

Reflexive Autopoietic Dissipative Special Systems Theory:

An Approach to Emergent Meta-systems through Holonomics

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0. Summary:

A newly discovered approach to extending General Systems Theory as defined by George Klir through a set of Special Systems is described. General Systems Theory is distinguished from the theory of Meta-systems. Then, a hinge of three special systems is identified between systems and meta-systems. These special systems are defined by algebraic analogies. Anomalous physical phenomena are specified that exemplify the structures defined by the algebraic analogies. The extraordinary efficacious properties of these special systems are explained. These include ultra-efficiency and ultra-effectiveness. These three special systems are called dissipative, autopoietic, and reflexive. They are anomalous within general systems theory and provide a bridge between the theory of systems and the theory of recursive meta-systems. This extension of Systems Theory allows us to move step by step through a series of emergent levels up to a comprehensive Meta-systems Theory. In that theory the different special systems fit together to produce the inverse of General Systems Theory which is called Emergent Meta-systems Theory. Emergent Meta-systems are composed of the meta-operations which appear at each level of algebraic emergence from the system through the three levels of special systems. Each level can be seen as a meta-operator within the overall structure of the Emergent Meta-system. Together these operations produce a theoretical model of the meta-system. Historical examples of artifacts with the structure of the Emergent Meta-system are pointed out. Four different series of anomalous physical, logical and mathematical structures are related which give different views of the special systems. Besides the series of solitons and the various other physical phenomena that exemplify ultra-efficiency we also look at the series of topological structures of which the mobius strip and kleinian bottles are the best known examples. These other mathematical and physical phenomena which indicate the nature of the special systems elaborate on the structures established through the algebraic analogies. In general we are indicating a new set of anomalous systems that may be used to extend and enrich general systems theory and build a bridge to a complete meta-systems theory. The special systems form the underlying basis of Meta-systems theory because it is through their interaction that they form the Emergent Meta-system. By recognizing this peculiar state of affairs we both found the General Meta-systems Theory and a Holonomics that deals with the Special Systems Theory at the same time.

Keywords: Systems Theory, Dissipative Systems, Autopoietic Systems, Reflexive Systems, Recursive Systems, Meta-Systems, Meta-systems Theory, Ontology, Existence, Emergence, Social Phenomenology, Social Theory, Ultra-efficacy, Ultra-effectiveness, Ultra-efficiency, Holonomics, Complexnion, Quaternion, Octonion, Sedenion, Algebra, Hyper-complex Algebras, Soliton, Soliton Breather, Instanton, Soliton Super-Breather, Super-Conductivity, Bose-Einstein Condensate, Super-Fluidity, Mobius Strip, Kleinian Bottle, Hyper-Kleinian Bottle, Lemniscate, Autogenesis, Computational Sociology, Autopoietic Sociology, Social Construction, Reflexive Sociology, Sociological Theory, Autogenesis, Gaia, Supra-rationality, Paradoxicality, Nihilism, Non-nihilistic Distinction, Gestalt, Flow, Proto-Gestalt, Proto-Flow, Environment, Context, Situation, Milieu, Propensity, Disposition, Tendency, Field.

1. Introduction

This paper will strike many as strange and peculiar because it goes against many of the fundamental presuppositions of the Western scientific approach to phenomena. In fact, it produces a bridge for understanding alternative scientific traditions such as those found in China and Islam and traditional sciences that are considered non-scientific from the narrow perspective of Western philosophy of science like Acupuncture and Homeopathy. In effect a more sophisticated and elegant form of science, that can be seen as an extension of normal Western science, is developed based on the understanding of meta-systems and some very special anomalous systems. The understanding of this extension is timely because it is precisely the misunderstanding of the environment which has led to the global destruction of our planetary environment. It is posited that these alternative scientific traditions and their traditional sciences have a much greater sensitivity to environmental concerns. This extension shows how we can both incorporate those concerns ourselves and extend our Western science to support that understanding and so benefit from the wisdom of traditional sciences developed within other worldviews down through history.

Ostensibly this paper is an introduction to the theory of Special Anomalous Systems that are seen to exist when we extend Formal Structural Systems Theory, such as that produced by George Klir, toward the realm of Meta-systems. Thus, it can be seen as developing a theory within the domain of General Systems Theory broadly conceived. However, since Systems Theory touches every discipline that attempts to isolate and describe systems, the presented here theory has very wide and deep implications for most scientific disciplines. Of special interest is the implications for Sociology because the theory is based on a philosophical Social Phenomenology and attempts to extend the biological concept of the autopoietic special system into the social realm. It aims at defining rigorously the social in terms of reflexivity in the tradition of philosophically oriented sociologists such as John O'Malley and Barry Sandywell. However, this extension is based on a previous extension from the physical dissipative special systems developed by Prigogine to the picture of living biological autopoietic special systems developed by Maturana and Varela. The paper proposes a new special systems and meta-systems theoretic basis for understanding and grounding our approach to social phenomena as reflexive¹. However, because it ultimately finds that Special Systems Theory describes precisely the Meta-systems, this paper also has much to say about the foundations of ecology and environmentalism and specifically gives us an interesting and new concept of Gaia, the living and cognitive meta-environment.

1. A precursor to this work is that of Arthur M. Young [1976] *Reflexive Universe*. Delacorte Press / Seymour Lawrence. This becomes evident if one reads Appendix II of that book on why the number seven is used as a basis of his category schemes. However we offer a very different categorical interpretation of the underlying mathematical basis which he appears to have appreciated before our work..

There are four basic disciplines related to Systems Theory of which three are defined for the first time in this paper. The first discipline is General Systems Theory which we take George Klir's Architecture of Systems Problem Solving to be the best representative. It is a good generalization of a Formal Structural Systems Theory. From this basis we project General Meta-systems Theory being concerned with systems of systems and we interpret these are environments of systems. Then between these two extremes we posit two other disciplines called Special Systems Theory and Emergent Meta-Systems Theory. Special Systems Theory amounts to the Holonomics as it concerns structures that are both whole and part yet neither precisely whole or part. Emergent Meta-Systems Theory concerns the meta-structures that occur when you combine normal emergent systems with the special systems to produce a dynamic cycling structure called an Emergent Meta-system. The Emergent Meta-system is posited to be the underlying dynamic of Existence beyond Being. Special Systems are posited to be an indication of the infra-structure of the Void. The Meta-Systems Theory includes both of these in an over arching theory of interpenetration of all things which are considered empty existences. This paper projects Meta-Systems as a means of situating Special Systems and then describes Emergent Meta-systems. It then shows how these two intermediate representations allow us to re-comprehend Meta-systems by the use of the new conceptual tools that have been developed.

2. Systems and Meta-systems

Instead of looking at systems as objects² we maintain that they are social gestalts³ and we do not divide them into sub-systems and sub-sub-systems, but instead contrast the systems view that sees the super-system as a social gestalt with a different way of looking at systems called the meta-system approach⁴. The view of the nested complex super-system is the opposite of the denested and deconstructed Meta-systems view. The Meta-system is the view of a system that occurs when one takes it apart and forms a field of disassembled mutually implicative parts. This view might also be called the proto-gestalt which underlies the pattern of gestalts seen from various viewpoints on the system. These various views and their gestalts have an inner relation that David Bohm⁵ called an "implicate order" that unfolds as we move from viewpoint to viewpoint and see a series of gestalts. The implicate order is the relation between the external coherence of a phenomenon which Husserl called the noematic nucleus and the internal coherence of the phenomenon which he called the essence⁶. Or we might say that the Meta-system corresponds to the design

2. As does George Klir in *Architecture of Systems Problem Solving*. op cit.

3. Köhler, W. [1929] *Gestalt psychology*. H. Liveright, New York. See also, Koffka, K [1935] *Principles of Gestalt Psychology*. New York.

4. Gigch, John P. [1991] *System Design Modeling and Meta-modeling*. Plenum Press, New York. See also Wilden, A. [1987] *The Rules are No Game*. London, Routledge Kegan Paul.

5. Bohm, D. [1980] *Wholeness and the Implicate Order* London; Boston: Routledge & Kegan Paul.

landscape out of which the system as a whole arises⁷. Meta-systems have two properties as the background out of which systems arise: They are the *origins* of systems and they are the *arena* within which systems communicate and cooperate or engage in conflict. Many different possible systems might arise from the same design landscape. When certain specific ones are embodied then suddenly the design landscape becomes the arena within which the embodied systems cooperate or conflict and co-evolve. Within this arena systems prove their fitness and those best adapted to the meta-system ecological environment persist longest or at least until there is a catastrophic change in the meta-systemic milieu. These two aspects of the meta-system provide a general structure in which evolutionary adaptation of complex systems may take place. When the meta-system plays these roles it is switching back and forth between its complementary aspects of origin or arena. Meta-systems are best modeled with systems-dynamics type models except in the meta-system positive feedback in each direction can go out of balance and destroy the dynamic balance of negative feedback. When positive feedback goes out of balance it can spiral off in either a positive or negative direction producing either a black hole (catastrophe) or miracle (windfall) in the meta-systemic landscape. Also that landscape can be inhabited by singularities which are utterly unexpected anomalies. If systems-dynamics⁸ models are allowed to go ‘out of control’ then they model the meta-systemic environment very well.

We tend to mix up systems and meta-system views of phenomena because we do not have a good word for a meta-system that abstracts its essential characteristics, instead we are left with a hodgepodge of words like ecosystem, environment, situation, context or milieu⁹. However, systems and meta-systems are very different views that can be applied to the same phenomena. Yet, in most disciplines the systematic view predominates and genuinely meta-systemic approaches are exceedingly rare. One notable exception is the discipline of ecology. Taking the meta-system view one sees the phenomena as a field of parts that are implicitly related to each other, but disassembled, while the other view sees those parts as assembled into a working system. For instance, in Software Engineering the program design is meta-systemic while the executing program may be seen as a system. These two views of phenomena and the ability to switch back and forth between them allow us to see things as what Arthur Koestler¹⁰ called “holons.” That is to say, as kinds of entities that have one face facing down within the hierarchy of subsystems and while

6. Husserl, E. [1958] *Ideas; general introduction to pure phenomenology*. Volume 1; London, Allen & Unwin; New York, Macmillan.

7. A model of such a design landscape could be the NK permutational fitness surfaces presented by Stuart Kauffman in *The Origins of Order* [1993] Oxford U.P. and *At Home In The Universe* [1995] Oxford U.P.

8. George P. Richardson [1991] *Feedback Thought in Social Science and Systems Theory*. Philadelphia, University of Pennsylvania Press.

9. All these terms are imprecise.

10. Koestler, A. [1978] *Janus, A summing up*. London: Hutchinson.

having the other face facing upward in that same hierarchy. Holons are two faced like the god Janus always presenting a different face to the whole of which it is a part from the face it presents to the parts for which it is a whole. A holon¹¹ is defined here by means of our ability to switch back and forth between the system and meta-systemic views of things. The holon is the rare point at which the meta-systemic and systemic views overlap and coincide. In order to have a sustained holonomic picture of things that are nested within super-systems, but also contain nested sub-systems, it is necessary to find a pivot that allows the observer to continuously change views from macro to micro within the layered super-system. The holon is what lies between the micro and macro viewpoints that cannot wholly be seen from either. The reversibility between part-whole and whole-part indicates the nondual chiasmus between the two viewpoints which can only partially be seen from either. The study of the special systems elucidates that pivot that exists as a hinge between the system and meta-systemic views of things. This study of the meso-level between macro and micro will be called Holonomics¹². Holonomics is the study of the nomos of the holons. Nomos is the intrinsic ordering that exists beyond the dualism of Logos and Physis. Both holons and nomi are meant to be understood as nondualistic concepts in contrast to the dualistic concepts we normally use to attempt to dissect systems in our theorizing.

As has been mentioned there is no good word for meta-system in our normal vocabulary. If I were to suggest a name it would be Archon. The archons were the leaders of the city in Ancient Athens who held power beyond the power of the King. If we consider the King and his domination to be Barbaric Domination of the Subject and thus a restricted economy, the Archons represented the general economy of the city. Archons are the origin for the word Archetype which is derived from the use of the word Archon by the Gnostics. We repudiate the Gnostic connection, but think that the association with what Jung called the Archetype is appropriate. Archons mean the essential characteristics shared by non-things like the field, ecosystem, environment, situation, context, milieu, etc. within which the system has its origin and which provides the arena within which systems exist and cooperate. The perfect analogy is that of the application program within the "operating system." Another good example is the relation of the Turing machine to the universal Turing machine. The best developed discipline in the Academy in terms of thinking about meta-systemic archons is Ecology. But also the field theories in physics are very good examples of highly developed meta-systemic models.

Now what we should consider is the relation of the system to the meta-system. Because all of the other levels of the ontological hierarchies are merely images at different levels of Being of this primary relation. Illusion itself is the fusion or

11. Bahm, A.J. [1984] "Holons: Three concepts" in *Systems Research* Volume 1, Number 2, pp. 145-150, Pergamon Press.

12. Jeffrey S. Stamps [1980] *Holonomy: A Human Systems Theory*. Intersystems Publications, Seaside, CA.

integration of all the kinds of Being. We get the best picture of the system-archon relation when we consider this ideal type. A system is a social gestalt and an archon is a social proto-gestalt. A proto-gestalt has implicate order while a gestalt has explicit order. The dual of a gestalt is a flow and the dual of the proto-gestalt is the proto-flow. Gestalts and flows may either be synchronic or diachronic. A synchronic gestalt is perceptual, or even conceptual. A diachronic gestalt is also called a temporal gestalt¹³, it is a gestalt that persists through time and only becomes whole across a span of time. William James called this aspect of time the *specious present*¹⁴. G.H. Mead says it was the time something needed to be itself. A synchronic flow is a timelapse snapshot of a flow. A diachronic flow is what we normally think of as a flow like a river. This is a precessing flow, in the sense that change is changing so that a differential between changes is created. Proto-gestalts and proto-flows are also synchronic and diachronic. The synchronic proto-gestalt is hidden ordering behind the succession of gestalts. A diachronic proto-gestalt is made explicit by the rendering of the multiple gestalts explicitly that it entails. A synchronic proto-flow is hidden changes not yet appearing overtly. Diachronic Proto-Flow makes changes explicit.

- Synchronic Gestalt (perceptual or conceptual gestalt) Figure on Ground.
- Diachronic Gestalt (temporal gestalt) Event on Context.
- Synchronic Flow (timelapse flow, like timelapse photograph of a waterfall that captures the general activity in a blur) Foreground stream moving past background reference point.
- Diachronic Flow (precessing flow, like river where differential changes are taking place simultaneously which we apprehend all together as a general impression.) Background changing in relation to itself producing its own context against a timing event.
- Synchronic Proto-Gestalt (implicate ordering) Origin. Various inks of different colors are in solution and are invisible. At the origin what might unfold and how it might unfold is invisible.
- Diachronic Proto-Gestalt (explicitly ordering) Arena. Various inks are rotated out of solution one at a time and are thus made visible in a sequence. Each rotation of an inkblot out of the solution is a repatterning of the arena within which systems interact.
- Synchronic Proto-Flow (implicate changing) Source. Solution changes with respect to a particular kind of Ink. The solution is the meta-environment for the inkblots held in suspension and mixed into the solution. The source is when the meta-environment changes and thus gives us a new and different proto-gestalt. Consequently the source is deeper than the origin. The source is the inner differentiation of possible origins.
- Diachronic Proto-Flow (explicit changing) Oceanus or Encompassing Stream. Solution changes in respect to itself producing its own context against an Inking event. The solution as

13. This same idea has been discovered independently by Patrick McKee and Carol Quinn of Colorado State, Fort Collins, as seen in their article "Temporal Gestalt: A Concept for Quantum Theory" in *Methodology and Science*. Esser Scientific Press Netherlands. (date and volume unknown)

14. Stroud, J.M. "The Fine Structure of Psychological Time" in *Annals of the N.Y Academy of Science* 138 (2) 623-631

meta-environment encompasses the environment with its implicate order. When the solution which is like an ether changes in relation to itself then we have an encompassing change that effects everything within the meta-environment or domain.

If you have looked at David Bohm's Wholeness and the Implicate Order¹⁵ then the reference to ink will be clear. He uses ink mixed into solutions which can be unmixed and brought back out of the solution by reversing the stirring process precisely as the prime example of the possibility of implicate order. We assume that there are actually multiple inks in the solution and that each can be separately unfurled to make them visible if necessary. Any particular gestalt we look at is an example of an ink-splotch within the solution which was rotated out. The splotch is like a Rorschach test and contains both figure and ground. The figure is a form and the ground is a meta-systemic archon field. The proto-gestalt is an ordering of the gestalts implicit in the field and thus it is related to Polyani's concept of Tacit Knowledge. Our tacit knowledge of our environment has to do with the understanding of the underlying social-proto-gestalt. But just as gestalts are not just perceptual, but also temporal and have their duals in timelapse and precessing flows, so too the proto-gestalt is not just this implicate patterning. It is also the unfolded proto-gestalt which is a temporal unfolding of each gestalt blob in a particular order. It is also the synchronic proto-flow in which the solution within which the social gestalt is suspended changes with respect to the blob, this is kind of like the idea of ether moving in the physics of yesteryear. The diachronic proto-flow is where the ether changes in relation to itself in relation to a timing event. Thus, we can see differential changes in the ether like the differential changes in the flows that go through the ether. Here the ether means the meta²-system¹⁶, that is the context of the situation or domain.

When we hear about Holonomic Nonduality and its relation to processes of life and consciousness we have no technical vocabulary to talk about how these

15. op.cit.

16. While the Meta-system is composed of Source (sink) / Stream (cause) :: Origin (destination) / Arena (boundary) in the Meta²-system these are accompanied by their duals Generator (destructor) / Encompassing Regress :: Singularity (anomaly) / Subspace Regress. The sink is the outflow opposite the source of inflow from nowhere by which the system enters the meta-system. The encompassing regress is the infinite extent of the n-dimensional encompassing domains which can be seen in the simplest regular polytope in each n-dimensional space which follows the Pascal Triangle up toward infinity. The singularity is the point of catastrophe such as that described by Rene Thom which describes where the order from nowhere enters the environment. The subspace regress is the negative dimensionality where the infinite regress of hyper-complex algebras and non-division algebras exist which follow the Pascal Triangle up toward infinity. The generator (destructor) is the algorithm or production mechanism by which that which flows from a source is produced. Concerning *Catastrophe Theory* see Saunders, P. T. [1980] *An introduction to catastrophe theory*. Cambridge; New York: Cambridge University Press. See also Thom, René, [1975] *Structural stability and morphogenesis; an outline of a general theory of models.*, Translated from the French ed., as updated by the author, by D. H. Fowler. With a foreword by C. H. Waddington. Reading, Mass., W. A. Benjamin, 1975.

processes actually work¹⁷. The concept of the differentiation of the social gestalt in relation to the social proto-gestalt gives us that vocabulary. We do not experience pure flux. If we did there would be no possibility of discrimination. Pure Flux is nihilistic. We need to understand the basis of discrimination before we can give it up. Discrimination occurs naturally when we see a gestalt in our perception. But in order for that discrimination of the gestalt to produce an image of a 'system' we need all these aspects. A system is a series of gestalts as we look at its various aspects. The system is also in time a set of events placed against the background of relevant happenings. Thus we think of temporal gestalt and perceptual gestalt as intertwining. We can think of each thing in the system as an event, that is an event and entity simultaneously. We see the event as part of a temporal gestalt and we see the entity as a figure in a perceptual gestalt. We see the entities as either with fixed essence or with unfolding essences. Unfolding essences have their constraints for transformation fixed at the level of traces. But we actually go beyond this view to look at the flows themselves within the system. When we do that we invert the gestalt and look at the movement of the foreground against a fixed object reference point. If we took a time-lapse picture of this it would be a blur of action suggesting the general movement within the system, as when we take a picture of a highway or traffic on streets at night with time-lapse photography. On the other hand we can do the same thing with the events. We can watch the general flow through time in relation to some timing event. General flow through time is experienced as precessing, i.e. changes changing in relation to each other. Precessing produces a change in timing which is then ranged against some trusted clock event. By looking at the diachronic flows we can get some idea of how the system is trending in its changes over time. All four of these views relate to our capture of the system as a social gestalt. Social gestalt means multiple simultaneous culturally related observers who share a world. Similarly we can see the same thing with relation to the meta-systemic archon. The archon is captured by David Bohm's idea of implicate order. Implicate order is like the mixture of ink blotches into solutions. The inkblot is like the Rorschach in that they contain multiple gestalts together in a configuration. We can assume that the universal ether, i.e. suchness, can contain multiple colored ink blotches, i.e. shadows and reflections, mixed into it in various ways and that any of them can be reversed out and made visible. Any particular gestalt we are looking at is merely one selection from a particular Rorschach. The Rorschach will have multiple simultaneous gestalts which our eyes pick from as we look around. But when the Rorschach changes then a new patterning is revealed by rotating in one inkblot into the solution and another out of the solution. The implicate order is a way to explain the patterning of the series of gestalts we are presented with. In effect we have some freedom to select one out of an array of presented possible gestalts. But that array of presented possible gestalts can change radically when a new inkblot is rotated out of the solution. Implicate

17. Jahn, R.G. and Dunne, B.J. [1987] *Margins of Reality: the role of consciousness in the physical world*. Harcourt Brace Jovanovich Pub.

order explains freedom and constraint simultaneously. We are constrained by the inkblot that has been rotated out of the solution, but we are free to explore whatever inkblot is now visible. When we think about this we see that this corresponds at the next higher level to the dichotomy between synchronic/diachronic and gestalt/flow. The synchronic proto-gestalt is the hidden implicate order that David Bohm talks about. A diachronic proto-gestalt is when we go through the process of rotating all the inkblots out in some order. Of course multiple orders of manifestation are possible but we can only actualize one of the orders at a time. This process makes the implicit explicit but also takes time and further binds manifestation to a particular order. Now if we are to think of the dual of this procedure in terms of flows then we see that the synchronic proto-flow is when the solution, or the ether of the archon changes in relation to a particular ink. This means that there is a change internal to the relation of the proto-gestalt to its context. This brings an awareness of the meta-meta-system. Each higher level meta-system acts as ether to the lower level meta-system. We call the meta-meta-system a domain. When the domain changes in respect to the network of inkblots mixed into the solution then there is a fundamental reordering of the proto-gestalt by the proto²-level of gestalt. Similarly it could be that the reference is in time not in space, so that there is a differential changing factor in the proto-flows that are seen against a temporal reference instead of an object reference. All this makes the proto-gestalt/flow more visible to us than it would be otherwise and allows us to get a picture of the meta-system and its relation to its container meta-system. Inkblots on Solution is the equivalent of Figures on Ground in the Meta-system. Solutions are the Domain and the Inkblots are the gestalts. So our principle that each level is generated out of the conjunction of the adjacent levels is adhered to very strictly.

