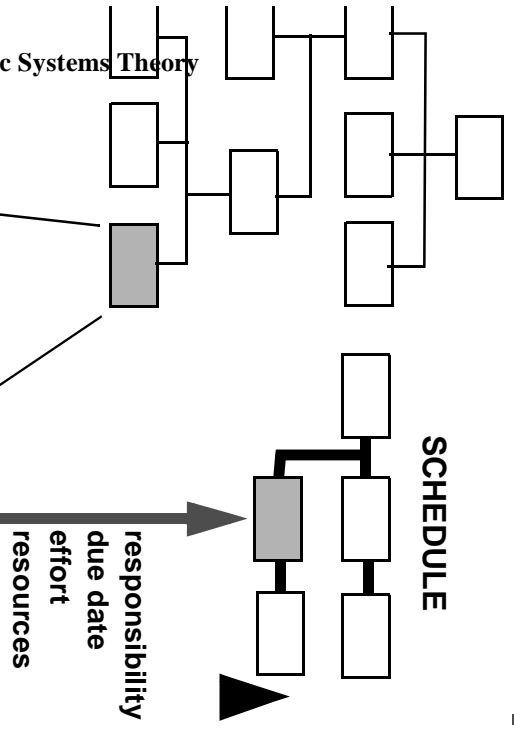
CHAOS



Jumping around between system states

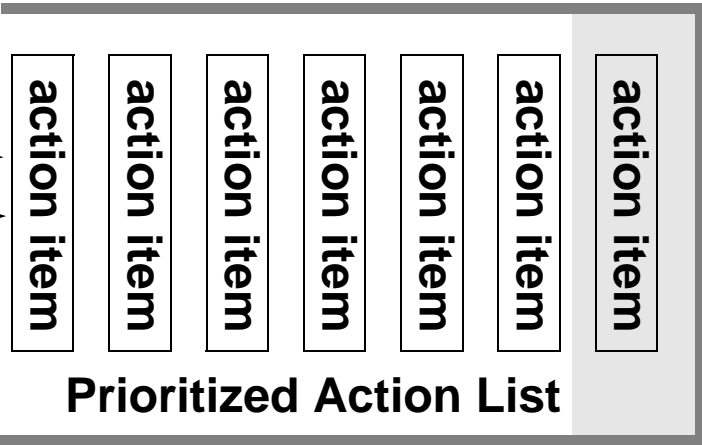
# PLAN

Work Breakdown Structure



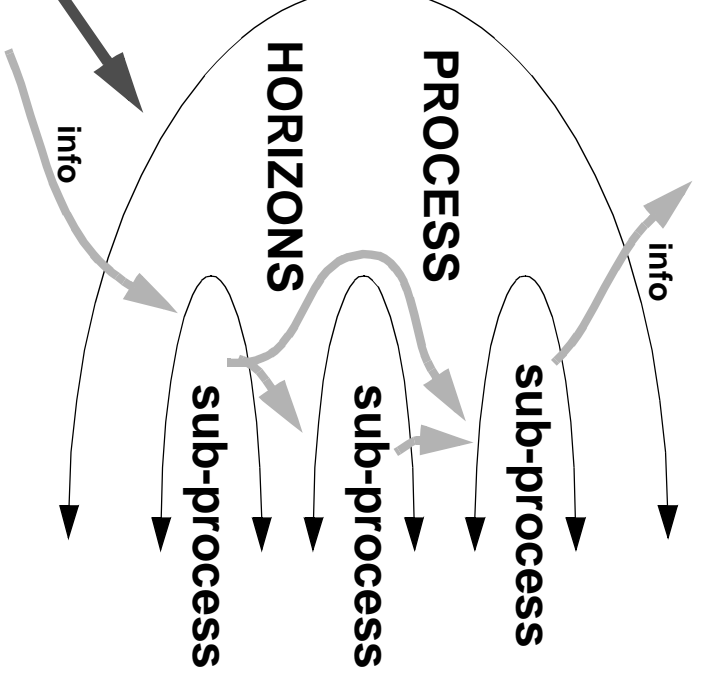
# Current Situation

What individual or team can relate to is day to day action lists



**WORK PROCESSES**

- o generic kinds of work
- o places to dig
- o do not replace judgement
- o curtails unnecessary variety
- o information flows not artifacts
- o guidelines only



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