The philosophical approach to systems theory advocated in this essay is fundamentally different from other approaches in the literature. This philosophical approach goes against the grain of the predominately dualistic propensity of the Western philosophical tradition that articulates the basic assumptions of the Indo-European worldview. Upon entering the metaphysical era within the Western branch of the Indo-European worldview inaugurated by Thales and Anaximander, a split occurred between the metaphysical principle as a transcendental and the immanent manifestations. Thales suggested that the metaphysical principle was the water of life, i.e. vital energy or what the Chinese¹⁸ called “Chi.” Anaximander instead suggested as a principle the *Unlimited* (Apeiron¹⁹) as contrasted to the *Limited*. Throughout the development of the Western philosophical tradition many different metaphysical principles have been proposed by different philosophers. Parmenides suggested that the basic metaphysical principle should be linguistic, and suggested

18. Zhang, Dai Nian [1987] “On Heaven, Dao, Qi, Li, and Ze” in *Chinese Studies in Philosophy*. Fall, 1987, Volume XIX, Number 1, pp 3-45.

19. Seligman, P. [1962] *The Apeiron of Anaximander*. London, Athlone Press.

that the most general concept within the Indo-european languages, which is Being, should be used as the reference point. This suggestion that Being is the ultimate metaphysical principle has become the predominate viewpoint within our tradition and has driven its development. But regardless of what transcendental metaphysical principle we select as ultimate, the important matter is the existence of the split between the Apeiron (transcendental) and the Peiron (immanent). Almost immediately after this bifurcation that inaugurated the metaphysical era as an emergent event that transformed our tradition out of the mythopoetic era²⁰, there was a second bifurcation of the *Peiron* (limited) that occurred separating physus from logos. This second bifurcation is between the unfolding of language and the unfolding of physical organisms. This bifurcation is the basis of most dualisms that propagate within our tradition such as mind/body, consciousness/brain, matter/spirit, male/female, etc. These dualisms are assumed by almost every discipline to be part of the foundations upon which science is built. We do not assume the validity of these deep and fundamental dichotomies. Instead, we seek a non-dual basis within these very same foundations, by first accepting the groundlessness philosophy discovers at the basis of the sciences, and then second searching beyond the dualisms that constantly shift with the groundlessness for the non-dual aspects of existence that are hidden by the projection of dualism by science. The recognition of the existence of holons such as those associated with the special systems that are the focus of this study is a case in point. Beyond the continually shifting distinction between logos and physus exists a nomos, or subtle order, that makes it possible for our mathematical representations to be used as a tool²¹ to understand physical phenomena. In this essay we point out a holonomic aspect of the nomos which has not previously been noticed due to the obscuration of the non-dual nomos by the continual projection of dualisms, like that between logos and physus, onto existence. The non-dual approach is alien to this worldview, but has been pursued by other worldviews, such as the Chinese²² and Islamic worldviews. However, there is a non-dual stream running through the Western worldview as well, which can be seen in the works of Plato, and which appears in Autopoietic Theory as enunciated by Maturana and Varela. They discover autopoietic systems to be chiasmically living²³ and cognitive. We can see Charles Peirce as the precursor to autopoietic theory when he outlines the possibility of such a theory in his discussion of “protoplasm” in his essay “Man’s Glassy Essence,”²⁴ which he also attempts to define in such a way as to remain non-dual, bridging the gap between dualisms. We find the same kind of formulation embedded in Plato’s description of the autopoietic “second best” city in the *Laws*. That which is simultaneously living and cognitive has a special non-dual nomos beyond the dualism we normally project on living things. This theoretical

20. Hatab, L.J. [1990] *Myth and Philosophy*. Lasalle IL, Open Court.

21. Rucker, R. [1987] *Mind Tools*. Boston, Houghton Mifflin Co.

22. Henderson, J.B. [1984] *The Development and Decline of Chinese Cosmology*. N.Y. Columbia University Press.

23. Capra, F. [1996] *The Web of Life*. N.Y., Anchor Books, Doubleday.

24. Peirce, C. [1892] *Monist* 3 Oct 1-22

formulation appears paradoxical from the normal dualistic viewpoint of science. This is why autopoietic theory remains marginal to standard scientific discourse. In this paper we extend this non-dual mode of thinking and practice to emergent levels above and below the autopoietic, namely to the dissipative level of form/pattern below and to the reflexive level of social/psychological above. Each of these levels are emergent²⁵ with respect to each other so that each have their own characteristics even though each level is constrained by those below it.

Within the Western philosophical and scientific tradition, we normally project the Logos/Physis dualism on to things. In this dualism one side usually dominates the other to the point where the dominated side is devaluated. Instead of dualism we support a non-dualistic view²⁶ which recognizes the inherent trade-off between dualistic extremes which form an interval that contains a point of reversibility between opposites. This point of reversibility is similar to that which appears in the spacetime interval described by Relativity Theory. Holons represent the chiasmic reversibility between the extremes of viewing things as parts or wholes. This recognizes the basic undecidability that exists between our models of phenomena that shows up in the quandary over particle or wave interpretations, or in the Heisenberg uncertainty principle that disallows simultaneous measurement of position and momentum. Holonomics arises because we cannot decide whether something is a part or a whole, that is because it is, in fact, both simultaneously depending on the context. In the context of a systemic whole a component is a part, yet in the context of a Meta-system, i.e. a field, the same component is a whole. The inner ordering of things, so that they can be nested such that they fulfill simultaneous synergetic roles, is the nomos that lies beyond the dichotomy of physis and logos which allows us to recognize partial structures that overlap in the center of the dichotomy. It is possible to construct a model of indeterminate particles that fulfill both the locality and wave like properties simultaneously. But to build such a holistic model it is necessary to relax some of our prerequisites of rigor and precision. Hidden variable models of quantum phenomena²⁷, such as David Bohm's implicate order model, are logically consistent as long as we relax our demands for the visibility of all aspects of the system. A similar transition takes place when we relax our need to know definitely whether something is a whole or a part. This generates the complementary system and meta-system views which make holons theoretically visible. Phenomena are inherently holonomic, which is to say nondualistic, but it is

25. Another term from Analytical Philosophy related to emergence is 'Supervenience'. Basically Supervenience is an entailment relation so that true emergence violates or goes beyond supervenience. One way to think about this is that God must do more work over and above the supervenient entailment to produce the emergent level above any given level of phenomena. See Guttenplan, S. [1994] *A Companion to the Philosophy of the Mind*. Oxford Blackwell, page 575. Our reference for the use of the term 'Emergence' is Mead, G.H. [1932] *The Philosophy of the Present*. Chicago, U. Chicago Press. Emergence has more social implications than mental implications.

26. Loy, David [1988] *Nonduality*. Yale U.P.

27. Hey, T. and Walters, P. [1987] *The Quantum Universe*. London, Cambridge U.P. See also Wolf, A. [1981] *Taking the Quantum Leap*. N.Y., Harper and Row.

our socially constructed dualistic views of phenomena that generates the bifurcation between the complementary system and meta-systemic views that overlay the phenomena.

Meta-systems are described very well by George Bataille as “general” or “global” as opposed to “restricted” economies.²⁸ Arkady Plotnitsky²⁹ makes the connection between Bataille’s idea of a “global economy” and the complementarity that Bohr³⁰ sees in quantum theories, for instance, such as the uncertainty principle. This yields the fundamental insight that meta-systems are always inherently complementary where as systems are inherently unified wholes that appear as gestalts. In fact, the gestalt itself is made up of a tension between figure and ground. In this tension the visible figure is systemic while the background is meta-systemic. But in the gestalt the figure is presented to us while the background disappears, so the gestalt represents explicitly the system and implicitly the meta-system. The dual of the gestalt is the flow in which the figure is pushed to the background as a reference and the background is pulled forward as a flowing foreground. Similarly in the proto-gestalt it is the mutually implicative context or situation that is brought to the fore, while the individual pieces of the fragmented system recede from view, so in that case it is the meta-system that is emphasized over the system. The dual of the proto-gestalt is the proto-flow. As the proto-gestalt is composed of origin and arena, so the proto-flow its dual is composed of source and surrounding all encompassing stream, such as the mythical Oceanus. What is important is that both viewpoints form a reversible complementary relationship with both aspects contributing in each case. The point is that all meta-systems are intrinsically complementary in contrast to the unification of the classical physical theories that envision systems that can be rigorously consistent, complete or clear (well-formed) simultaneously. Meta-systems (as proto-gestalt/proto-flows) preclude having consistency, completeness or clarity all at the same time. The relaxation of the rigor of the simultaneous completeness, consistency and clarity criteria allow us to see the meta-systemic shadow that surrounds every system. The meta-system is, as Priest would define it logically, either para-consistent para-complete, or has para-clarity. Para-consistency entertains the possibility of active contradictions of antimonies. Para-completeness entertains the possibility of a radical incompleteness in which fragmentation abounds. Para-clarity entertains the possibility of indistinctness where multiple partial formalisms compete with each other as the means of representation so that statements are not well-formed. Plotnitsky goes on to show that Derrida³¹,

28. See George Bataille [1991] *Accursed Share*. Zone Books, New York.

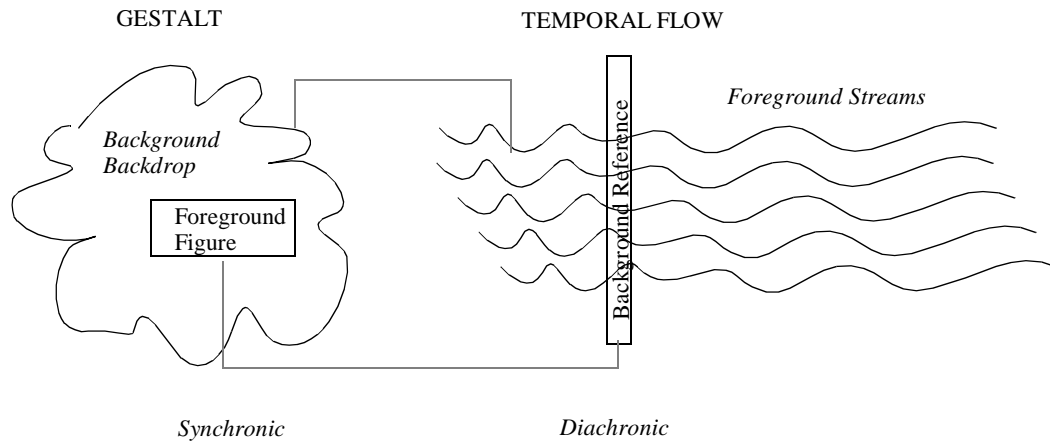
29. See Arkady Plotnitsky [1994] *Complementarity: Anti-epistemology After Bohr And Derrida*. Duke University Press, Durham.; [1993] *In The Shadow of Hegel: Complementarity, History, And The Unconscious*. University of Florida, Gainesville.; [1993] *Reconfigurations: Critical Theory And General Economy*. University of Florida, Gainesville.

30. Dugald Murdoch [1987] *Niels Bohr's Philosophy Of Physics*. Cambridge University Press, New York.

31. Derrida, Jacques [1976] *Of grammatology*. Johns Hopkins University Press, Baltimore MD. Also by the same author *Writing and Differance* [1978] University of Chicago. *Dissemination* [1981] University of Chicago

following Godel³², has concentrated on pointing out the undecidability of classical systems, and that this needs to be balanced by pointing out the indistinguishability that interferes with our isolation of the classical unified and monolithic system. Indistinguishability produces the inability to say when a system is complete and undecidability prevents us from showing its consistency. This leads to what Graham Priest³³ calls para-consistency and para-completeness. Para-consistency allows systems to have active contradictions and makes them into meta-systems. Para-completeness allows systems to be incomplete which means they cannot be distinguished from their meta-systemic grounds. Things that are both para-consistent and para-complete are by definition the embodiments of the Other of reason: they are monstrosities that are banned from science. However, our world abounds with undecidable and indistinguishable ambiguities. We have not been able to reduce them by the rigors of our disciplines to systematic wholes. They lack the characteristics that we normally attribute to systems³⁴ which, as Rescher says, derives from our analogy to the organism.³⁵ These monstrosities roam the landscape of the meta-system and haunt the systems which attempt in vain to cut themselves off from their contexts.

Figure 1: Duality between Gestalt and Flow



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32. Godel, Kurt [1940] *The Consistency of the Axiom of Choice and of the Generalized Continuum-hypothesis with the Axioms of Set Theory*. Princeton University Press, Princeton.; See also, Nagel, E & Newman, J. [1958] *Godel's proof*. New York University Press, New York.
33. Priest, G., Routley, R, and Norman, J. [1989] *Paraconsistent Logic*. Philosophia Verlag, Munchen Hamden Wien.
34. See Rescher, N. [1979] *Cognitive Systemization*. Rowmann and Littlefield, Totowa, New Jersey. Pages 10-11. Rescher gives the following characteristics of a 'system': wholeness, completeness, self-sufficiency, cohesiveness, consonance, architectonic, functional unity, functional regularity, functional simplicity, mutual supportiveness and functional efficacy.
35. See Rescher, N. [1979] Page 12. *ibid*.

Figure 2: Duality of the Gestalt/Flow

	Synchronic	Diachronic
Gestalt	Perceptual Gestalt <i>example concept</i>	Temporal Gestalt <i>example: idea</i>
Flow	Time-lapse Frozen Flow across time pre- sented in a single image by superimpo- sition <i>example: emotion</i>	Temporal Flow <i>example feelings</i>

Figure 3: Duality of the Proto-Gestalt/Flow

	Synchronic	Diachronic
Proto-Gestalt	Origin	Arena
Proto-Flow	Source	Oceanus (encompassing stream)

Once we accept that all systems have meta-systemic shadows of undecidability and indistinguishability, which are complementary, and that all systems originate and interact with other systems in these meta-systemic arenas, then we see that there is a spectrum that exists from the extreme of pure meta-system to the other extreme of pure system. A system is a gestalt whole that is greater than the sum of its parts. A meta-system (as proto-gestalt or proto-flow) has a *lack*, rather than a surplus, and is a defective whole that is less than the sum of its parts. Between these two extremes of surplus and lack, there are stages of assembly of the parts awash in the field of the meta-system, until they are fully assembled into the system. When the parts are assembled, then the emergent properties arise which give the system a wholeness that is greater than the sum of the parts taken separately. These emergent properties arise seemingly spontaneously and instantaneously out of the background of the meta-system. For this reason, in the spectrum from system to meta-system, or in the reverse direction, there is a discontinuity, or a quantum like effect, of sudden emergence or vanishing of the surplus properties of the system out of the generalized lack of these characteristics, that forms the background out of which these new systemic characteristics arise. We can posit an idealized transformation which assembles and disassembles these parts. That transformation may work in two directions given any two complementary theories of objects. In other words, a given complementarity may be viewed as either system or meta-system and transformed into its opposite through a series of holonomic stages. But, because of the discontinuity at the point of emergence this transformation is counter intuitive and complex. This means that what looks like a fundamental unity (either as gestalt or

flow) from one perspective can be transformed into a composite (within a proto-gestalt or a proto-flow). And what looks like a composite may be transformed into a fundamental unity. This characteristic of the complementarity of systems and meta-systems views has been dubbed the “duality” property in recent Superstring physical “Theories of Everything.”³⁶ This “duality” property has been found to reduce the many Superstring theories to a single theory seen through the fragmentation of its many representations that otherwise appear as many independent theories. We can relate this back to the view that wishes to see systems as hierarchies of sub-systems as long as we realize that the complementarity of systems and meta-systems perspectives is more basic than that hierarchy. When the parts are disassembled we see down the hierarchy of subsystems and when they are assembled we have changed our gaze to look up toward the higher unites of the hierarchy of systems. The intersection of these two perspectives in a single thing converts it into a holon in Koestler’s sense. But due to the complementarity of the two approaches we only glimpse the holon by oscillating between these two approaches. There is no single conceptual framework that captures the holon completely in isolation. Instead we realize that there are a set of anomalous special systems that approximate the point of perfect balance between the two complementary approaches. These special systems, that allow us to transition back and forth between system and meta-system views, do not form an infinite series, but instead the progression stops after just three steps. Thus our extension of General Systems Theory defines just three holonomic special systems that inhabit the interspace between systems and meta-systems. For general systems theory meta-systems exist in the nether world beyond the limit of understandability defined by the end of the progression of special systems. But meta-systems themselves are infinitely complex and have an indeterminate number of recursive³⁷ levels of nesting which are also modeled by our mathematical analogies. This extension of General Systems Theory, place it in the context of a “global or generalized economy,” which breaks the bonds of the restricted economy of the system, that we normally struggle to maintain in order to rigorously assert the isolation of our subject of study under the discipline of our domain. The fact that the extension discovers a class of balanced anomalous special systems in the margins between system and its meta-systemic milieu is an unexpected surprise. It is, in fact, at the general systems and general meta-systems level, the equivalent of the unexpected discontinuity of the arising properties of the emergent system. In other words “General Systems Theory” as a restricted economy has emergent characteristics which appear unexpectedly out of the general meta-systemic economy of all possible specialized scientific disciplines which exist within the rubric of the university. Holonomics becomes a new field that exists between all the specialized sciences, that study systems of particular kinds and General Systems

36. Kaku, M. [1994] *Hyperspace: a scientific odyssey through parallel universes, time warps, and the tenth dimension*. Oxford University Press, New York. See also Kaku, M. and Trainer, J. [1987] *Beyond Einstein*. Bantam Books, New York.

37. Sanchis, L.E. [1988] *Reflexive Structures*. N.Y. Springer Verlag.

Theory, that attempts to abstract from all these particular systems general principles as Klir tries to do in Architecture of Systems Problem Solving³⁸. Holonomics studies the anomalous ultra-efficacious³⁹ systems that appear in the interstices between specialized sciences. Holonomics is therefore inherently interdisciplinary. We cannot see holonomics from the myopic viewpoint of a single discipline but must instead study at least two phenomena simultaneously in order to glimpse them. Thus, holonomy corresponds to the phenomena observed by Bateson in Mind and Nature,⁴⁰ which is that we get a much higher quality of information if we study two disciplines simultaneously, rather than one at a time. This higher quality of information comes from the realization of synthetic and synergistic relations between apparently unrelated but conjuncted information streams. This effect is an example of what we will call ultra-efficaciousness in this paper. These synergies are the subject of holonomy which can only be appreciated if we approach phenomena from a nondual perspective. The point is that nonduality has a specific form -- it is not just a vague fusion of perspectives, but instead has a very specific and mathematically describable foundation, that may be discerned as underlying very different phenomena. Holonomy attempts to find examples of this peculiar and specific configuration in phenomena. We recognize that the configuration is rare because these special systems studied by holonomics are anomalous. Yet, due to their ultra-efficaciousness they are also pervasive. Their pervasiveness accrues from the fact that, when they do appear by chance they are so much more efficient and effective than all other configurations that they persist while their competition fades, due to the action of entropy to a greater degree as a pressure on all other configurations. Holonomic systems have an inherent advantage over all other forms of organization. This one fact about the anomalous special systems goes against all our assumptions about natural phenomena. But nevertheless is true, because we find systems in nature with these characteristics. For instance, the superfluids⁴¹ of Helium⁴, and even Helium³ when paired. Superfluids show that quantum effects can occur at macro-levels. They have extremely unusual properties that are anomalous in micro nature, but nevertheless real and something our Western science must come to terms with. The point is that these anomalous formations do not just occur in nature alone, but appear in many phenomena at the macro level. Holonomics studies these phenomena at the macro level which are analogous to superfluidity, that occurs due to the conjunction of Helium atoms at a specific very low temperature. Examples

38. op cit.

39. Efficaciousness is a combination of Efficiency and Effectiveness. Ultra-efficaciousness means highly efficient and effective beyond what we might normally achieve given entropic pressures. Ultra-efficaciousness, Ultra-effectiveness and Ultra-efficiency are more or less used interchangeably in what follows. The use of this term is taken from Arkady Plotnitsky in *Complementarities*, but here the definition has been sharpened. We take this to be the dual of DifferAnce with its phases of differing and deferring. It is DifferAnce that prevents efficaciousness. Differing disturbs efficiency and deferring disturbs effectiveness.

40. Bateson, G. [1988] *Mind and Nature: a necessary unity*. Toronto; New York: Bantam Books.

41. op.cit.

of similar phenomena at the macro level are the universe, life, consciousness (including psychological flow⁴²) and the social (including social flow⁴³). Holonomy is primarily concerned with far from equilibrium neg-entropic super-efficient and highly effective special systems. Such special systems give rise to the emergent unfolding of living and cognitive hyper-efficacious special systems. These in turn give rise to the emergent unfolding of the ultra-efficient and ultra-effective socially reflexive⁴⁴ special systems. Eventually these decay into the meta-system and thus lose their peculiar efficacious characteristics. However, these three levels of emergent unfolding from super-special, to hyper-special, to ultra-special are paradigmatic of many similar configurations of other rare and exceptional phenomena, that may be usefully studied under the rubric of Holonomics, and that appear in the interstices between many different specialized disciplines. The major reason to focus on holons in the attempt to study their special nomos is to see how nature violates its own rules in specific anomalous situations, especially the rules of entropy locally. This leads to some very special situations, but what we find is that all these cases have a common if anomalous form. So like the Feganbaum number for chaos⁴⁵ that is a constant in the bifurcation, there is a more complex order that is specific to anomalous super, hyper and ultra-efficient special systems which is a constant regardless of the specific realm in which they appear. It is a peculiarity of nature that all special systems achieve holonomic harmony⁴⁶ through conjunction following the form of the hyper-complex algebras. Now that a general theory of such anomalous cases is available we can use this general theory as a basis for looking for other examples in different realms of holons embodying their special nomos.

General Systems Theory as defined by George Klir in Architecture of Systems Problem Solving⁴⁷ identifies a series of epistemological levels by which formal structural systems⁴⁸ are defined. These epistemological levels are the object, source, data and generative systems. The levels bifurcate into infinite regresses through the production of meta-structures and meta-processes. Meta-structures allow different patterns within patterns within patterns while the meta-processes control the changes in the structural templates at various meta-process levels in time. Certain chiasmic combinations of Structure and Process are considered by Klir in this epistemological

42. Csikszentmihalyi, M. [1990] *Flow: The Psychology of Optimum Experience*. N.Y., Harper and Row Pub.

43. I do not know of anyone who has posited the dual of psychological 'flow' in the social field before.

44. The term reflexive (reflexion) which is the English usage corresponding to the American usage of reflective (reflection) are in this context taken to have two different senses. "Reflexive" means when antinomies cancel to yield formlessness while "Reflection" means that thought stops in its tracks, i.e. the alternation not just between thoughts but between thought and no-thought. These two sense like "differing and deferring" or "efficiency and effectiveness" belong together as the Same. However, this is a difference that makes a difference in relevance.

45. Gleick, J. [1987] *Chaos*. N.Y. Viking Press.

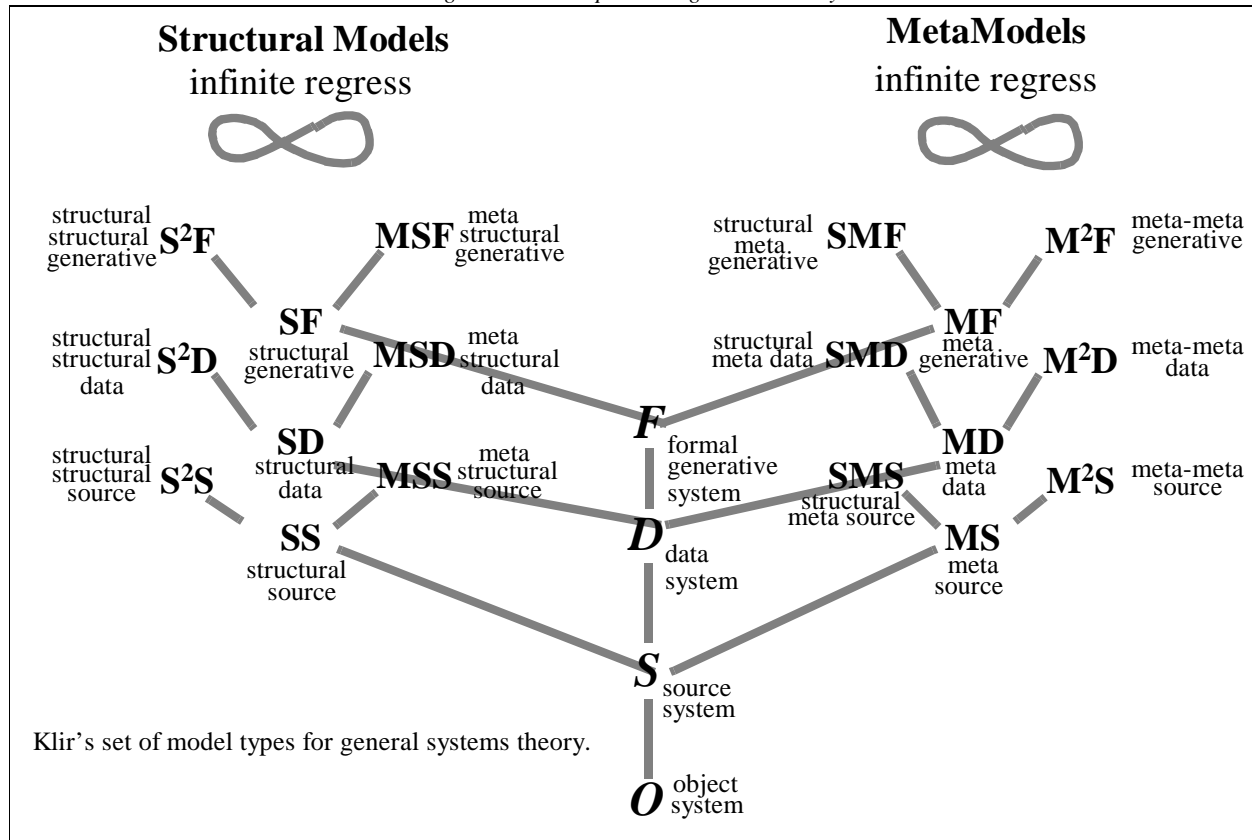
46. Chung Ying-Cheng [1989] "On Harmony as Transformation: Paradigms from the I Ching" in *Journal of Chinese Philosophy*. Volume 16; p.125-158.

47. Klir, G. [1985] *Architecture of Systems Problem Solving*. Plenum Press, New York.

48. Wilden, A. [1972] *System and Structure: essays in communication and exchange*. London, Tavistock Publications.

framework as well.

Figure 4: Klir's Epistemological Hierarchy



We have extended⁴⁹ the epistemological framework of Klir to include an autopoietic level and a reflexive learning level beyond the dissipative generative level in his epistemological hierarchy. The reflexive learning level encompasses the meta-levels of learning posited by Bateson in Steps to the Ecology of the Mind⁵⁰. The levels end in the definition of the unthinkable as what occurs beyond the fourth meta-level of learning. Through this extension we first defined three special systems levels associated with the dissipative, autopoietic and reflexive systems. Now we explore the underlying mathematical analogies that support the conceptual definition of the special systems.

Here is quoted the relevant section from the authors previous attempt to extend Klir's Epistemological Framework in ASPS that appeared in the IJGS article⁵¹ which first defined the special systems. [Begin excerpt.]

49. Excerpt from Kent Palmer, "Software Engineering Design Methods and General Systems Theory" *International Journal of General Systems* [Vol 24 (1-2) 1996 pp.43-94].

50. Bateson, G. [1987] *Steps to the Ecology of the Mind: collected essays in anthropology, psychiatry, evolution, and epistemology*. Northvale, N.J. : Aronson. See also, Bateson, G. [1980] *Mind and Nature: A Necessary Unity*. Bantam Books, New York.

51. *International Journal of General Systems* (IJGS) vol24 (1-2) 1996 pp 43-94

1.1 ARTIFICIAL LIVING KNOWLEDGE SYSTEM

To have deep understanding of a generative system requires a knowledge representation scheme to be overlaid on the generative system. That supplemental system displays understanding of the workings of the generative system. It needs to ultimately be living/cognitive or what is called Autopoietic. Autopoiesis means self-producing or self-organizing⁵². Thus we posit that the next level is most like an organism that is the root metaphor for the system. It is not just a knowledge level added to the generative but the knowledge is activated by being the self-knowledge of an autonomous being. This level actually allows us to understand software better because it is the next higher meta-level above software called the proto-technical and operating at the next higher meta-level of Being which is Wild Being as defined by Merleau-Ponty.

When we think of software we notice that the attempt is made to define it in such a way to get rid of all the paradoxes like self-modifying code and spaghetti goto statements and others. When we move to the Artificial Intelligence and Life level beyond software what we see is a mosaic of techniques with nothing like methodologies for us to hang our hats on. Each AI or ALife technique competes with all the others in a bewildering array of sophisticated but very basic programming techniques mostly realized at the implementation level. After studying this area for a long time I realized that there was a reason there were no equivalents to minimal methods for AI and ALife. That is because all the paradoxes that were pushed out of the software layer by the discipline of Software Engineering were pushed into AI and ALife. Each of these techniques revolved around some paradox in the software layer and because they were paradoxes they could never be resolved into a simple method that is easily represented. All the monstrous aspects of software are collected here and combined to create specific techniques that will use the side effects of software to create imitations of life or cognition.

Another point about this level is that it uses software as an enabling machine instead of hardware. Because of that it is free to create theoretical structures that are completely disconnected from reality. Thus Virtual worlds arise as the abodes of artificial living and intelligent creatures that can be completely disconnected from any kind of recognizable reality enforced by the world we live in mundanely. When this detachment from reality is combined with network technology then you get the advent of cyberspace as the realm of all possible virtual worlds. Within these worlds artificial intelligent and living creatures roam which will be created by the opaque AI and ALife techniques that arise from the paradoxes in the software layer. Combinations of opaque techniques will render these creatures even more opaque and incomprehensible. Thus we are engaged in creating alien creatures within our virtual worlds which we can never understand. They are inherently incomprehensible since they are created using all the techniques banished from software engineering because they are not trusted to produce assured results in the real world.

Between the fantasy virtual world and the real world stands what Geleternier calls the “mirror world⁵³” which attempts to render an image of the real world in virtual reality. Mirror worlds

52. Jantsch, E. [1980] *The Self-Organizing Universe*. N.Y., Pergamon Press.

53. Gelertner, D. H. [1991] *Mirror worlds, or, The day software puts the universe in a shoebox-- : how it will happen and what it will mean*. New York: Oxford University Press.

stand between the real world and the fantasy worlds disconnected from reality. Mirror worlds give us more knowledge about the actual world than we would normally possess. They are worlds with superabundance of information and real-time connection to the actual world. They are the mirror between our world and the fantasy worlds that depart from reality in significant ways. We can say that the mirror worlds are super-real and form the reversible interface between reality and irreality. For instance a fantasy world may be a world where a fundamental assumption that is made in the designated as real world is changed to see what would happen. These fantasy worlds give us the possibility of conducting experiments in worlds that do not exist which will shed more light on the world that does exist through intersubjective agreement. It is through mirror worlds and fantasy worlds that our ability to socially construct worlds is unleashed into realms that it was impossible to enter before. These mirror worlds and fantasy worlds will have a profound impact on the designated as real world as a hyper extension which when treated as part of the designated as real world actually has profound effects on that to which it is supplemented. This is because all of these worlds function in the realm of Hyper Being which as Derrida has shown has the form of a supplement which changes the meaning of the thing to which it is attached.

At this level generators become imitations of living knowing organisms. That is they imitate the most sophisticated systems we know which are living creatures. Thus it is only at this level that we have a true attempt to portray systems in relation to the root metaphor of organisms with cognitive capacity. These organisms have a fundamental ability to learn and adapt. And this must be taken into account in our model. Therefore an important part of this level of manifestation are the meta-levels of learning which were first defined by Bateson⁵⁴. There are four of these meta-levels of learning which scale the ladder of meta-levels until they reach the unthinkable which lies at the fifth meta-level beyond all forms of learning.

1.1.1. LEARNING SYSTEM

The knowledge system may learn about other systems or may expand to cover a domain of systems rather than a single system of a particular kind. Thus Learning systems supplement Knowledge systems. When software systems display learning then they cease to be fragile with respect to changes in their environment. A learning software system may also exhibit this learning with respect to itself producing internal images of itself and learning about itself.

1.1.2. META-LEARNING SYSTEMS

These systems as Bateson shows learn to learn. Learning to learn means exploring new ways of learning. This allows such a software system to cope with discontinuous changes in its environment and within itself. When we learn to learn we increase our learning capacity and also gain new learning skills. Such a software system would be very robust with respect to its environment being able to cope with environmental changes and changes in itself that are unexpected.

54. Bateson *Steps to the Ecology of the Mind* op. cit.

1.1.3. META-META-LEARNING SYSTEMS

Learning how to learn can be supplemented by Learning at the next meta-level which means changing paradigms of learning how to learn. There may be different paradigms of how to learn to learn which is to say different approaches to learning to learn. At this meta-meta-level the difference between self and environment become irrelevant. The environment and the self is considered a single meta-system where the environment learns from the self and vice versa. At this meta-levels the differences in paradigms in learning become important and the ability to switch paradigms of learning so that new self-other configurations become possible becomes important.

1.1.4. META-META-META-LEARNING SYSTEMS

Bateson says that the next level is one in which ones whole worldview changes and that this is the highest meta-level of learning. Beyond this is only the unthinkable. It is at this level that the projection of the world by the self-other meta-system is accomplished. The key feature of this level is the appearance of the emergent event. The emergent event is the possibility of a genuinely new thing to come into existence. A meta-system that operates at this meta-level could handle the appearance of the genuinely emergent event. The genuinely emergent event is defined as one that moves through all four meta-levels of Being as it enters the clearing-in-Being and becomes part of the World.

An example of a Meta-meta-meta learning system is Western science. In school we are taught things in a certain pedagogical style. But as we encounter different teachers we realize that there are different ways of learning and we attempt to learn how to learn in these different ways. For instance, there are ways of learning suited to those who are language oriented, graphically oriented, and kinetically oriented. But we may combine these different ways of learning to achieve particular learning effects that are difficult to achieve in any other way. As an example, audio visual materials may be combined with an exercise. But eventually as we begin to achieve mastery of subjects we realize that we need to produce our own synthesis of the materials in order to show mastery. These syntheses appear like paradigms in that they go beyond the information given to posit theories which are not contained in what we have learned to learn. When we can advance these paradigms then we have in effect reached the fourth meta-level of learning where we advance the state of the discipline in which we are engaged. Finding these cutting edges at the fourth meta-level of learning is very difficult. In fact one can say that the whole problem of intellectual advance is to locate these cutting edges and make progress with respect to the disciplines at those edges. Persons who do not learn to learn to learn cannot locate these cutting edges. Those who do locate them and contribute to our understanding at those cutting edges are the ones who bring genuinely new things into existence. They are the ones who transform the world.

1.1.5. THE UNTHINKABLE

The unthinkable is the meta-level beyond which we can create learning representations.

Notice that we have gone beyond Klir's original formation to add levels of learning until we reached the unthinkable. We note that the unthinkable is equivalent to the infinite meta-levels to

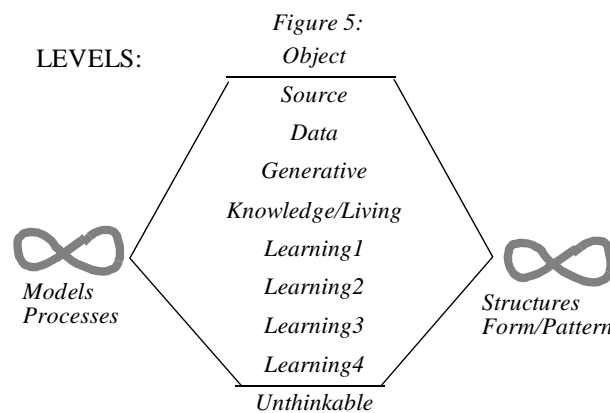
which structural and process models ramify and fuse.

We have also noted that when we reach the infinite meta-structures or meta-process models or the unthinkable we have reached a point identical with the “essence of manifestation” described by Henry that is the point of pure immanence which never manifests.

The unthinkable may be considered identical with the Buddhist non-concept non-experience called Emptiness. Emptiness is itself empty. It is the expression of the absolute middle between all nihilistic opposites. Emptiness is the center of the vortex around which the dynamic of worldview projection at each of the meta-levels of learning revolves. Understanding Emptiness is essential to understanding the projection of the worldview because Emptiness balances the whole action of worldview projection.

1.2. WINGS TO INFINITY

Now we will explore each of the wings that take us to infinity of process and structural meta-levels and see how they function at the multiple levels of the epistemological hierarchy. In what follows the word LEVEL can be replaced with any of the following levels we have discovered:



1.2.1. STRUCTURAL LEVEL SYSTEM

For software the structure appears as multiple whole-part relations exemplifying the relations between patterns and forms.

1.2.2. META-STRUCTURAL LEVEL SYSTEM

These whole-part relations become ever more inter-embedded. At the first level of inter-embedding there are structures within structures.

1.2.3. META-META-STRUCTURAL LEVEL SYSTEM

At the next interembedding level there are structures within structures within structures. This regress is infinite because we can imagine structures embedded within each other to infinite levels of logical typing. Ultimately these meta-levels of structures approach the unthinkable, which is a complexity of structure beyond which the human mind cannot conceive.

1.2.4. MODELED LEVEL SYSTEM

Models are the temporal structuring by which the spatial structuring is controlled and changed over time. We call these process models.

1.2.5. META-MODELED LEVEL SYSTEM

We can think of processes within processes controlling structures over time.

1.2.6. META-META-MODELED LEVEL SYSTEM

There is also an infinite regress for models of processes as we can think of processes within processes infinitely. These also approach the infinity of meta-levels of process which is unthinkable.

1.3. FUSION OF PROCESS AND STRUCTURE

There is an interference between our structural and process model reifications which sees them as fused. This fusion represents the timespace causal view of the system. In one fused view structure dominates time whereas in the other time dominates structure. These are equivalent to the proto-imaginaries found in Spencer-Brown's Laws of Form. We follow Merleau-Ponty in calling these points of fusion between process and structure chiasms or points of reversibility. In fact, we will coin a new term called intaglio for the fused relation between process and structure. Intaglio is the engraving of an image within a stone so that it appears three dimensional usually through the other side of the transparent stone. Many times the intaglio is frosted to produce the appearance of solidity to the image. There are sculptures that exist made of glass where intaglio is used on both sides to give the appearance of intertwined figures connected through the medium of the glass. Many times these are figures of men and women intertwined in some exotic fashion. In other words in these intaglio sculptures what exists is a fusion of the figures through the connecting medium. The figures themselves have no reality other than the medium that holds the carving of the intaglio. So it is with the fusion of process and structure. They do not exist as separate entities but only exist as the chiasm or reversibility between them. We can talk of this fusion at three levels.

- PATTERN/FORM CHIASM = structuralized forms
- LIVING/COGNITIVE CHIASM = autopoietic systems
- SOCIAL/PSYCHIC CHIASM = reflexive systems

Here we understand that form and pattern together produces structures of forms and that processes model these over time. But form and pattern also have an intaglio relation in which one cannot be completely separated from the other. In that relation they exhibit interferences which reveal the trace structures below the level of manifestation of form and pattern. In those trace structures the intaglio of form and pattern as interference patterns between disorder and order appear. It is this trace level that give us the foundation for the understanding of the autopoietic systems that imitate living/cognitive organisms. The living and the cognitive also produce a fusion of process and structure that has a qualitative difference from process or structure in isolation. The autopoietic theory of Maturana and Varela display these features of reversibility

very well. However, these theories break down when we move to consider the social. Thus the social must be a new level of organization that goes beyond the autopoietic. Autopoietic systems maintain their organization homeostatically. A reflexive system is defined as the next level beyond the autopoietic and it is seen as heterodynamic instead of homeostatic with respect to its organization. This means a reflexive system is ecstatic in projecting the world and changes its organization dynamically to different organizational regimes. Thus the reflexive system can accept emergent events as the way the worldview is projected changes radically over time. We say that such a fusion of process and structure lies right on the brink of the unthinkable because it accepts changes from the region of what is incomprehensible in relation to it and deals with these changes which are called emergent events. At this level there is a chiasm between the social and the psychic. From one point of view reflexive systems are social but from another point of view they are psychological. Thus there is a psychosocial dual-intaglio at the level of the reflexive heterodynamic system. The understanding of heterodynamic systems is the furthest reaches of all systems theory.

Each of these levels of dual intaglio that we have been laying out are extensions of General Systems Theory. They lay beyond the understanding of structural-process fusion. Structural-process and process-structural fusion exist at each level of the epistemological framework. We can view these merely as reversible process and structural modes of the framework or we can look beyond that to see the qualitative difference between the fused and the unfused aspects of structure and process. This qualitative difference points us toward the special systems that emerge from General Systems Theory. These are the systems theories regarding dissipative, autopoietic and reflexive systems. They appear as the fusion of process and structure from the timespace perspective. This fusion has a qualitative difference that expresses itself quantitatively as well⁵⁵. We see here that Dissipative systems can be looked at from the point of view of the object, source, data, and generative systems. The Autopoietic system can be looked at from the point of view of all these systems as well as from the point of view of Knowledge and Life. The levels of learning are the province of the reflexive system and can be considered up to the point of unthinkability.

Now that we have defined the special systems and their chiasmic fusion we can go back to consider the generic fusion from the process and structural perspectives.

1.3.1. STRUCTURAL MODELED LEVEL SYSTEM

At each level there is a fusion which emphasizes structure over process and one which emphasizes process over structure. These take on a different quality from the timespace viewpoint that reveals the special systems that emerge from GST. However if we go back and look at the structural-modeled system that exists at each level from the spacetime viewpoint we see that when space dominates time we get the equivalent of a knowledge representation system as in Prolog where connections in space are more important than the processing in time. In knowledge representation schemes the knowledge is coded into structures which are unified by a single logical algorithm. There is only one process and multiple knowledge representations on

55. For further details see the author's two series of papers "On the Social Construction of Emergent Worlds" and "Steps Toward the Threshold of the Social" contained in *Autopoietic Reflexive Systems Theory*. (unpublished manuscripts; see <http://dialog.net:85/homepage/refauto2.htm>)

which it does its work.

1.3.2. MODELED STRUCTURAL LEVEL SYSTEM

When time dominates space from a spacetime perspective we see that we get a normal relation in programming between processing and memory where the processing controls the memory rather than the configuration of memory controlling the processing. But here we have an interpreted system where data and processing are more intimately connected rather than a precompiled program which operates on completely separate data.

Knowledge representation that emphasizes space over time is independent of interpretation which emphasizes time over space but still allows fusion of data and processing. These two fusions are orthogonal to each other in every case at each level of the epistemological framework.

So at the data level there can be control data and non-control data. This means that non-control data is dominated by processes while control data dominates processes and contains in the data stream the structure that controls processes.

At the generative level we see that data can be coded into tables which control processing or we can allow processing to contain many more control statements and we can code the functioning of the software into source code algorithm.

At the knowledge level we get the difference between Prolog which uses the unification algorithm to process static knowledge structures and Lisp which does its processing on lists where the list itself can be the program being executed. Thus list processing algorithms dominate the data representation but they are fused. Prolog expresses this fusion in the way it rewrites its knowledge representation causing the unification algorithm to give different results from pass to pass.

At the levels of learning we can either emphasize the materials being learned or the learning process itself. If we emphasize the materials being learned then the drive to learn is external and we call this teaching. If we emphasize the process of learning over the materials learned then the drive is internal and we call this self-realization which Maslow called a drive. This ramifies to all the meta-levels of learning. The drive to learn at any meta-level can be either internal or external but whatever the driving force learning has to be reciprocal and social. When we see this learning mirrored within the individual we call that the psychological realm. The psychological and the social are mirror opposites.

The fusion of the structure and process represents yet another way in which the unthinkable enters the epistemological framework. We already noted that the framework itself extends past the generative to the knowledge level and on up the hierarchy of the meta-levels of learning to the unthinkable. Then we saw that at each epistemological level there are two wings of extension to infinity. The point of infinity for both wings of meta-level extension is the same and is identical with the unthinkable. Now we see that each wing fuses with the other wing of the epistemological framework in a way that can either be seen causally from the point of view of timespace or in terms of separation from the viewpoint of spacetime. When we interpreted fusion from the point

of view of timespace we recognized the levels of chiasm related to the generative system, the knowledge and living level and the levels of learning. These we defined as the special systems that emanate from General Systems Theory. The we turned around and saw that these fusions of the wings can be seen from spacetime viewpoint instead in terms of separation and we saw how that meant the difference between coding action into spatial configurations rather than writing algorithms and we can see how these may be expressed at every level of the epistemological hierarchy. But the reversibility between the spacetime and timespace views of fusion also points us toward the essence of manifestation because of the qualitative and quantitative differences between these two views of fusion that produce a blind spot in our view of chiasmically fused aspects of systems. We cannot understand easily the connection between timespace-like fusion and spacetime-like fusion of the two wings that tend toward and infinity of meta-levels.

Figure 6: Definition of General Systems Theory Dual (Self Generating System) via the Kinds of Being.^a

Wild Being	Existence	Hyper Being
Chiasm process/structure interferences internal {Proto-flow Source}		Finite Unthinkability Beyond the meta-level of learning {Proto-gestalt Origin}
	<i>Emergent Meta-System</i> <i>'Magicians' Self Generating System</i> <i>meta-system</i> <i>proto-gestalt/flow</i>	
Reversible Aspects process over structure structure over process interferences external {Proto-gestalt Arena}		Infinite Complexity Separate structure and process wings of meta-level {Proto-flow Oceanus}

a. This table has been altered from the original presentation.

In effect this shows that we need to understand better the extension of General Systems Theory into the realm of the special systems. The means for doing this is Software Engineering because it is software engineering that provides the connection to computability of systems. The special systems appear when we consider the fusion of structure and process from the causal or timespace perspective. They do not appear when we consider the spacetime perspective on fusion. Instead there we get a view of the computability of the combination of structure and process. Thus the special systems are bound to computability in a mysterious fashion which is not clear as we reverse our perspective from timespace to spacetime emphasis. In effect this calls for the development of a computational meta-system orthogonal to General Systems Theory. That computational meta-system is embodied in Goertzel's 'Magician' Systems first proposed in his

work Chaotic Logic⁵⁶. If we see the expansion of the epistemological framework toward the unthinkable and the spreading of the wings of meta-levels of structure and process toward infinity as the dual opposites of the timespace and spacetime views of fusion then we see that these two duals define an interface which is orthogonal to GST within which the dual to GST must exist. That dual must deal with chaotic processes in a structured way which is computable. Goertzel's 'Magician' Self-generating System is the only candidate yet found that fulfills the conditions that this dual must fulfill. And it turns out that the 'Magician' meta-system is intimately connected to the special systems when it is expressed meta-algebraically. 'Magician' systems also have the characteristic that they express formally all the different kinds of Being. So 'Magician' systems provide us with a model of the balance of heterodynamics and homeostasis within the realm of dynamical dissipation.

Therefore we see that General Systems Theory as the theory of gestalts or showing and hiding systems must have a dual which expresses the meta-system and meta-gestalt within which gestalts form. We posit that this dual is the 'Magician' meta-system and that it is defined negatively by the relation of the fall into the essence of manifestation via infinite meta-levels and finite meta-levels to the embedding of fusion between process and structure seen in terms of spacetime and timespace. This reversibility between two views of fusion and two approaches to the essence of manifestation defines possibility of the 'Magician' meta-system negatively. It is by studying the relation of the 'Magician' meta-system and the special systems in this context that we realize their inner connection. And that connection is made possible by computability and ultimately by software as an embodiment within the matrix of spacetime and timespace.

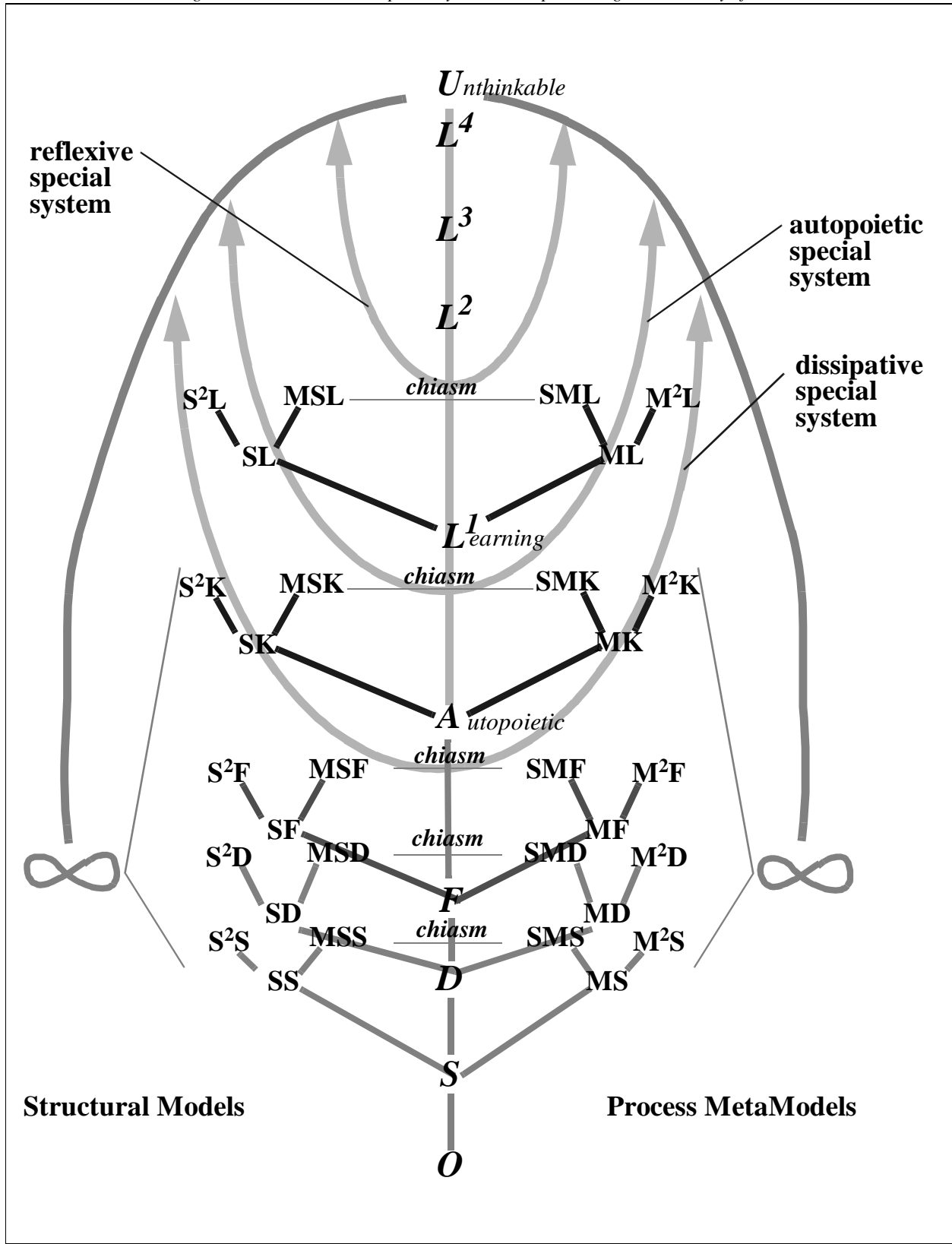
GST is formed completely in the realm of Pure Presence. But it attempts to deal with processes in terms of models of temporal structuring as opposed to spatial structuring. Thus as a formal-structural system it gives us a view of processes while attempting to not fall into Process Being. When we realize that systems are gestalts of showing and hiding processes we fall into Process Being and we must reinterpret GST within that context. When we extend the GST epistemological framework we see that it truncates in the unthinkable which is either finite or infinite. We have seen that this is an expression of the essence of manifestation and that is what takes GST to the third meta-level of Hyper Being where the software essence also resides. At that level we see GST and Software Engineering as duals. But then when we look at the Epistemological Framework we see that there are nodes of fusion between process and structure. We can see these in terms of spacetime or timespace as we look at the embedding of the GST epistemological framework in the timespace/spacetime matrix. These two views show us the place of the special systems that emerge from GST with their chiasmic relations between fused components. But if we look at them from another angle we get a view of the computability of these fused structures seen externally in terms of process and structure. These two views of fusion indicate the presence of Wild Being which is the highest meta-level of Being beyond Hyper Being. Within the gap between fusion and the essence of manifestation the possibility of a dual to GST arises and we posit that this dual is a 'Magician' meta-system that combines the inscription of traces with the computational emulation of chaotic processes. We posit that 'Magicians' are the meta-system which combines all the special systems into a single proto-gestalt from which all the gestalts of systems arise within the clearing-in-Being. 'Magician'

56. See figure 15.

systems combine all the kinds of Being into a single computable formal meta-system. The meta-system of 'Magicians' is the dual of the structural-formal system of GST and it is software that provides the interface between them as the means of conferring computability to both.

The discovery of a dual to General Systems Theory is a surprising result which needs further study in order to explore all of its ramifications. That dual is a meta-system that defines the basis for the emanation of all the systems that arise within General Systems Theory. This dual of GST can only be appreciated from the point of view articulated by the definition of the different kinds of Being. But once this perspective on systems that looks explicitly at their ontological basis has been established it becomes clear that GST needs underpinnings that attach it to all the more fundamental ontological levels. 'Magician' meta-systems perform that role. They unify all special systems theories and provide a meta system that defines their ontological basis. It is clear that a major extension to the foundations of General Systems Theory has been proposed based on these ontological ramifications of the fragmentation of Being which relates the most general system to a computational infrastructure and also to the thresholds of complexity that provide the basis for the emanation of dissipative, autopoietic and reflexive systems.

Figure 7: Relation between Special Systems and Epistemological Hierarchy of Klir



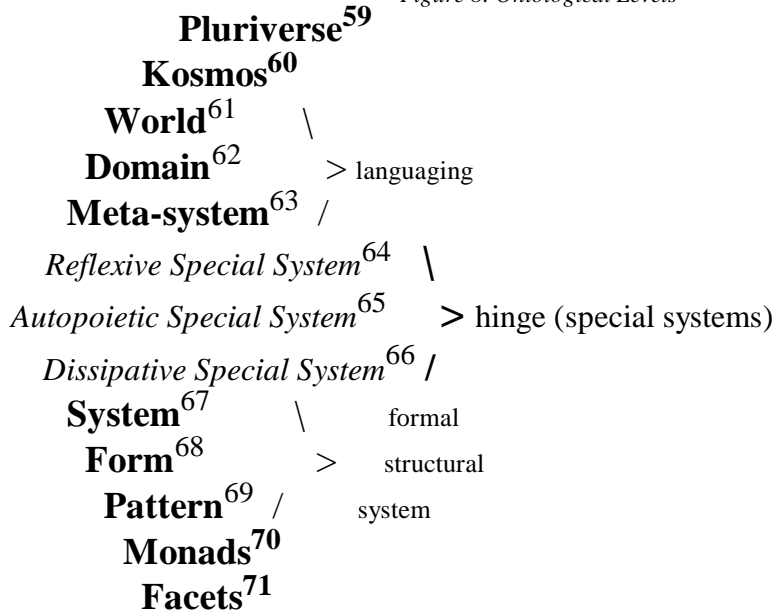
[End Excerpt.]

What we need to realize is that there are different thresholds of organization to perceptual and conceptual phenomena. We normally concentrate on the forms, or outlines, of things as the principle level for understanding things. Structural-formal systems posit an organization on the level of content via the positing of a structural micro-formalism such as that we find in Klir's work where data contents are structured in variables⁵⁷. We also sometimes posit the systems level where we see the forms in a supra-formalism which is equivalent to a gestalt. Formalism allows deductions from rules. Structuralism adds the ability to transform across discontinuities over time. Systems give us the ability to consider part-whole relations. Structure is explanatory while System is descriptive. Explanation is weaker than proof, and description weaker than explanation. Formalism on the other hand is brittle and superficial because it cannot handle either time nor emergent phenomena. When we combine all three of these ways of looking at things into a single model as Klir does we get a formal-structural system⁵⁸ perspective on things. But this series of emergent thresholds of our modeling of things does not have to stop there. We need to recognize beyond that a further series of levels which are called meta-system, domain, world, universe, pluriverse. In this essay we are only concerned with distinguishing the system from the meta-system level and recognizing the special systems that serve as a hinge between them. However, these other emergent ontological levels also play a role in the comprehension of the nestings of the structures of the world.

57. Klir, G.J. and Uyttenhove, H.J.J. [1976] "Computerized Methodology for Structure Modeling" in *Annals of Systems Research*, Volume 5, pp. 29-66.

58. See also, Wilden, Antony [1972, 1980] *System and Structure: Essays in Communication and Exchange*. Travistock Publications, London. See also, Salthe, S.N. [1985] *Evolving Hierarchical Systems: Their Structure and Representation*. Columbia University Press, New York.

Figure 8: Ontological Levels



In this hierarchy the lower four levels take their articulation from the Kinds of Being⁷². When we look at the substrata beyond form we find the level of pattern which includes structure, process, sign, and value. The substrata beyond pattern is called by Derrida ‘Traces’ and the substrata beyond traces are variously called propensities or tendencies.

Goodwin in How the Leopard Changed it’s Spots⁷³ talks about “active media” and describes DNA as controlling the parameters of the unfolding of active media along its lines of natural propensity. Thus we can think of the facets as the elements which have propensity or tendency in the active media. The monad may be seen as an articulation based on a particular set of tendencies. The pattern is a configuration of monads. Think of the monads as the imaginary isolatable quality contents of

59. The pluriverse is the same as the many worlds interpretation in physics. It is the multitude of universes beyond our universe. In Indo-European mythology it was represented by the worldtree: Yddrassil.

60. The Kosmos is our universe which is projected upon and differentiated by all other possible universes within the pluriverse. The pluriverse is beyond our kenning but the universe is everything that exists within our kenning.

61. The World is defined by our languaging. As with the Whorfian Hypothesis we believe that different languages create different worlds that highlight different aspects of the Kosmos.

62. The domain is set up by specialized sub-languages under the auspices of a natural language. Thus, the special languages of different disciplines produce different perspectives on the world and create sub-domains within the world. The domain of art, sometimes called the ‘art world’ is an example.

63. Meta-systems exist between languages and the systems we see in the world. Meta-systems are very nebulous but exist as environments, contexts, situations, milieus, ecologies, etc.

64. The reflexive special system is the foundation for the social within the world.

65. The autopoietic special system is the foundation for the organism within the world.

66. The dissipative special system is the foundation for the organ, or what Deleuze and Guattari call partial objects (following M. Kline’s definition of object relations) or *desiring machines*. These are the effective constituents of individuals.

67. Systems are primarily understood as gestalts.

68. Forms are understood in terms of G. Spencer-Brown’s *Laws of Form* [1972] Julian Press, New York.

experience. Patterns are a configuration of these isolatable units which cannot in actuality be pinned down. The form is a shape or behavior made up of these patterned contents that articulate tendencies of the active media. There are active media at various ontic emergent levels. In the case of the cell particular forms are produced by guiding the patterning process that arises from actively articulated tendencies in the media itself. Everything does not come from the DNA. Instead, it is the inter-relation between the DNA code and the active media of the cell which includes the natural molecular interactions that allow the creature to arise and take form in the unfolding of the physus. What surprises us is that this leads to the concomitant unfolding of the Logos as well.

The upper four levels take their articulation from the 'Having'. Having is composed of ownership, domination, and use. All three of these apply to the level of the Domain. We successively lose these properties as we move upward toward the pluriverse. At the level of world we lose ownership. Worlds are held in common and not owned by anyone person. At the level of Kosmos we also lose the ability to manage so that we only have use of the discovered Kosmos and cannot own it or dominate it. Finally the Pluriverse is a 'reserve' which cannot be owned, dominated or used. Being and Having enter the complex of the Indo-European languages together and are intimately connected. Our hierarchy shows the transition from the internal differentiation of Being into Meta-levels toward the differentiation of Having. Between Being and Having the difference between System and Meta-systems appears and within that difference the Special Systems take root. Here we are particularly concerned with the nature of the System/Meta-system distinction as the basis for understanding the Special Systems. However, it is important to realize that this distinction takes place within an overall context of the difference between Being and Having that we accept from our Indo-European linguistic roots.

Take the example of a software application. We treat the application as a system. But we recognize that we need an operating system to support the resource and computational needs of the application system and also to allow different applications to interact. Operating systems are indeed software meta-systems that are the origin and arenas for the existence and interaction of software application systems. We can see this same distinction when we think of the relation between the

69. Patterns take the form of Structures, Processes, Signs and Values. Klir treats Structures and Processes in his Epistemological Hierarchy. He calls Processes 'Meta-models'. Structures are also the subject of Structuralism in the work of Levi-Strauss (*The Savage Mind* [1966] University of Chicago Press) or Piaget (*Structuralism* [1970] Basic Books, New York). This is the level beneath of the symbol where the sign flourishes so it is studied in terms of semiotics. Structures are micro-formalisms that organize the distinctions between different kinds of content. Signs and Values are treated by Baudrillard in his Critique of the Economy of the Sign. Jung also includes sign and value as the major ingredients of the psyche.

70. Monads are the lowest distinguishable unit of sensation which Husserl called Hyle. It is the content that is distinguished and organized into patterns by structures.

71. Emergent meta-systems theory discovers that monads are faceted, this is where the many worlds come from is the fragmentation or faceting of the monads. Thus, we begin to think of monads as summaries over possible worlds.

72. To be explained below.

73. Goodwin, B.C. [1994] *How the leopard changed its spots: the evolution of complexity*. London: Weidenfeld & Nicolson.

Universal Turing Machine and the specific Turing Machine. A Universal Turing Machine⁷⁴ contributes the Meta-systemic aspects that allow different Turing Machine embodiments to exist in the same computational environment. Universal Turing Machines are meta-systems within which Turing Machines can be embodied and even interact if one either produces output from one that feeds through the tape to the other or else provides for multi-tasking of Turing Machines within the Universal Turing Machine architecture⁷⁵. Gurevich generalized the cumbersome Turing machine formalism into an Abstract State Machine specification method⁷⁶ that is extremely useful in capturing the behavioral models that are the interpretation of requirements for a system. This method produces layers of virtual machines through a process of refinement. The interaction between the environment and the virtual layered machines may be captured by interacting sets of rules. Rules that describe the environment are couched as constraints while the rules that describe the application represent causal chains. Rules provide a good way to capture behavior and the constraints on behavior because they synthesize all four methodological viewpoints (agent, function, event and data) and the multiple layers of information (data, information, knowledge, wisdom) into a single synergetic construct. From this we can see that not only are meta-systems a familiar phenomena but we can embody them computationally. Also we can now understand the intrinsic *lack* that Meta-systems have. Operating systems without applications are useless. Universal Turing Machines without tapes with specific Turing Machines on them are useless. Meta-systems have an inherent lack that is only filled by the provision of systems. Likewise Systems need an arena in which to operate and their environment is just as important to their functioning as their own internal structure. Via the environment they communicate with other systems, garner resources, and interact through mutual actions. The law of requisite variety enunciated by Ashby⁷⁷ calls for the mutual adequation of the nested systems with a meta-systemic field. The surplus of the gestalt system whole exactly compensates for the lack that exists in the meta-systemic environment. In fact, they need to be fitted to each other like any complementary pair of things that are made for nesting and to work together. The difference is that in this complementary paring of system and meta-system the system is a unified whole while the meta-system is itself intrinsically complementary in the sense that Bohr saw in our models of quantum phenomena. In other words, in the meta-system there is an exclusive showing and hiding of characteristics⁷⁸ that does not occur in the system. The objects are figures that are shown and hidden in the temporal gestalt of the system's dynamism. But the face that we see of the system at each point in the system's evolution exists within the meta-systemic field that has

74. Herken, R. [1988] *The Universal Turing Machine*, Oxford University Press, New York.

75. Manthey, Michael "Toward an Information Mechanics" IEEE 1994 0-8186-6715-X

76. aka Evolving Algebras (the old name of this formal method)

77. Ashby, W.R. [1961] *An Introduction To Cybernetics*. Chapman & Hall, London.

78. This showing and hiding has a logic of its own embodied in August Stern [1988] *Matrix Logic* Amsterdam; New York: North-Holland; New York, N.Y., U.S.A.: Distributors for the U.S.A. and Canada, Elsevier.

an implicit or implicate ordered dynamism that is only seen in the breaks between systemic regimes in which the objects are reordered or different sets of objects appear. The system has coincident and overlapping characteristics whereas the meta-system has co-exclusive and non-overlapping properties. This difference defines the surplus of one and the lack inherent in the other.

The system and meta-system are complementary ways of looking at any matter. They are inverse duals of each other in the sense that what one has the other lacks. Meta-systems are inherently split into complementary properties like the characteristics related to its role as origin and its role as arena of exchange. Systems on the other hand are apparently unified. But systems within a meta-system may stand in complementary relations to each other. The complement of a system is the anti-system. The anti-system may be embodied or may merely be all the other possible systems, other than a particular system, within the meta-system. If there is a specific anti-system then all the other possible systems become classified as the non-system. The Greimas square⁷⁹ allows us to construct the anti-non-system which holds the position of the “Other” with respect to the system. We may construct a chiasmic relation by reversing the anti-non-system and getting the non-anti-system. This chiasmic reversal within the Other gives us our access to non-duality. This chiasm is mirrored in the complementarity of the meta-system proto-gestalt in the relation of origin to arena or in the proto-flow as source and Oceanus, i.e. encompassing stream. In other words, the Otherness that appears to us arising out of the meta-system is inherently split into a chiasmic reversal where either the “anti” or the “non” is emphasized. If the “anti” is emphasized we see the arena within which the system confronts its opposites. If the “non” is emphasized we see the variety that is being produced and our attention is focused on the origin of that variety. The meta-system is the nexus out of which Otherness arises and is sustained from the viewpoint of the system. That Otherness drives it’s need for requisite variety. But, variety is not random difference. Variety arises together from the proto-flow source or proto-gestalt origin of the meta-system and plays itself out within the arena of freedoms set up by the meta-system or within the all encompassing flows of the Oceanus. In this way the Meta-system plays the role of the nonduality of the Good which is the source of endless complementary variety. This play unfolds the necessary fourfold dimensions of Otherness directly expressing the needs of the system for opposite variety to its own internal coherence of differences. The complementarity of system (gestalt or flow) and meta-system (proto-gestalt or proto-flow) conditions and grounds all other complementarities between systems and their Others that take place within the meta-system and causes the complementarity of the meta-system to manifest.

79. Greimas, A.J. [1987] uses the square of logical contraries and contradictories as a basic pattern to analyze narrative in *On meaning: selected writings in semiotic theory* Minneapolis: University of Minnesota Press.

Once we have understood the distinction between the System and Meta-system as the difference between a whole greater than the sum of its parts (a surplus) and a complementary assemblage less than the sum of its parts (a lack), then it is possible to consider the special systems that appear as a hinge⁸⁰ between these two ways of looking at things. Unless we recognize the complementarity of the system and the meta-system and the complementarity within the meta-system between origin and arena, or source and encompassing flow, then it is impossible to ‘see’ the special systems that arise between them. This is because we are used to seeing everything as systems and we reserve the meta-system as subsidiary concept rather than as a way of approaching things that is co-equal with the approach to things as systems. When we see surpluses (of projected gestalt systems) everywhere and suppress the complementarity of things it is difficult to realize that anomalous special systems exist that exactly balance these two complementary perspectives. However, there does exist when we look at things in the right light a set of special systems that exactly balance the concerns of the system and the meta-system and in the process produces some unique and peculiar emergent properties that seem anomalous from the perspective of either systems or meta-systems. These special systems, as partial systems or superabundant meta-systems, are exactly equal to the sum of their parts with no excess or deficiency. There are exactly three such special systems that can be called by the names dissipative, autopoietic and reflexive special systems. Each one has its own emergent properties different from the properties of Systems gestalts or Meta-system proto-gestalts. We follow David Bohm⁸¹ in ascribing implicate order to meta-systems and we call them proto-gestalts to distinguish them from normal gestalts that underlie systems. Proto-gestalts generate the discontinuous changes that occur in gestalt fields. These produce temporal gestalt formations in which a gestalt is associated with a duration which suddenly changes into a completely different gestalt pattern. Proto-gestalts produce the pattern of discontinuities that fragments gestalts in time. In this way proto-gestalts are similar to process meta-models in Klir’s ASPS⁸² while gestalts are similar to meta-structures. The difference is that process and structural meta-levels are both visible modulations of data by generative functions, whereas proto-gestalts are invisible operating behind the scenes to produce emergent events in which genuinely new process and structural patterns are generated. Proto-gestalts contain the pattern of emergent novelty implicit in a series of gestalt system formations.

The *dissipative special system* has been best described by Prigogine⁸³ as *dissipative structures* and demonstrated to be a special phenomena by the exploration of far from equilibrium thermodynamic processes⁸⁴. These dissipative

80. See Jacques Derrida *Of Grammatology*, op. cit.

81. See David Bohm [1983] *Wholeness and the Implicate Order*. Ark Books, New York

82. *Architecture for Systems Problem Solving*, op. cit.

83. Prigogine, I. [1984] *Order Out of Chaos*. Bantam Books, New York. See also, [1980] *From Being to Becoming*. W.H. Freeman, New York.

phenomena which dissipate order that arises spontaneously are seen to be neg-entropic local fluctuations that make possible the arising of life and other complex ordered phenomena. The natural phenomena that relates to dissipative special systems is the anomaly of soliton waves.⁸⁵ The mathematical analogy for this type of special systems is the imaginary complex algebra, called here complexnions⁸⁶. This algebra is equivalent to the reflection between two facing mirrors⁸⁷. The simple topological analogy of the dissipative special system is the mobius strip⁸⁸.

The *autopoietic special system* has been best defined by Maturana⁸⁹ and Varela⁹⁰ who use self-organization as definition for life. The best introduction to this literature is John Mingers' Self-producing Systems⁹¹. In general all macro-quantum mechanical phenomena are autopoietic in nature⁹². An autopoietic system is seen to be closed from an information perspective while remaining open to physical perturbations and maintaining it's own organization as a homeostatic variable. It is composed of a network of nodes that produce their own structural components which are then organized by the system to produce itself. The natural phenomena that relates to autopoietic special systems is both the anomalies of superfluids⁹³ of Helium three and four as well as the anomaly of superconductivity.⁹⁴ With reference to solitons there is a higher level structure called the '*breather*' that is composed of a soliton and a negative soliton interacting to form a stable stationary wave formation. The mathematical analogy for these special systems is the imaginary quaternion hyper-complex algebra⁹⁵. This algebra is equivalent to the reflection between three facing mirrors that form an equilateral triangle.⁹⁶ The topological analogy of the autopoietic special system is the kleinian bottle.

The *reflexive special system* is posited as the social extension of the autopoietic special system. The definition of this new emergent level is a fundamental contribution to Autopoietic Theory which does not cover social

84. Goldstein, M. and Goldstein, I.F. [1993] *The Refrigerator and the Universe: Understanding the Laws of Energy*. Cambridge, MA, Harvard U.P. See also Sklar, L. [1993] *Physics and Chance*. Cambridge U.P.

85. Lamb, G. L. [1980] *Elements of soliton theory*. Imprint New York: Wiley. See also Drazin, P.G. and Johnson, R.S. [1988] *Solitons: an introduction*. Cambridge [Cambridgeshire]; New York: Cambridge University Press.

86. Nahim, P.J. [1998] *An Imaginary Tale: the story of the square root of negative one*. Princeton: Princeton University Press. This is an excellent introduction to the history of complex and imaginary numbers.

87. Onar Aam (onar@hsr.no) discovered this fact in his research into the underlying mathematical basis of the special systems theory.

88. Fauvel, T., Flood, R. and Wilson, R. [1993] *Mobius and His Band*. Oxford University Press.

89. Maturana, H.R. and Varela, F.J. [1992] *The Tree of Knowledge*. Shambala Books.

90. Varela, F.J., Thompson, E. and Rosch, E. [1991] *The Embodied Mind*. MIT Press, Cambridge MA.

91. Mingers, J. [1995] *Self-Producing Systems*. Plenum Press, New York.

92. Smolin, L. [1997] *The Life of the Cosmos*. N.Y. Oxford U.P. This book talks about the relation between Self-Organization and Physics of the Universe.

93. Khalatnikov, I.M. [1965] *An introduction to the theory of superfluidity*. New York, W.A. Benjamin.

94. Rose-Innes, A. C. and Rhoderick, E. H. [1969] *Introduction to superconductivity*. Oxford, New York, Pergamon Press. See also Tinkham, M. [1975] *Introduction to superconductivity*. New York: McGraw-Hill.

phenomena in spite of the fact that many researchers such as Luhmann⁹⁷ have attempted to use Autopoietic Theory to cover social phenomena. It is best defined by John O'Malley in The Sociology of Meaning⁹⁸ and by other reflexive theorists from the Sociological tradition that looks at the philosophical roots of sociological theory such as Barry Sandywell in his Logological Investigations. A good introduction to this literature is Ashmore's The Reflexive Thesis⁹⁹ and Alan Blum's Theorizing¹⁰⁰. The natural phenomena that relates to dissipative special systems is the anomaly of the Einstein-Bose Condensate.¹⁰¹ The mathematical analogy for these special systems and their physical example is the imaginary octonion hyper-complex algebra¹⁰². This algebra is equivalent to the reflection between four facing mirrors that form a inwardly mirroring tetrahedron. This is equivalent to what Onar Aam

95. Quaternion hyper-complex algebra has the following rules: $ij=k, jk=i, ki=j, ji=-k, kj=-i, ik=-j, i^2=j^2=k^2=ijk=-1$.

Quaternion Multiplication Table

	1	i	j	k
1	1	i	j	k
i	i	-1	+k	-j
j	j	-k	-1	+i
k	k	+j	-i	-1

See also du Val, P. [1964] *Homographies, Quaternions and Rotations*. Oxford University Press.

As a side note notice also that the singularity $-1 = e^{\pi*i}$. This is the most remarkable equation in mathematics according to the youthful Feynman. Our interpretation of this equation is that the e is the natural logarithmic spiral which is dissipative ordering. the $\pi*i$ exponent is composed of a half of a hyper-cycle circle and an orthogonal component which can flip the half circle 90 degrees into the imaginary space. When we combine two $e^{\pi*i}$ elements then we get an autopoietic system composed of two dissipative spiral generators and a full hyper-cycle circle that can be rendered orthogonal by flipping it into imaginary space. This equation $-1 = e^{\pi*i}$ represents the internal structure of the singularity in the real number line at -1 and is an image of the autopoietic holon. Since $0 = e^{\pi*i} + 1$ we can see the reflexive structure in the cancellation of the antinomies of -1 and 1 which arise from the void and return to it. But this also implies that $0 = e^{\pi*i} + (e^{\pi*i} * e^{\pi*i})$ which means that any systemic whole is composed of two symbiotic autopoietic elements multiplied but if you add another one then that cancels. This underwrites their status as holonomic. This is like the equation $0 = -1 + (-1 * -1)$ which causes us to look more carefully at the difference between $-1 * 1 = -1$; $-1 * -1 = 1$ and $1 * 1 = 1$. We can interpret these to mean non-existence times non-existence is existence and existence times existence is existence. We also know that non-existence times existence is always non-existence. So when two non-existences get together there can come from them an existence. It is this fact that we use to produce forms out of the void. The number -1 is the singularity in the real number line where imaginary orthogonality appears which is neither less than nothing, more than nothing nor nothing. We get a glimpse inside of that singularity through the remarkable term $e^{\pi*i}$ which is the image of an autopoietic holon. The square root of $e^{\pi*i}$ is i, or j or k. This makes i, j and k imaginaries of the quaternion subsidiary holon factors within this higher level holon. We get the following image of the levels of the Special Systems Theory.

Systemic Gestalt	= Any number produced by addition or multiplication of 1, 0, -1
Dissipative Special System	= $e^{\pi*i} = -1$ composed of $\sqrt{e^{\pi*i}}^2 = i^2 = j^2 = k^2 = ijk$ [holon and sub-holons]
Autopoietic Special System	= $e^{\pi*i} * e^{\pi*i} = -1 * -1 = 1$ [autonomous unity]
Reflexive Special System	= $e^{\pi*i} * e^{\pi*i} + e^{\pi*i} = (-1 * -1) + -1 = 1 + -1 = 0$ [arising and passing away of pairs]
Meta-Systemic Proto-Gestalt	= 0 [void as ground state of formlessness]

We note that in the sub-holon $i = \sqrt{e^{\pi*i}}$ the imaginary appears within the definition of itself producing a non-well-founded set mediated by the two transcendental numbers e and π . How these two transcendentals can compensate each other to produce a whole of -1 is hard to imagine. But it shows that there is infinite information within the dissipative system which is composed of two sub-holons multiplied. We have used the Escher waterfall or Penrose triangle to illustrate how infinite information, in this case the randomness of the transcendental number which is yet fixed can yield a self-originating informational flow which is apprehended as the gestalt of a dissipative system.

calls a “Mirror House” on the analogy of the mirrorhouse in a circus. It is also equivalent to what Martin Heidegger calls the fourfold of Being. We speculate that there is a higher level soliton formation also associated with the reflexive level which we have named the Super-Breather. We hypothesize that the soliton super-breather is a combination of two soliton breathers that appear in a configuration which produces an instantaton¹⁰³ formation. The two breathers exchange solitons as instantatons though a potential trough between the two positions in spacetime where the breathers are located. Thus, the superbreather is both a soliton and an instantaton at the same time. Also we speculate that there is a higher level analog to the kleinian bottle called the hyper-kleinian bottle formed by two kleinian bottles intersecting at their self-intersection circles to form a *sphere of ambiguity* when the two kleinian bottles are rotated in four dimensional space. Both the Super-Breather and the hyper-kleinian bottle should they exist would complete the series of anomalies that allow us to describe facets of the reflexive special system. There is good evidence for the existence of the hyper-kleinian bottle¹⁰⁴. The Super-Breather is merely a hypothesis at this time.

Autopoietic theory has been variously applied to social groups by different theorists¹⁰⁵. The authors of this theory deny that it is a valid use of the theory and distinguish between autonomous and autopoietic systems.¹⁰⁶ They see social groups as one form of autonomous system that is made up of autopoietic systems, but they stress that social systems have different properties than merely living systems. This difference can be defined by saying that reflexive social systems are heterodynamic instead of homeostatic. This means that social systems are continuously changing with radical quantal changes that transform their essence. In the process of accepting

96. This insight due to Onar Aam.

97. Luhmann, N. [1982] *The differentiation of society* Translated by Stephen Holmes and Charles Larmore. New York: Columbia University Press. See also Luhmann, N. [1990] *Essays on self-reference* New York: Columbia University Press.

98. O'Malley, J. [1979] *The Sociology of Meaning*. Human Context Books, London.

99. Ashmore, M. [1989] *The Reflexive Thesis: Writing Sociology Of Scientific Knowledge*. University of Chicago Press. Chicago. See also Sandywell, B. [1996] *The Beginnings of European Theorizing: Reflexivity in the Archaic Age: LogoLogical Investigations*. Routledge, London.

100. Blum, A. [1974] *Theorizing*. Heinemann, London.

101. Griffin, A.; Snoke, D.W.; Stringari, S. [1995] *Bose-Einstein condensation*. Cambridge [England]; New York: Cambridge University Pres. See also Griffin, A [1993] *Excitations in a Bose-condensed liquid*. Cambridge [England]; New York, NY, USA: Cambridge University Press.

102. Octonion Multiplication Table from Donald Chesley

	e1	e2	e3	e4	e5	e6	e7
e1	-1	+e3	-e2	+e5	-e4	+e7	-e6
e2	-e3	-1	+e1	-e6	+e7	+e4	-e5
e3	+e2	-e1	-1	+e7	+e6	-e5	-e4
e4	-e5	+e6	-e7	-1	+e1	-e2	+e3
e5	+e4	-e7	-e6	-e1	-1	+e3	+e2
e6	-e7	-e4	+e5	+e2	-e3	-1	+e1
e7	+e6	+e5	+e4	-e3	-e2	-e1	-1

See URL <http://idt.net/~chesley/TWISTED.HTM> where he also talks about a variation called Twisted Octonions.

these radical changes the social system is ecstatic, or as Heidegger says “ex-static,” which means it is continually projecting itself outside of itself into the others of the society of which it belongs. This many to many self projection of the social organism that G.H. Mead called the “Generalized Other¹⁰⁷” can be seen as having the nature of a meta-hologram in which the perspectives of the social group are holographic as well as the contents of the parts. And this meta-hologram, or four-dimensional hologram, contains a myriad of sub-holograms that all interpenetrate each other. George Leonard has called this meta-hologram the “holoid.¹⁰⁸” In the meta-hologram¹⁰⁹ each member is the whole which is mirrored in all the other parts. All the perspectives on these various wholes are contained within the meta-hologram in such a way that all the perspectives contain parts of all the other perspectives. We can use Aczel’s¹¹⁰ model of Hyper-sets which are Non-well-founded and violate Russell’s dictum that sets do not contain themselves¹¹¹. The meta-hologram is a model of interpenetration in which the tremendous overdetermined synergy that exists in the social arena is modeled. We can follow Arkady Plotnitsky in saying that these perspectives and sub-holograms within the meta-hologram are “heterogeneously interactive and interactively heterogeneous.” We can go further and call the meta-holographic structure a projection of the world. Each projected perspective within the world we would call a domain. Normally the domains are embodied by a living linguistic sub-culture. The projected world encompasses all the linguistic subcultures within a single overarching synergetic totality. Within those linguistic sub-cultures we can produce either complementary theories of phenomena described by meta-systems or monolithic classical theories of phenomena that we describe as formal-structural systems.

As a digression it is worth saying something about the Kosmic Monad / Faceted Pluriverse. We notice that the ends of the ontological emergent hierarchy are bounded by the Kosmos and Pluriverse at one end and the Monad and the Facets of the Monad at the other end. We can construct a picture of the totality of all things by considering the Kosmic Monad and the Pluriverse of Faceted Monads. The Kosmic

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103. Freed, D.S. and Uhlenbeck, K.K.[1984] *Instantatons and Four Manifolds*. N.Y. Springer Verlag. See also Rajaraman. [1982] *Solitons and Instantatons*. North Holland.
 104. Steve Rosen [1994] first speculated of the existence of Hyper kleinian bottles in *Science, Paradox and the Moebius Principle*. SUNY. He has produced an excellent series of articles which explore the connection between the mobius strip and the kleinian bottle and their implications for the creation of a non-dual philosophy very similar to the authors.
 105. For example, Luhmann, Niklas [1982] *The Differentiation Of Society*. Columbia University Press, New York. For an excellent example see Adams, R.N.[1988] *The Eighth Day*. Austin, University of Texas Press.
 106. Varela, F.J. [1979] *Principles of biological autonomy*. New York: North Holland.
 107. Mead, G.H. [1962] *Mind, Self, and Society from the Standpoint of a Social Behaviorist*. University of Chicago Press, Chicago, IL. Peirce mentions the possibility of super-organismic personality in “Man’s Glassy Essence.” [Monist 3, Oct 1892 1-22]
 108. See Leonard, G. [1978] *The Silent Pulse*. E.P. Dutton, New York.
 109. Onar Aam has called this mutual mirroring structure the magical *mirrorhouse* on the analogy of the fun houses that have mirrors in circuses.
 110. Aczel, P. [1988] *Non-Well-Founded Sets*. Center for Language and Information, Number 14, Stanford University.
 111. Whitehead, A.N. and Russell, B. [1925-1927] *Principia Mathematica*. Cambridge University Press, Cambridge, UK.

Monad is a standard symbol in Theosophy¹¹² standing for the archetype of what exists on the edge of form where it bleeds off into formlessness. There are many representations of Kosmic Monads within the Western mystical literature¹¹³. The basic concept is that each atom of the subtle universe has the same form as the whole universe so that everything is produced from a single archetype of energy involution. The normal form of the Kosmic Monad is some kind of helix structure that turns back in on itself like the worm Omniborus eating its tail. The theosophical Kosmic Monad is merely a picture of the paradoxicality of the Totality of what *Is*. It is very similar to the paradoxicality of the autopoietic system as defined by the biologists Maturana and Varela. Hofstadter dealt with many similar paradoxical formations in Gödel, Escher, Bach: Eternal Golden Braid¹¹⁴. We see images of this archetype in the Chinese Dragons that hover between form and formlessness. The Faceted Pluriverse, on the other hand, is the inverse of the Kosmic Monad archetype. The Faceted Pluriverse is the meta-system to the Kosmic Monad system. In the Pluriverse there are many possible worlds that are simultaneously present. These many possible worlds interfere with each other to produce what we know as the real world. These worlds are constantly arising and canceling and in fact act like a swarm of monads from the theory of Self-Generating Systems.¹¹⁵ These monads fragment and it is that fragmentation that produces the many worlds.¹¹⁶ In other words, instead of positing many possible universes we can equally posit fragmenting monads in which the worldlines of these fragmenting faceted monads diverge. What we notice is that the distinction between the System and Meta-system is writ large in the relation between the Kosmic Monad and its umbra of Many Possible Worlds that are produced by the shattering of Fragmented Monads. The Kosmic Monad is the result of the cancellation of the Possible Universes that hover around it. Similarly, we can see that at the next level down there is a World Pattern that serves as the meta-system to the Formal Domain. In other words, the distinction between system and meta-system reverberates in these higher and lower levels of ontological emergence. In order to see this all we must do is combine the concepts that are opposite each other at the two ends of the spectrum. So we see why this distinction between System and Meta-system is so crucial. The reason is that it underpins the hierarchy of ontological emergent levels by which we comprehend phenomena. At the highest level we model the highest archetype of the interface between form and formlessness. The Emergent Meta-system formation is an explicit process model of the Kosmic Monad. But we realize that our kosmos is merely one of many possible universes and that these universes cancel out leaving our universe precisely the same way as cancellations of monads occur within the Emergent Meta-system. So the spacetime within which the

112. Rogers, L.W. [1956] *Elementary theosophy*. Wheaton, Ill., Theosophical Press.

113. Yeats, F. [1956] *A Vision*. New York: Macmillan Co., 1961.

114. Hofstadter, Douglas R. [1979] *Gödel, Escher, Bach : an eternal golden braid*. New York : Basic Books.

115. Goertzel, B. [1994] *Chaotic logic: language, thought, and reality from the perspective of complex systems science* New York: Plenum Press.

116. Deutsch, D. [1997] *Fabric of Reality: The Science of Parallel Universes- And Its Implications*. Allen Lane.

Emergent Meta-system operates is produced by the same process as the Emergent Meta-system itself. But that process is seen as the Pluriverse of Fragmented Faceted Monads instead of as a swarm of Monads. Similarly, the Domain of Form which Science takes to be its object must be subjected to the critical accounting of the World Pattern. The World Pattern has been explored by Husserl in Krisis¹¹⁷ and by Schutz¹¹⁸ in his Sociological explorations of the concept of lifeworld. Phenomenology¹¹⁹ discovers the patterning of the world that acts as a meta-system for all formal domains. Science is blind to its own roots in the lifeworld. Heidegger attempted to lay out this world-patterning in Being and Time¹²⁰ in terms of 'being-in-the-world' or 'dasein.' What we see of interest is that Physics when it explores its limits formulates the concept of the Pluriverse but it is only theosophy that formulates the paradoxical Kosmic Monad that is the focus of the Faceted Pluriverse. Phenomenology, Dialectics, Hermeneutics and Structuralism explore the World Pattern beyond the realm that Science will allow itself to enter, rather it restricts itself to the formal domain. Thus, Physics attempts to stick within its formal domain but ends up escaping into the strange domain of the Pluriverse. On the other hand the Humanities formulates the process of world patterning that goes beyond the formal domain and encounters paradoxes that it formulates in terms of the Kosmic Monad which are similar to the paradoxes formulated by the theosophists that go beyond what even social scientists are willing to entertain. But this whole formation that arises when we consider the fact that the ontological emergent hierarchy folds back into itself is merely a ramification of the basic distinction between systems and meta-systems taken on a grand scale. We can learn the most about this distinction if we stick to the relation between systems theory and its meta-theory. But it is good to be aware that this distinction has many ramifications within our tradition.

The theory of systems and meta-systems as well as the theory of the special holonomic hinge between them is the basis of a theory of Emergent Worlds. The Kosmic Monad and the Faceted Pluriverse are projections beyond our experience. The World Pattern is the highest level of the ontological hierarchy that we experience. So it behooves us to posit the theory of Emergent World Patterns as the ultimate foundation, as groundless a ground, for all our endeavors within the various disciplines. The World Pattern is our ultimate experiential meta-system and it behooves us to attempt to understand it theoretically. World Patterns arise as Emergent Events, such as the transformation from the Mythopoetic era to the Metaphysical era we are encompassed by now. So our theory of World Patterning must take account of Emergence as a primordial phenomena. So ends the digression

117. Husserl, E. [1965] *The crisis of European sciences and transcendental phenomenology; an introduction to phenomenological philosophy*. New York, Harper & Row.

118. Schutz, A. [1973] *Structures of the Lifeworld*. Evanston [Ill.] Northwestern University Press, 1989

119. Moustakas, C. [1970] *Phenomenological Research Methods*. Nijhoff.

120. Heidegger, M. [1962] *Being and Time* London, SCM Press. Translated by John Macquarrie & Edward Robinson. See also translated by Joan Stambaugh. Albany, NY: State University of New York Press, c1996.

concerning the macro-organization of the world using the system/meta-system distinction ramified out beyond the bounds of experience as a means of projecting the world.

Figure 9: Nesting of ontological levels.

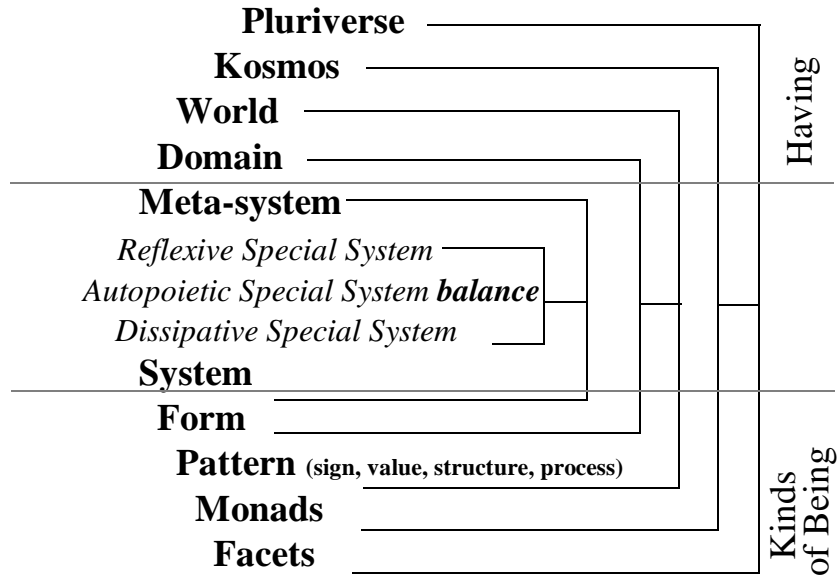


Figure 10: Ontological Shells

Faceted Pluriverse - Kosmic Monad
 World Pattern - Formal Domain
 Systemic Meta-system - Reflexive Dissipation
 Autopoietic Balance

The important point about the special systems is that they are defined not just by theoretical definitions, but more succinctly and rigorously by mathematical analogies. Each threshold of complexity that defines a special system level is associated with a particular algebra. These algebras form a natural series that define the minimal emergent properties at each transition point between special systems. The fact that we can find a mathematical basis for our theory of special systems is quite unexpected, but if proven sound, it opens the possibility of the long sought after mathematical basis for the social and psychological sciences. At the reflexive threshold of complexity we find an intrinsic sociality that we can construe as the relations between individuals or as the relations between cognitive agents in the

“society of the mind” ala Minsky¹²¹. The layers of progressive emergence begins with normal systems, and then defines neg-entropic far from equilibrium natural systems, and then specializes further to give autopoietic living/cognitive systems, before finally further specializing to give us social/psychological reflexive systems. There is a nice progression that naturally leads to the definition of the ‘socius’¹²² as a *sui generis* phenomena which Durkheim expected Sociology to discover. This series of emergent levels abruptly stops at this final social reflexive level before giving way to the pure recursive meta-system of infinitely deep interpenetrated complexity. This shows us the intrinsic connection of the social to previous emergent phenomenal levels as well as giving us a glimpse of the preeminence of the social as the final strata of phenomenal ontic emergence from which we gain a vista on the panoply of the manifestations of the pluriverse. The ontic emergent layers end at the social unless we hypothesize a further level Gaia. We can use this final level of phenomenal emergence as the foundation made clear by our mathematical analogies as the basis for a new Social Phenomenology. Social Phenomenology¹²³ takes the social as the bedrock of all phenomenal experience. In that we follow Durkheim who posited that the philosophical categories were in fact socially constructed¹²⁴. In this we follow Merleau-Ponty and go on to build upon the work of postmodern philosophers like Deleuze and Guattari who posit the socius not the individual as the most basic unity upon which our world is built. So social phenomenology now has a rigorous mathematically derived foundation that we can exploit to build a more “scientific” sociology and psychology.

The definition the special systems by recourse to mathematical analogies leads us to redefine general systems theory on the basis of order instead of the things being ordered. Normally we say a system is a set of components and relations between these components. The relations between components form an N^2 static structure. But where the components interact then the result of the dynamics are different qualitative regimes. Those qualitative regimes may be seen to reflect the interpenetration of the interacting components. As we know from chemistry the qualities of combined components may be very non-intuitive, so ultimately we have to try each interactive relation between components in order to discover its specific qualities which may be very surprising. Interactive interrelations are the external manifestation of internal interpenetration of the components. The interpenetration only occurs because the things that are interrelated dynamically are empty. So there is a dialectic between something and nothing that gives rise to the layering and

121. Minsky, M. [1986] *The Society of Mind*. Simon and Schuster, New York.

122. Deleuze, G. & Guattari, F. [1977] *Anti-Oedipus: capitalism and schizophrenia*. translated from the French by Robert Hurley, Mark Seem, and Helen R. Lane. New York: Viking Press.

123. Sadler, W.A. Jr. [1969] *Existence & love; a new approach in existential phenomenology*. New York, Scribner.

124. Berger, P. & Luckmann, T [1966] *The social construction of reality; a treatise in the sociology of knowledge*. Garden City, N.Y., Doubleday,

multiplicity that underlies the emergent patterns we see in our world. We normally do not mention that to resolve paradoxes that arise in dynamic interaction we will have to appeal to ramified logical type theory, so that there are meta-levels of things within the system and there are different types of things at each meta-level. Also it is normally not mentioned that we need to leave room for the existence of nothing (like zero) within our definition of the system (i.e. the place holder of something). These different ways of defining the system based on its relations and the things woven together by those relations leads us to a definition similar to that posited by G. Spencer-Brown¹²⁵. Spencer-Brown stops his elaboration of this formalism at the point where time would be introduced into it -- that is at the point where the formalism would have to become structural. The formalism as a whole defines a system in the classic sense as the set of all formulas that can be derived from the two axioms of form.

Figure 11: Laws of Form

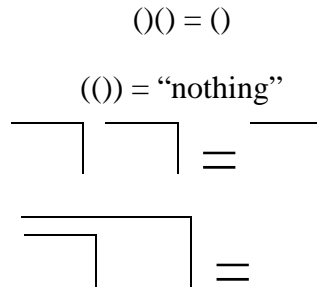
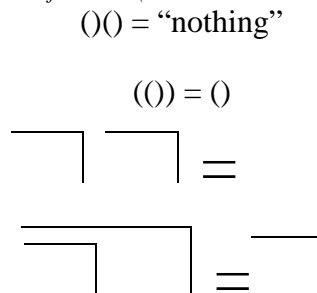


Figure 12: Laws of Pattern (anti-rules to those of Laws of Form)



125. See G. Spencer-Brown [1979] *Laws of Form*. Dutton, New York

Figure 13: Aspects of Form

These formulas assume the primitives:

- Something
- Nothing
- Multiplicity
- Hierarchy

These in turn become the fundamental constituents of forms. When we look at these constituents we see that hierarchy and multiplicity play off of each other either in the realm of something or in the inverted realm of nothing. We can see that the layering and multiplicity of Nothing is equivalent to the ramified higher logical types of Russell as described by Copi¹²⁶. Thus, there is produced a framework of manifestation where meta-level layering and multiplicity within which something or nothing appears is prior to the establishment of relations or operations for the elements. It is through this framework that the basic constituents of form are laid out in relation to each other before explicit relations are created between things.

At this point it is necessary to introduce the concepts of the Kinds of Being¹²⁷. We will do this using G. Spencer-Brown's Laws of Form¹²⁸ and John Conway's Surreal Numbers¹²⁹. If you follow Laws of Form closely you will notice that each aspect of the formal *Mark* refers to a different kind of presentation, that is a different kind of showing and hiding, and since Being, as Manifestation, is only showing and hiding this means that we have introduced at least four different kinds of Being instead of the normal unified kindless Being of traditional philosophy. It has been in the last hundred years that the kindness of Being has been discovered and explicated by modern Continental philosophy starting with Husserl¹³⁰ and moving forward into the other dimensions of Being through the work of Heidegger¹³¹, Sartre¹³²,

126. See Copi, I. [1971] *The Theory Of Logical Types*. Routledge and K. Paul, London.

127. The Kinds of Being or the Fragmentation of Being was introduced by the author in his dissertation *The Structure of Theoretical Systems in Relation to Emergence*, London School of Economics, University of London, UK 1982. This phrase names the four different kinds of Being discovered in modern continental ontology. There is a series of four meta-levels of Being that together constitute the world within the Western worldview.

128. op. cit.

129. Conway, J.H. [1976] *On Numbers and Games*. L.M.S. Monographs, 6, Academic Press, New York. See also Kunth, D. [1974] *Surreal Numbers*. Addison-Wesley, New York.

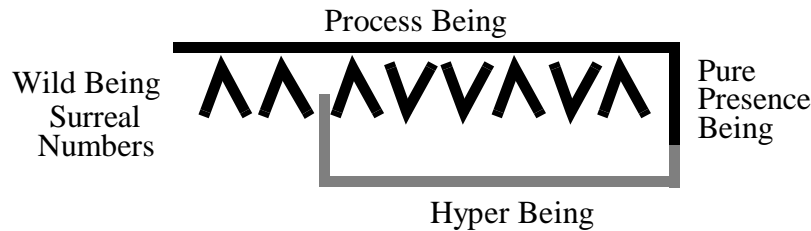
130. Husserl, E. [1970] *Logical Investigations*. Translated by J. N. Findlay. London, Routledge and K. Paul; New York, Humanities Press. Two Volumes. See also Husserl, E. [1960.] *Cartesian meditations : an introduction to phenomenology*. Translated by Dorion Cairns. The Hague; Boston: M. Nijhoff.

131. Heidegger, M. *Being and Time*. op.cit

132. Sartre, J.-P. [1992] *Being and nothingness: a phenomenological essay on ontology*. Translated by Hazel E. Barnes. New York: Washington Square Press. See also Sartre, J.-P. [1976, 1982-1990] *The Critique of Dialectical Reason*. Two volumes. Translated by Alan Sheridan-Smith; edited by Jonathan Rée. Verso ed. London: Verso.

Merleau-Ponty¹³³, Derrida¹³⁴, Deleuze¹³⁵ and others¹³⁶. In order to make the explication of these kinds of showing and hiding brief we will use the Mark and say that the following correspondences hold.

Figure 14: Laws of Form and Surreal Numbers



The vertical stem of the mark indicates the point of the now within the process that is indicated by the overhanging horizontal roof of the mark. The dotted line indicates the jumps that Spencer-Brown adds to the formalism later in the book which generates the proto-imaginary numbers.¹³⁷ These jumps introduce non-linearity into the formulas of the Laws of Form arithmetic and algebra. Varela and Kaufmann further introduce the idea of process through oscillating waves of instituted marks within the variables of the formalism.¹³⁸ When this process oriented interpretation is imposed then the Hyper Being loops are the points where the nestings of the formulas involute. This deeper reading of the Laws of Form makes it more than just a formalism that achieves non-duality of operator and operand and goes on to indicate different kinds of presentation. For instance, there is the momentary presence of the vertical stem, there is the temporal duration of the overhanging horizontal roof, and there is the discontinuous motion of the jumps. Each of these aspects of the Mark represents a kind of temporal presencing. Each kind of Being indicates a different form of persistence within manifestation which has been revisited many times under various names in modern Continental philosophy. But this scheme leaves out one of the canonical kinds of Being. We can capture this last form of Being which is called Wild Being by imagining the Marks

133. Merleau-Ponty, M. [1962] *The Phenomenology of Perception*. Translated from the French by Colin Smith. New York, Humanities Press. Merleau-Ponty, M [1963] *The Structure of Behavior*. Translated by Alden L. Fisher. Boston, Beacon Press. Merleau-Ponty, M. [1968] *The Visible and the Invisible* Edited by Claude Lefort. Translated by Alphonso Lingis. Evanston [Ill.] Northwestern University Press.

134. Derrida, J. *Of Grammatology*. op.cit.

135. Deleuze, G. and Guattari, F. [1987] *Thousand Plateaus*. Translation and foreword by Brian Massumi. Minneapolis: University of Minnesota Press. See also *Anti-Oedipus*. op cit.

136. Henry, M. [1973] *The Essence of Manifestation*. Translated [from the French] by Girard Etzkorn. The Hague, Nijhoff.

137. Proto-imaginaries is my name for the imaginary like formations that appear when the *Laws of Form* is animated as is done toward the end of the book by allowing jumps from one mark to another mark in the sequence of formula.

138. Kaufman, L.H. and Varela, F.J. [1980] "Form Dynamics" in *Journal Social Biological Structures*. Volume 3, 171-206. See also, Takuhei Shimogawa and Yasuhiko Takahara [1994] "Reconstruction of G. Spencer Brown's Theme" in *International Journal of General Systems*, Volume 23, pp 1-21. See also, Kauffman, L.H. [1995] "Arithmetic in the Form" in *Cybernetics and Systems*, Volume 26, 1-57.

of the Laws of Form as being filled with Surreal Numbers¹³⁹ as discovered by John Conway¹⁴⁰ and popularized by Donald Knuth¹⁴¹. These numbers are formed by a progressive bisection starting from zero. There are two symbols called up and down. These are progressively permuted to form a tree structure the nodes of which are mapped to the numbers. What is interesting about Surreal numbers is that it is possible to derive most of the properties of other more familiar numbers from them. They include all the infinite and infinitesimal numbers as well as the Reals, Rationals, Integers and Naturals. If we see surreal numbers as the content of the laws of form then we find that surreal numbers perfectly express the nature of Wild Being within the context of the other kinds of Being represented by the Laws of Form. To be more exact, just as the Laws of Form goes beyond the duality of operator and operand, so the surreal numbers go beyond the duality of quality and quantity. The relation between quality and quantity is contained in the formulas N^2 and 2^N . N^2 is the number of things in a system and all their relations. On the other hand 2^N are the number of interpenetrations of those N things which define the possible qualities of the dynamical system operating within the meta-system. The surreal progressive bisection can either map to numbers, or even more naturally, represent the 2^N interpenetrations of things in a system and, thus, it's possible qualities. Both the Laws of Form and Surreal Numbers add crucial characteristics to the four aspects that underlie the Laws of Form (and its complement the laws of Pattern): namely *something*, *nothing*, *layering* and *multiplicity*. Out of the multiplicity comes the ability to have multiple things in a system that can be related or interpenetrate to form quantitative and qualitative characteristics of the system. On the other hand out of layering comes the possibility of the progressive bisection tree, which gives us the qualitative and quantitative contents of the formal system, that surrounds and imbues things with their Quantifiers and Qualities. Operations are actions performed on the things, or if the things are verbs, then they meld into the Operators and other things become nouns. This allows us to have dynamic relations between things. Those dynamic relations may be transformations. The arising of quality and quantity, and the ability to transform things with respect to their qualities or quantities, gives us the fundamental basis of the formal structural system like the ASPS of Klir. As the special systems unfold from the General Formal Structural System, that we see in Klir's epistemological hierarchy,¹⁴² we will see the arising of special meta-operators first introduced by Goertzel as part of his formulation of the 'Magician' Self-generating Systems (SGS). Those special meta-operators are creation, annihilation, mutual action and gestalt pattern formation¹⁴³. These arise as the inverse dual to the

139. Gondhor, H. [1986] *An Introduction to the Theory of Surreal Numbers*. Cambridge University Press.

140. Conway, J. *On Numbers and Games* op.cit

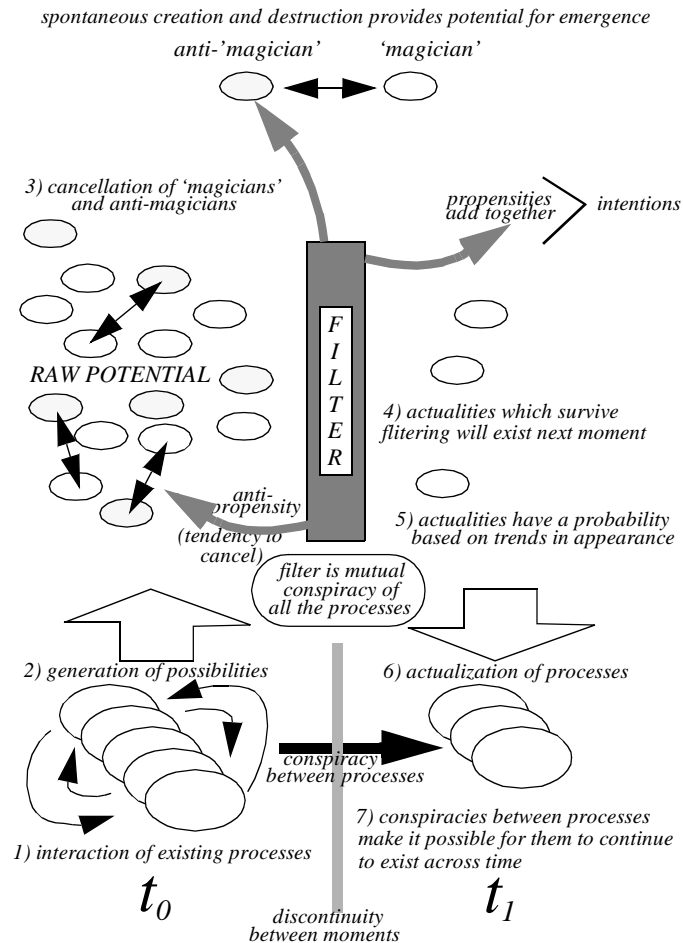
141. Knuth, D. *Surreal Numbers*. op cit.

142. Klir, G. ASPS. op cit.

143. Goertzel, B. [1997] *From complexity to creativity : explorations in evolutionary, autopoietic, and cognitive dynamics*. New York: Plenum Press.

Formal Structural System as explained in a previous paper by the author in the IJGS journal¹⁴⁴.

Figure 15: 'Magician' Self-generating System Dynamics¹⁴⁵



The laws of form of G. Spencer-Brown has a flaw in that he identifies the background upon which the mark is made with the void or emptiness. This is an error when we compare this to the definition of the void or emptiness enunciated by Nargarjuna the Buddhist Logician. Nargarjuna¹⁴⁶ builds upon Indian Logic which rejects the Principle of the Excluded Middle posited by Aristotle. Aristotle's logic is known in India as the Student's Logic and is a subset of the more comprehensive Indian logic that holds there are four statements that may be made about anything:

- X.
- Not-X.
- Both X and Not-X.
- Neither X nor Not-X.

144. International Journal of General Systems (IJGS) vol24 (1-2) 1996 pp 43-94

Nagarjuna¹⁴⁷ goes on to define emptiness as that which goes beyond all four of these statements. It is explicitly embodied as the disjunction between the statements as they are posited. So Emptiness, or the Void, from a Buddhist perspective is the difference between the “*Both...and ...*” and the “*Neither...nor...*” statements. Nagarjuna goes on to use this definition as the basis for denying any statement of the four forms found in Indian logic that in turn denies the excluded middle. It is quite clear when we read Aristotle’s Metaphysics that he is specifically answering Indian Logic as he posits the Principle of Excluded Middle, because he specifically denies the four statements of Indian Logic. However he references Heraclitus and Anaxagorus instead of Foreigners as the ones who hold this paradoxical and self-contradictory opinion. Aristotle finds this particular extreme logical and philosophical position to be distressing. However we adopt it and would prefer August Stern’s Matrix Logic¹⁴⁸ to the Spencer-Brown’s Laws of Form as a formalism because it is more fundamental and does not mistake the background for the void. Stern has in our opinion produced a logic that is as radical a transformation of logic as Einsteins transformation of Newtonian physics. Stern uses truth vectors with two quantities instead of simple truth values. The truth vectors may take on three values 1, 0, -1 and he uses the truth tables of normal logic as matrices to manipulate the truth vectors. When we do an operation in matrix mathematics we either get a scalar or another matrix depending on the configuration of *bra* and *ket* vectors. When we get a scalar, then the logic has produced a normal truth value. This

145. *Explanation of Figure: 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. [Explanation from *On The Social Construction Of Emergent Worlds: The Foundations Of Reflexive Autopoietic Systems Theory Part 3: Chaotic Social Process Architecture* (manuscript) pages 493-494 Draft #2 961206]*

is associated with the dissipative system. When we get another matrix instead of a scalar then we have turned the interaction of truth vectors into an operator, so the interaction becomes operation which is reflexive. The interacting bra and ket truth vectors engaged in exchange are autopoietic. The single truth vector outside of exchange represents a system or restricted economy. Thus we see in Matrix Logic a representation of the special systems where individual truth vectors represent the restricted systemic economy. When these vectors engage in exchange and are converted to bra and ket notational rotations then we find an autopoietic system. When this exchange reduces to scalar values we find a dissipative system component and when the exchange is enhanced into a matrix operator then we see the production of a reflexive component. The reflexive and dissipative components suggest the expansion and collapse that occurs like blackholes and miracles in the Meta-system. The void exists as the difference between the two values that make up the truth vector. Any combination of the values from Indian logic may occur in the truth vector. 00 equals the “Neither...nor...” statement. 11 equals the “Both...and...” statement. 10 and 01 are true and false respectively. The negative one value is made necessary by certain matrix operations. It represents “the hidden” and thus makes Matrix Logic a logic of manifestation and therefore is more suited for phenomenological analysis than normal excluded middle logic. It is a kind of deviant logic¹⁴⁹ that is similar to those that Priest calls Para-Complete and Para-Consistent. By covering the statements of the Indian Logic, and the Buddhist Logic’s non-statement that negates the Statements of Indian Logic, as well as the hidden, Matrix Logic provides us with an apt tool for describing Meta-systems and the Special Systems as an extension of the normal excluded logic that represents the systemic restricted economy. With this logic as a reference we can see what is wrong with G. Spencer-Brown’s Laws of Form. He mistakes the background on which the mark has been made as emptiness, and the Void as it is called in Taoism, exactly because he accepts excluded middle. He does not see that the background is a plenum that makes up the background of the gestalt on which the figure of the Mark is seen. It is only when we add to the mark an anti-mark that cancels it that we can approach the Void of Taoism or emptiness as Nagarjuna describes it. We approach it though annihilation which is one of the meta-operators that dependently co-arise within the Emergent Meta-system. Form is not opposite the background-as-a-void. Instead Form is opposite No-Form which is its inverse. Form and No-Form cancel to give us the Void or Emptiness. The background upon which the Mark is written is something, not nothing, as Spencer-Brown believes, but a different kind of something from the figure. That “something” is the substrate which carries pattern,

146. Cheng, Hsueh-Li [1982] *Nagarjuna’s Twelve Gate Treatise*. Dordrecht, Holland, Riedel. Pub. Co.

147. Kalupahana, D.J. [1986] *Nagarjuna*. State University of New York Press.

148. Stern, A. [1992] *Matrix logic and mind: a probe into a unified theory of mind and matter*. Amsterdam. New York: North-Holland/Elsevier; New York: Distributors for the U.S. and Canada, Elsevier Science Pub. Co. See also *Matrix Logic* op cit.

149. Haack, S. [1974] *Deviant Logic*. Cambridge University Press.

traces and propensities as we look at it ever more deeply going down through the meta-levels of Being. This insight may be represented if we acknowledge not just anti-marks but use the quaternions¹⁵⁰ to allow for imaginary marks of three kinds (i, j, k). These marks can be signified by the rotation of the symbol of the mark, or by the writing of the mark in each of the four planes that constitute the four dimensions.

These four marks:

Figure 16: Quaternion Laws of Form and Anti-forms

$$\begin{array}{c} \text{real} \\ \neg r \quad r = \end{array}$$

$$\begin{array}{c} \text{imaginary} \\ \neg i \quad i = \end{array}$$

$$\begin{array}{c} \text{imaginary} \\ \neg j \quad j = \end{array}$$

$$\begin{array}{c} \text{imaginary} \\ \neg k \quad k = \end{array}$$

$$ij=k, \quad jk=i, \quad ki=j, \\ \neg i \quad \neg j = \neg k$$

$$\neg j \quad \neg k = \neg i$$

$$\neg k \quad \neg i = \neg j$$

$$ji=-k, \quad kj=-i, \quad ik=-j, \\ \neg j \quad \neg i = \neg k$$

$$\neg k \quad \neg j = \neg i$$

$$\neg i \quad \neg k = \neg j$$

$$i^2 = j^2 = k^2 = ijk = -1.$$

$$\neg i \quad \neg i = \neg j \quad \neg j = \neg k \quad \neg k = \neg i \quad \neg j \quad \neg k = \neg i \quad \neg i \quad \neg k = \neg j$$

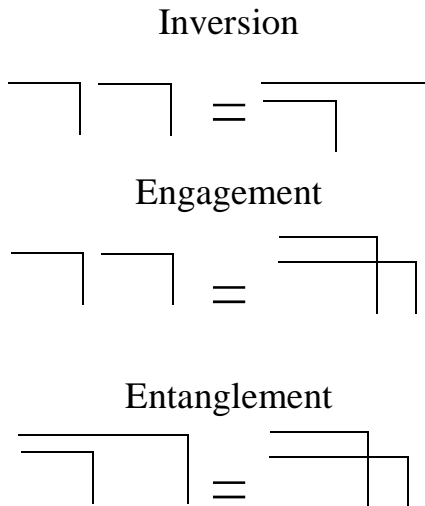
constitute a closed quaternionic system which algebraically represents interpenetration of forms and emptiness. This is because each pair of imaginaries produce the other imaginaries from the set. These relations are holonomic in that each imaginary is both whole and part at the same time. This holonomic aspect is intimately related to the conjunction of operator and operand that Spencer Brown postulates, but that August Stern achieves more completely in the Matrix Logic. For Stern operators may operate on truth values or each other. There is a special circular set of operators that Stern describes that is Autopoietic, in which the matrix logic

150. Altmann, S.L. [1986] *Rotations, Quaternions and Double Cross*. Oxford, Clarendon Press.

operators are operating on themselves and producing themselves. We see this as a much more robust model of the Autopoietic special system than the Laws of Form which Varela adduces as the formal image of Autopoiesis.

When we add the Laws of Pattern anti-rules to those of the Laws of Form then we get a much more expressive formal system that will allow forms to pop out of the void and return to the void again. Laws of Form by itself is an incomplete system in which we must either start with something or nothing and these cannot return to the void without the assistance of the other set of rules. If we make our criteria that the system must pop out of the void and return to the void then this can only occur when we have both rules and anti-rules at our disposal. Beyond this it is necessary to further understand that there is a stage beyond laws of Form and Laws of Pattern (i.e. rule and anti-rule) which we might call the Laws of Interpenetration. In the normal laws of form there is not intersection of boundaries. However, if we allow the intersection of boundaries then we get Venn Diagrams. When Venn Diagrams are allowed so that distinctions can intersect then we have a model of interpenetration. These rules might look like this:

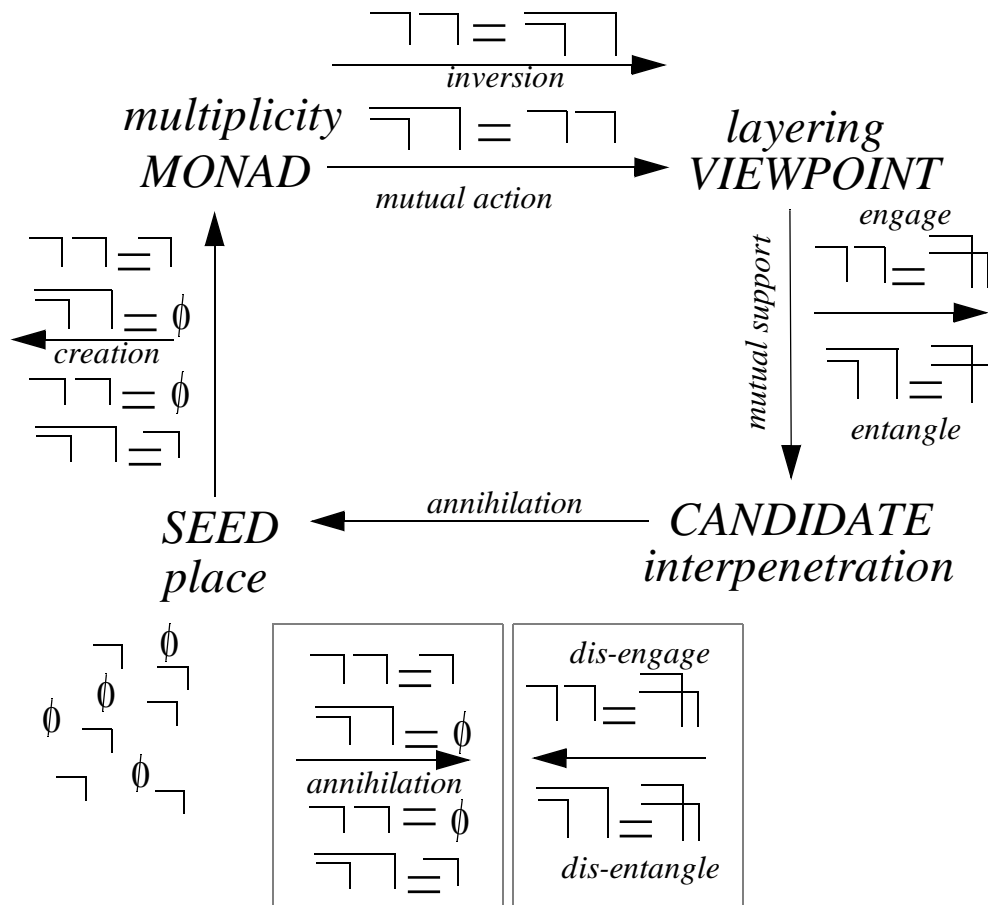
Figure 17:



Engagement is when multiplicity allows separate individual marks to criss-cross boundaries. Entanglement is when layering allows separate layers to criss-cross their boundaries. Inversion is when layers become multiples or vice versa. We notice that if we apply both engagement and entanglement we get the equivalent of inversion. This is similar to DifferAnce that is made up of Differing and Deferring or Effacacity which is made up of Effectiveness and Efficiency. In other words we find here the basis for the production of dual implicated phases. This is the sign of the movement into the meta-system. The meta-system is always made up of

complementary duals. We can now use this further extension of Laws of Form/Pattern into laws of Interpenetration to give us a precise model of the movement from System to Meta-system. It is in the Meta-system that interpenetration occurs. In it the system loses its distinctiveness as it sinks into the background. In the meta-system origin and arena or source and encompassing stream arise as the context for the system. Complementarity is the threshold for this advent of Interpenetration in which all the parts of the system become mutually implicative as it sinks into the meta-system. This also gives us the basis for the production of a precise model of the Emergent Meta-system that is our *sui generis* representation of the meta-system.

Figure 18: Laws of Interpenetration Emergent Meta-system model



This model of the Laws of Interpenetration which encompasses the Laws of Form and Pattern allows us to be very precise about the relation between the system and meta-system. Here we see the laws of form and pattern working together allow series of marks to arise from the void. These marks become the monads of the Emergent Meta-system model. Then the marks engage in mutual action though inversion where the layers become the multiplicities and vice versa. These exchanges give some insight into the relation of the layers to the multiplicity. Once the trade-off between layering and multiplicity has been recognized so that they

themselves are seen as duals of each other, then via entanglement and engagement we enter into interpenetration where we allow the boundaries of each to criss-cross. This means we are then fully into the meta-system in which we move from N^2 to $2N$ and experience interpenetration. That state is like moving from Laws of Form (or pattern) to allow the over lapping circles of Venn Diagrams. We exit that state of exploding combinatorial relations via a disentanglement or a disengagement. Then it is possible to reverse the creation operation and allow annihilation as the marks collapse into each other until they re-enter the ground. What ever uncanceled marks are left, or if not the marks then just the places become the basis for the next cycle around the Emergent Meta-system cycle.

When we use the Matrix Logic to describe autopoietic formations we need to remember that it is not just truth values that need to be described. Being has four aspects: Truth, Reality, Identity and Presence. We can use so called ‘truth vectors’ to describe each of these aspects of Being. This application of Matrix Logic to the various aspects of Being is similar to the distinction between the real marks and the imaginary marks mentioned above. Each of the aspects of Being form elements of a quaternion in which truth, reality and identity are the imaginary values and presence is like the real value ($truth+reality+identity+presence = i+j+k+r$). So we can see that each form has imaginary images and that the phenomenological presence of the form also has imaginary images within Being itself. This leads to a very complex situation that produces basically 4^4 or 256 combinations. When we combine Truth, Reality and Identity with each other we get what I have called the Trigrams of Being which define the spectrum between [true, real, identical] and [false, illusory, different]. The 256 combinations refines this set of eight basic juxtapositions of the aspects of Being and adds to that the consideration of presencing or manifestation. When we begin to consider this relation between Matrix Logic and the augmented Laws of Form then it is possible to begin building up a formalism that defines the autopoietic system beginning from the level of pattern, working up though form to the level of system in a new way. In order to do this we must recognize, following Butchvarov,¹⁵¹ that material identity is significantly different from formal identity. He posits a difference between entities and what are called ‘objects’. Objects are the “*pre-entities*” that though material identity become an identified entity. Once we have justified a kind of structuralism beneath the level of Being, that is used to compose entities, then it is just a short step to recognize that the four kinds of pattern (i.e. process, structure, sign and value) appear out of the aspects of Being. Thus, the level of pattern is reduced to pre-entities, and by this we mean entities that do not have Pure Presence Being. We hypothesize that these pre-entities described by Butchvarov really have Process Being and that there are also Pre^2 -entities with Hyper Being Derrida has called Traces, and there are also Pre^3 -entities with Wild Being that are propensities

151. Butchvarov, P. [1979] *Being Qua Being*. Indiana University Press, Blomington IL.

or tendencies. With respect to Identity the pre-entities at the level of Process Being produce structure through reduction. With respect to Presence the pre-entities at the level of Process Being produce process through concatenation. With respect to Reality the pre-entities at the level of Process Being produce value through exclusion. With respect to Truth the pre-entities at the level of Process Being produce signs through reference. We posit that at the level of Hyper Being these different kinds of patterning become indistinguishable. At the level of Hyper Being traces are seen as juxtapositions of broken and fragmented patterns in the palimpsest. Differences between structures, between processes, between signs, between values are jumbled together as figures broken and submerged partially in the gestalt background. At the level of Wild Being this collage becomes chaotically mixed to form a *DADAist* surreal combination of order and disorder. But the fact that they appear as different kinds of pattern at the Process Being level give us the basis for modeling the different kinds of contents of form. We can imagine that there are different Surreal number progressive bisections relating to the different kinds of pattern and we can use Grenander's Elements of Pattern Theory¹⁵² as a basis for understanding how different kinds of patterns are produced in space and time. However, the sign and value patterns are fundamentally different from those of process and structure. Baudrillard speaks of the relation of signs to value in his Critique of the Economy of the Sign¹⁵³. There he shows that sign and value are independent and function in two orthogonal economies simultaneously that may be in conflict with each other. It is interesting to note that it is precisely the conjunction of sign and value that Jung uses to define the Psyche. In general the sign/value realm forms a hyperspace over the autopoietic system where the hypercycles that control the autopoietic nodes in spacetime are manifest. This is where the psychic shadow of the system comes from. It is built in from the beginning at the pattern level beneath the level of forms. When we add to this picture of the four kinds of pattern, interrelated to each other like four orthogonal surreal number bisections, the marks of the Laws of Form/Pattern and then we allow those marks to be differentiated into real and quaternionic imaginary marks then we have produced a four dimensional formalism that contains the four kinds of pattern.

152. Grenander, Ulf. [1996] *Elements of pattern theory*. Baltimore : Johns Hopkins University Press. See also Grenander, Ulf. [1993] *General pattern theory : a mathematical study of regular structures*. Oxford : Clarendon. New York: Oxford University Press. See also Grenander, Ulf. [1978] *Pattern analysis*. Two Volumes. New York : Springer-Verlag. See also Grenander, Ulf. [1976] *Pattern synthesis*. New York : Springer-Verlag. See also Grenander, Ulf. [1981] *Regular structures*. New York : Springer-Verlag.

153. Baudrillard, Jean. [1981] *For a critique of the political economy of the sign*. Translated with an introduction by Charles Levin. St. Louis, MO. : Telos Press. See also Baudrillard, J. [1975] *The Mirror of Production*. St. Louis Telos Press.

Figure 19: Matrix Logic Operations

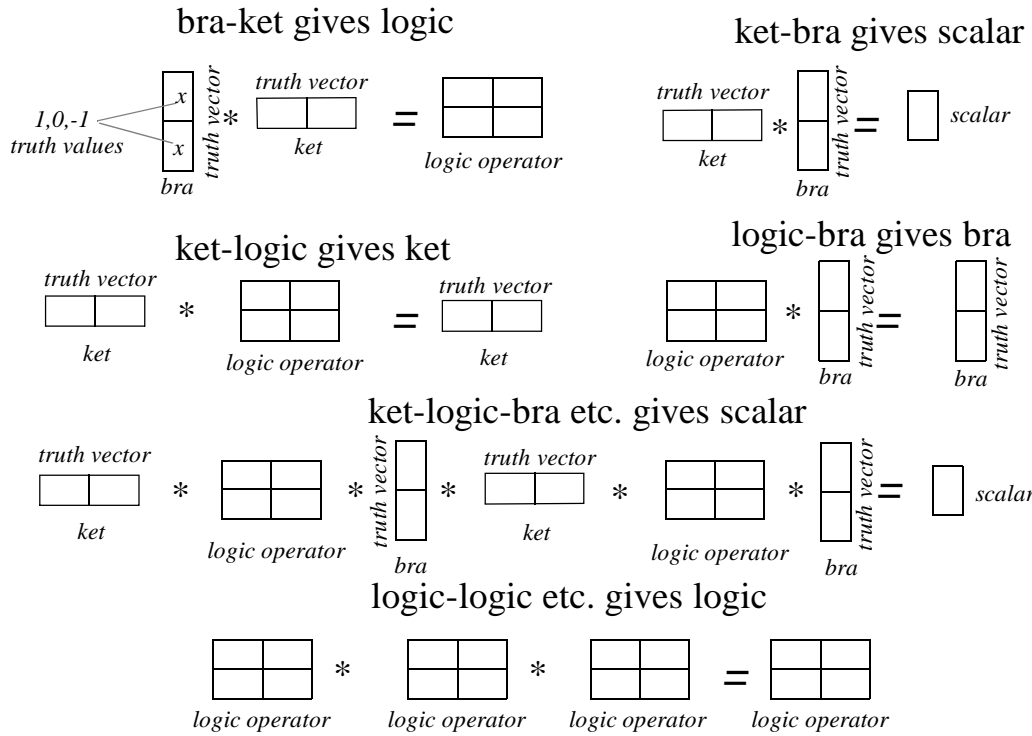
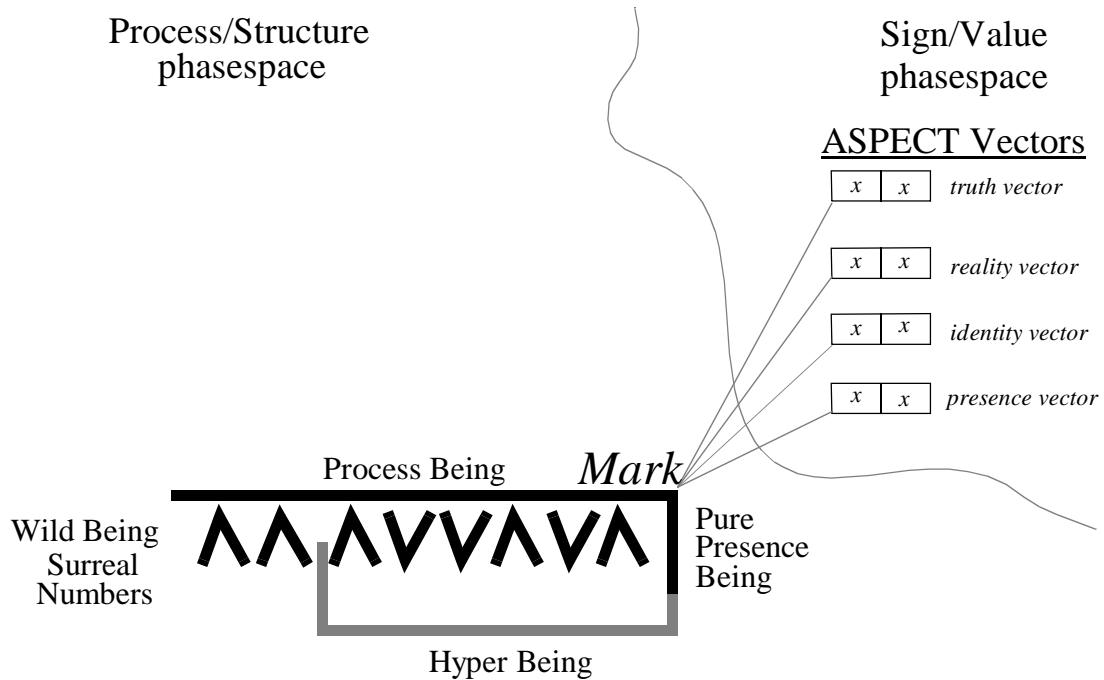


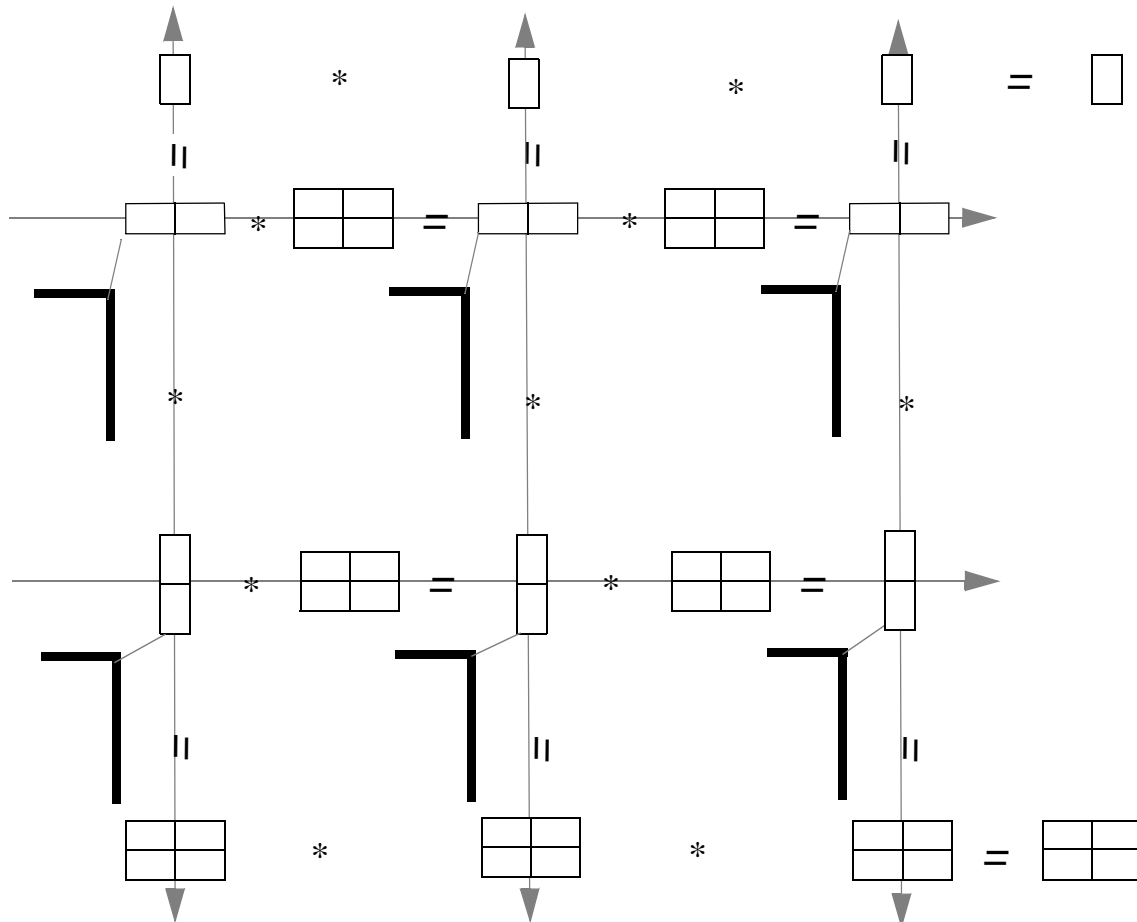
Figure 20: Attachment of Matrix Logic Vectors to Marks



By the attachment of Aspect Vectors to Laws of Form/Pattern *Marks* which contain Surreal Numbers we have a complete model of Being that includes both the

Kinds of Being and the Aspects of Being together. The surreal numbers can be thought of as the wave-train of marked/unmarked states which Varela and Kaufmann talk about. Surreal Numbers allow that wave train to be differentiated instead of merely marked then unmarked in succession. Or we can consider the surreal numbers as the content of the Marks which gives us Qualitative states. Or we can think of them as numbers in the way Conway does which generate all the other numbers such as natural, integer, rational, reals, infinitesimals, infinities, etc, upto and including the holes that prevent integration. Each mark is a distinction that we project, unless it is non-nihilistic. Each mark can be characterized in terms of each of the aspects of Being. The Aspect Vectors allows this characterization in a way that can be manipulated by Matrix Logic. The characterization of distinctions and their contents in terms of aspects occurs in the imaginary phasespace of signs and values above the spacetime phasespace process and structure.

Figure 21:



The structure of possible Matrix Logic operations allows us to concatenate them such that if we have two lines of marks, each mark can have its bra or ket aspect values, where each line is either bra or ket. Between each of these aspect vectors a logical operation can be given such that the entire line computes and each mark's

vector can be calculated from the logic operation and the vector of the last mark. Then crosswise there is either the upward evaluation that gives us scalars or the downward operations that give us matrices. The resulting matrices and scalars each multiply to give final values. The bra or ket vector signifies the orthogonality of the marks in each line. The propagation of the aspect values allows us to work out the summary aspect value of the whole line. Each logic operator between marks allow us to specify the exact relation between the marks in terms of logical relations. The production of matrices and scalars give us the meta-systemic relations between the two orthogonal lines.

We now introduce the concept of the Formal Domain. The formal domain is the conjunction of form and domain. In it we make a distinction as Spencer-Brown does with his marks. But the distinction may be related to each of the four aspects of Being which we now know is related to the four kinds of patterning of pre-entities. From these four types of distinctions we get by combination the six properties of any formal system. These are as follows:

- Clarity (well-formedness)
- Consistency
- Completeness
- Verification
- Validation
- Coherence

These properties are the relations between the different aspects of Being. From the inter-relations of these properties we derive the four approaches to the Humanistic Science which are Structuralism, Dialectics, Hermeneutics and Phenomenology. These four are completed by Ontology which describes the unity that these collapse back into at the top of the lattice of the formal domain. The autopoietic unity is precisely what appears out of the combination of the four approaches to Humanistic Science. The Formal Domain is a way of establishing the relation between the patterned content and the autopoietic form that is both operator and operand, noun and verb, at the same time which is the actual object of traditional Autopoietic Theory.¹⁵⁴

Once we understand how to produce the autopoietic formal unity out of the aspects of Being as expressed as patterns of pre-entities, then it is a small step to realize that these forms have a quaternionic set aspect. These quaternions of marks constitute the nodes in the autopoietic network. The network exists in spacetime but is governed by the hypercycles of sign and value in the hyperspace of reality and truth that floats

154. See Figure 38.

over the spacetime/timespace Matrix of identity and presence. It is the interplay between the psychic hyperspace and the spacetime of embodiment that allows the self-production to occur. The hyperspace allows for the necessary difference from itself that is the prerequisite for the reestablishment of sameness over time and within space. But the autopoietic nodes in spacetime and the hyperspace containing the hypercycles is not enough. It is also necessary to introduce organization which may be done by allowing Matrix Logic to manipulate each of the aspects of Being as they impinge on the real marks, true marks, identical marks, or present marks and their imaginary counterparts. Matrix Logic manipulates these aspects of Being as they impinge on the marks and this gives us the level of organization posited by Maturana and Varela. The autopoietic interaction of circular sets of operators is the means for achieving autopoiesis at the system level. It is the higher unity of the interaction of the operators and the different sorts of vectors. This interaction can be productive of scalars that reduce to excluded middle logic or of other matrices. The other matrices that are produced become new operators and it is when the operators only operate on themselves and not the vectors that the autopoietic effect appears at the system level. This set of formalisms together define the Autopoietic System with a theoretical rigor that has not been described before. But it also leads us to call into question the structure of Autopoietic Theory itself.¹⁵⁵ This is because observers are introduced into Autopoietic Theory in an ad hoc manner. For ourselves, we would like to use Jumarie's theory of relativistic information that appears in his *Subjectivity, Information, Systems*¹⁵⁶. This at least gives us a formalism on which to tack our speculations. But the introduction of the observer in this way calls us to question the very foundations of Autopoietic Theory and ultimately to replace it with Reflexive Autopoietic Special Systems Theory which is formulated in a much more elegant and refined manner.

This brings to the fore the fundamental criticism of Autopoietic Theory that I have advanced. I now believe that Autopoietic Theory applies to forms not to systems. The theory put forward by Varela and Maturana defines autopoietic formal unities of the kind that G. Spencer-Brown defines, rather than systems. We can see this because they begin by defining the difference between 'structure' and 'organization'. By structure we believe they refer to the level of patterns in our ontological hierarchy. This is where the material substrate that is ever changing lies. Upon this substrate autopoietic systems confer formal organization. But organization is an inherently social concept and is something more than merely unitary form that is both the operator and the operand at the same time. Organization bespeaks the upwelling of the nomos within the formalism as the various forms interact within the

155. See Palmer, K. [1998] *Autopoietic Meta-theory* (manuscript; see <http://dialog.net:85/homepage/at00v00.pdf>)

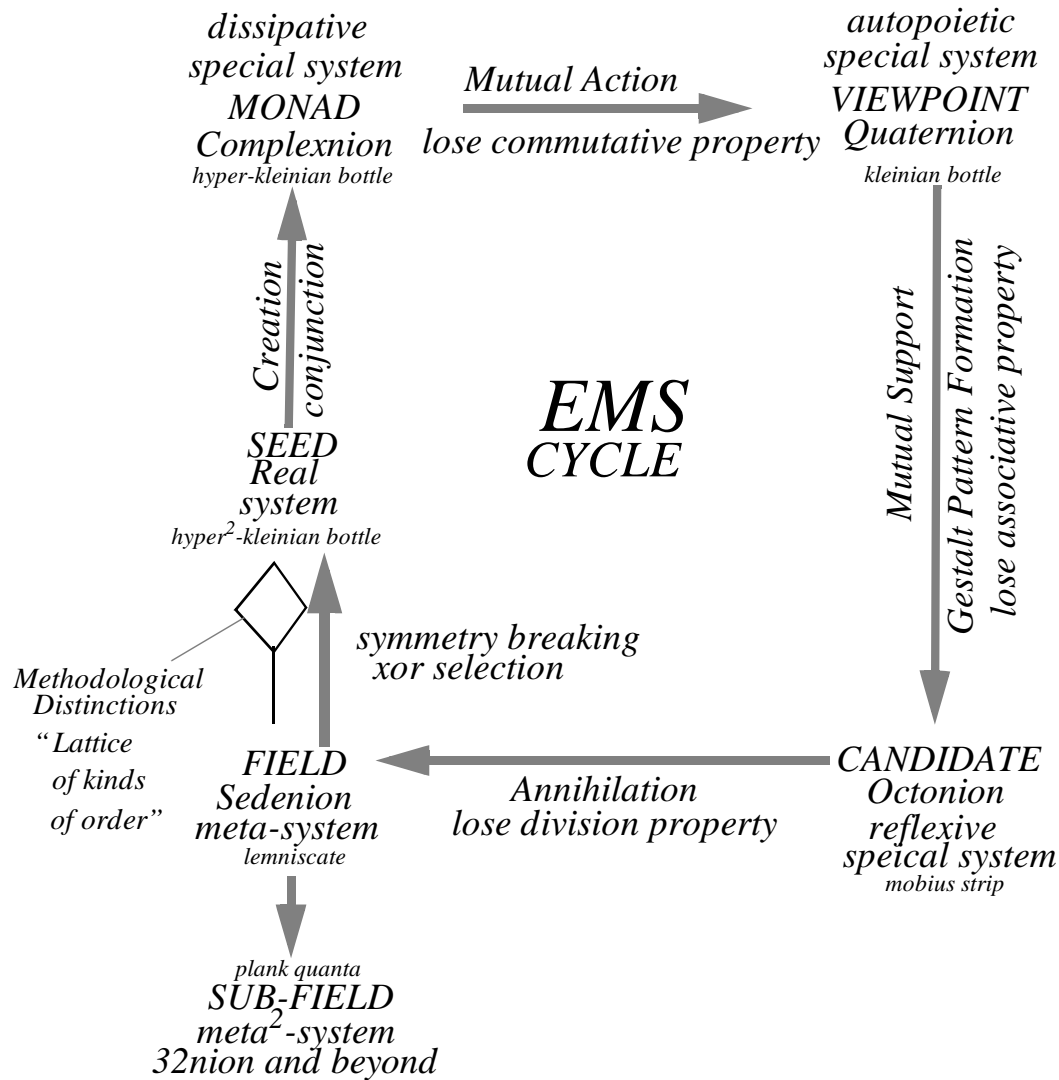
156. Jumarie, G. [1986] *Subjectivity, Information, Systems: an introduction to a theory of relativistic cybernetics*. New York: Gordon and Breach Science Publishers. See also Jumarie, G. [1990] *Relative information: theories and applications*. Berlin; New York: Springer-Verlag. See also Bennett, B.M. and Hoffman, D.D. [1989] *Observer Mechanics*. N.Y. Academic Press.

milieu created by enforcement of axioms that underlie the formalism. These axioms may be seen to interact mutually in a kind of hermeneutic circle as Rescher notes in his work *Cognitive Systemization*. Organization together with structure serve to delimit the autopoietic form. In order to talk about systems they introduce Observers as a *deus ex machina* that converts the autopoietic form into an autopoietic system, i.e. a figure seen on a background by an observer. It is this autopoietic system seen by the outside observer that is closed. We see this as an image or intimation of the special systems because the structural level can be seen as dissipative, while the organizational level can be seen as reflexive which leaves us with the autopoietic form as an image of the autopoietic level between these. However, I believe that this correspondence is merely fortuitous as we cannot see any explicit comprehension of the special systems in the works of Varela and Maturana. Instead we see that they have created an inherently flawed theory because they cannot derive autopoietic ‘systems’ from autopoietic forms except through the miracle of the external observers that merely appear out of nowhere. Thus we believe that Autopoietic Theory as defined by Maturana and Varela is incoherent and weak in terms of its theoretical structure.¹⁵⁷ This is not to say that the theory does not contain a grain of truth. But that truth is obscured by the sophistry that is needed to produce the logical unfolding of the theory from the distinction between structure and organization. Structure is at the level of pattern and Organization is at the level of System. But they are used to define a special kind of form that is self-forming similar to that described by G. Spencer-Brown. That is where the affinity between Varela’s view of autopoiesis and Laws of Form arises. But when Maturana attempts to raise this Autopoietic Form to the level of the system then we must introduce Observers that have no natural springboard within the theory itself. They are just considered ontologically given. Instead we propose that all we must do to save Autopoietic Theory is base it on the distinction between system and meta-system. Once these are understood in their differences and in terms of surplus and lack then it is only necessary to introduce the idea that there are special balanced systems that neither have surplus or lack. Either we speak of the dynamic balance of the dissipative and reflexive special systems together or we speak of the perfect balance of the autopoietic special system. Altogether this is more satisfying because the definition of the special systems naturally arises out of the distinction between the system and the meta-system once those two dual concepts are understood properly. Out of the dual of system/meta-system comes another dual of reflexive/dissipative and then between these naturally arises the self-dual of the autopoietic. Peirce was a precursor to the theoretical formulation of this insight as autopoietic theory when he discussed the strange nature of “protoplasm” in “Man’s Glassy Essence”. All this takes place between the system and the meta-system which naturally entail each other as duals. Form and Pattern, nor any of the other ontological levels, are necessary in order to define special systems. Nothing is necessary beyond the distinction between system

157. See Palmer, K. [1998] *Autopoietic Meta-theory* (manuscript; see <http://dialog.net:85/homepage/at00v00.pdf>)

and meta-system. However, once we have defined the systemic level it is instructive to apply these structures to the other ontological levels as well. When we do that we see that the Autopoietic Form is a devolution from the autopoietic system properly defined. We see the place of form, pattern and the rest of the schemas of understanding within the context created by the advent of the special systems. Our theory is truly systemic and is not a disguised formal theory pretending to be a systems theory like the Autopoietic Theory constructed by Maturana and Varela. The fact that their theoretical construction is flawed should not however detract from their insight which guided their theoretical construction. That insight which sees self-production as the key to understanding organisms and other biological phenomena is still valid. All we have done is recognize a logical flaw in their theoretical formulation and replaced it with a better and more profound theoretical structure. It is like the difference between Laws of Form and Matrix Logic. Laws of Form contains some excellent insights but in a flawed theory. Matrix Logic provides a deeper and more robust formalism for expressing the same insight and more.

Figure 22: Emergent Meta-System Cycle



The four aspects underlying the laws of form/pattern when combined with the four meta-operators give us the definition of the Emergent Meta-System (EMS) which is the inverse dual of General Systems Theory. In Emergent Meta-Systems there is a pure theory of meta-systems that is founded on discontinuity rather than the underlying assumption of continuity that systems theory makes. Emergent Meta-Systems assume radical spatial and temporal discontinuity and then attempts to explain the apparent continuities of the swarming components of the meta-system. This age old problematic that haunts Buddhist Metaphysics¹⁵⁸ is finally solved by the realization that the Emergent Meta-system is engaged in recursive reflexive mirroring. Thus, the life-cycle of the EMS has four moments in which the reflection travels around the inwardly mirrored tetrahedron of separate life-cycle stages. In the EMS formation there is no movement but only recursive reflexion in which the different life-cycle phases mirror each other in precisely the way that Heidegger describes in the mutual mirroring of the positive fourfold of Heaven, Earth, Mortals

and Immortals in his later philosophy¹⁵⁹. In the EMS structure the components of each phase are qualitatively different so that the monads of the swarm reflect into viewpoints in a constellation that reflects into the candidates in the slate that reflect into the seeds in a pod that finally reflect back into monads in a swarm. This recursive reflexion is done by the application of the meta-operators one by one to particular reflexive modes of the EMS. This gives us a formal mode of meta-systemic operation which implicitly allows us to derive the EMS from the unfolding special systems because as each meta-operator arises properties are lost at each stage of algebraic unfolding.

When we go from complexnion algebra to quaternion algebra we lose the commutative property. That loss makes visible the asymmetries of mutual action. When we go from the quaternion algebra to the octonion algebra we lose the property of association. That loss makes visible the asymmetries of social relations which gives us gestalt pattern formation. When we go from the octonion algebra to the sedenion algebra¹⁶⁰ we lose the division property which makes visible the asymmetries of the distinctions between elements. Distinct elements may annihilate each other without side-effects. Indistinct elements always emanate side-effects in annihilation. The persistence forms in the universe are sustained as cascades of annihilation side-effects. The opposite of annihilation is creation. Creation can be seen in the difference between real and complexnion algebras. Both of these algebras sustain the same properties. But the complexnion algebra makes it possible to solve some equations which could not be solved otherwise. In complexnion algebra conjunction arises which makes two different kinds of real numbers into a real-imaginary pair. By conjunction an emergent property is created that would not be seen otherwise. If we break the conjunction the imaginary aspect vanishes and we are left with two real numbers again. Creation and Annihilation meta-operators

158. This problem occurs because the radicalization of emptiness overwhelms all dharmas and so it is impossible to think what would be left from moment to moment to turn into a Karmic seed for the next moment, yet the Buddha accepted the Hindu doctrine of Karma despite holding the doctrine of Emptiness. The solution to this quandary that the Buddha pointed to by his silence in the face of antinomies is Holonomics as we describe it in this paper. We hypothesize that the Buddha discovered the Special Systems within consciousness so that the whole of the Buddha's teaching is an explanation of Holonomics as it applies to individual consciousness. In fact we would identify the Three Jewels with the Special Systems as follows:

Dharmma = Dissipative Special System
 Buddha = Autopoietic Special System
 Sangha = Reflexive Special System

A close reading of the Pali Suttras shows many instances where Special Systems Theory is exemplified and described by the Buddha or his followers. When the Buddha touched earth at the moment before his enlightenment we posit that he touched the ground of ultra-efficacy that we describe here in terms of Special Systems. His teaching concerned how to experience the states of consciousness associated with ultra-efficacy which he named *Enlightenment* the indubitability of which he called his Lion's Roar. Whether the Buddha was a prophet is unknown. More likely his teaching represents the ultimate limit of purification of the self without prophecy.

159. Heidegger, M. [1971] "The Origin of the Work of Art" in *Poetry Language and Thought*. Translations by Albert Hofstadter. [1st ed.] New York, Harper & Row.

160. For information about the sedenions see Section 7.

connect the forms of numbers with the underlying field of the imaginary. Mutual action and Gestalt Pattern Formation meta-operators allow the forms to interact asymmetrically and to associate asymmetrically. Creation is a symmetry breaking in relation to the field. Annihilation is a symmetry breaking with respect to the creation of side-effects. Thus, all the meta-operators produce asymmetries of different kinds. These various asymmetries synergize to produce the Emergent Meta-system formation. That Formation is the dual inverse of General Systems Theory. General Systems Theory is about the persistence of formal structural systems. It posits forms and within them micro-forms that capture content characteristics and that organize the content. Beyond the forms is the social gestalt of the system which contains the forms. All these elements are positively present and deterministic. Emergent Meta-systems describe the meta-systemic environment which is the field in which all these determinate elements appear. To see this field we must focus not on the elements but on the asymmetries that become visible in the field arising out of the lacuna betwixt the elements. There we see the asymmetries that appear separate but always together. With conjunction emergent properties appear that would not exist otherwise. These are subtle properties organized around the singularity -1. That singularity opens out into its own dimension which is like the inwardness of numbers. That inwardness, called “imaginary” by the first discoverers of this *sui generis* numerical realm, continues to unfold into more and more complex realms with further dimensional structure. Next unfolds the quaternions, then the octonions, then the sedenions, and so on into infinite non-division algebras. The four algebras that exemplify division are unique among all the infinite non-division algebras in their beauty, power and elegance. We use the strongest of these as our normal algebra and so render something unique and peculiar in its ability to inter-transform numbers into something mundane¹⁶¹. The loss of properties which occurs as the series of imaginary algebras unfold is the key to the realization of the properties of the special systems. Each loss of a property renders something visible that would otherwise be invisible. So with conjunction appears the imaginary as an inward emergent property of numbers. Spencer-Brown shows that this property also can be defined in terms of forms through the definition of his proto-imaginaries that appear when he introduces jumps into the Laws of Form. Conjunction is the embodiment of the meta-operator of creation within the Emergent Meta-system. When we lose the commutative property suddenly actions can no longer easily be reversed and mutual action becomes visible. When we lose the associative property, then suddenly associations between elements become significant. Associations are arrangements of elements apprehended together though gestalt pattern formation. Association is an arrangement in an order by some external power or invisible hand producing an overall or global patterning. Mutual action on the other hand is local and proceeds from the various actions upon each other of the elements themselves. In this way, it is clear how mutual action and gestalt pattern formation are duals of each other. As

161. Moon, P. and Spencer, D.E. [1986] *Theory of Holors*. Cambridge University Press.

Powers says, it is our actions that control our perceptions which is the normally neglected inverse of our perceptions guiding our actions that is commonly pointed out by behaviorists. When elements may no longer be divided from each other cleanly, but instead overlap and produce relations between partial objects such as those that Melaine Kline recognized, then annihilation of objects always produces side-effects. Each side-effect is a new quantal creation so that creation & annihilation come to entail each other beyond the realm of the division algebras. This mutual entailment is called in Buddhism ‘inter-dependent co-arising’ which is another way of describing emptiness. We take the infinite depths of the Pascal triangle that defines the non-division algebras as a model of Indra’s net¹⁶² in which each thing is a jewel that reflects all the other jewels which represent the things in creation. As Buddhist metaphysical doctrine states concerning the nature of interpenetration, it is the myriad differences between elements in existence that is the means of their being interpenetrated, i.e. when we look at the inverse of the differences between existent elements we see their subtle fusion. However, the normal example of the different parts of the house, through their differences making possible the whole of the house must be amended. The jeweled net of Indra is not a whole or a system, like a house, but rather the ultimate meta-system. That is why it can function as a field or matrix out of which everything else can arise. The differences are like the broken symmetries of the uncut diamonds rather than the sharp perfect crystalline edges of cut diamonds. The symmetry transformations at the non-division level always leave an excess that is the means of making-one between any set of connected elements greater than eight at some 2^n threshold of complexity. This excess is the *remainder* described by Jean-Jacques Lecercle¹⁶³, or the *accursed share* described by Bataille, which is the nexus of fusion beyond difference without the negation of difference. We enter this realm when we apply all four asymmetries simultaneously as the meta-operators of an Emergent Meta-system. Seeds give rise to monads through the creation meta-operator and the imaginary realm opens up via conjunction of elements around the singularity. Monads give rise to viewpoints through the mutual action meta-operator and the interaction of the monads externally encompassed by their inward vision of the other monads. All relations between monads are projected internally within each monad and all we see externally are fuzzy summaries of those relations. Viewpoints give rise to candidates through the gestalt pattern formation meta-operator and the swarm projects the possibilities of the next life-cycle phase separately. These possibilities as candidates annihilate each other to produce the seeds that will give rise to the monads of the next life-cycle spiral. Candidates give rise to seeds through annihilation meta-operator producing the next live-cycle phase of the swarm jumping across the radical discontinuity between moments of the existence of the swarm. This problem has existed in Buddhist Metaphysics nearly from its inception: How can we have causation between moments when there is the

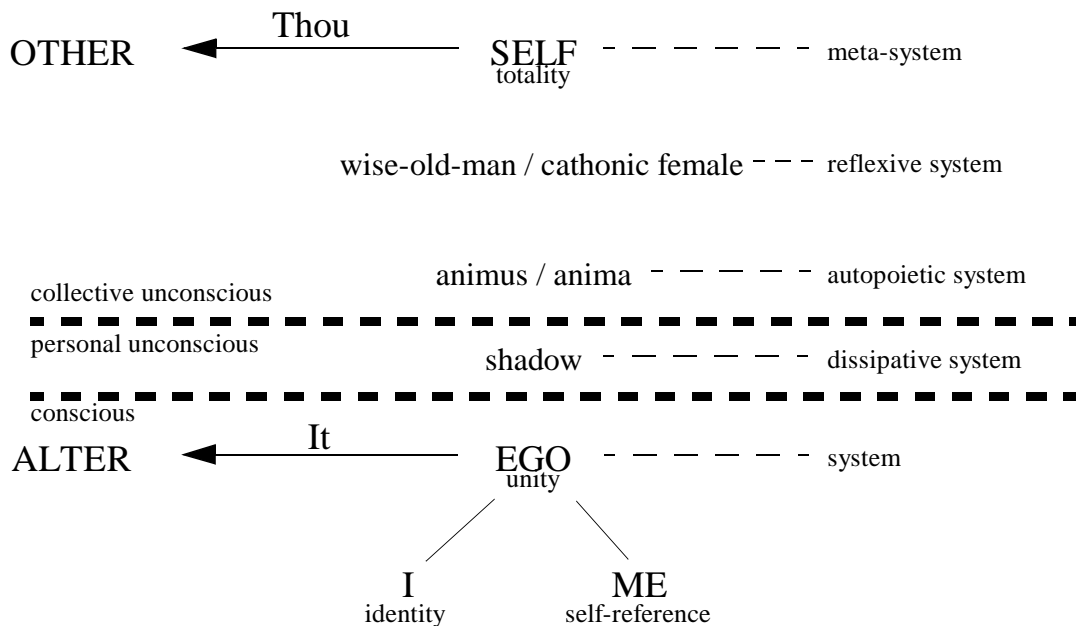
162. Cook, F.H. [1977] *Hua-Yen Buddhism: The Jeweled Net of Indra*. London, Penn. State U.P.

163. Lecercle, J.-J. [1990] *The Violence of Language*. London, Routledge.

radical discontinuity of emptiness between the moments and inundating them. It is the Emergent Meta-system formation that solves this riddle. The Emergent Meta-system submerges into the field of the meta-system itself and then arises from it again, and again. The meta-system is not a blank plenum but has embedded in it the non-dual nomos of the infinitely deep non-division algebras. The division algebras pop out of this infinitely deep infrastructure as a self-organizing process. They are unique as a dynamic basis of the inter-transformations between independent conjoined number streams. The different emergent levels of conjunction (2, 4, 8 Streams) together form a higher level emergent construct that is the nexus for the intersection of form and no-form around the interface of formlessness described as the void. The intertwined time streams are contrast to the broken or partial streams governed by the non-division algebras at the level of the sedenion or higher.

The EMS structure is a model of the kosmic-monad which is the archetype for the transition from form to formlessness in many philosophical traditions. Plato calls it the Spindle in the Timaeus and the Chinese call it dragons in their tradition. The dynamical unfolding of the Kosmic-monad is seen as the pluriverse that is created by the fragmentation of monadic observers. Thus there is an oscillation between unity and multiplicity at the macro and micro levels that frames the *meso* level, the special systems, and the formal structural system levels of the ontological emergent hierarchy. This oscillation may be seen as the involution of the kosmic-monad into Otherness and back out again and concretely this involution has the form of the recursive reflection of the EMS structure because these are the complementary aspects of the ultimate meta-systemic formation.

Figure 23: Jung's Ego-Self complex



Jung identifies the structure of the Self in Aion¹⁶⁴ as a series of quaternary mandalas which form a cycle which is an image of the Emergent Meta-system. This representation was constructed out of historical cultural materials from the Western tradition. These materials show that between the Catholic tradition and its Other, the heresies, such as Gnosticism, Manichism, Catharism and Alchemy that the human mind produced images of the totality of the self including both the conscious ego and the archetypes of the unconscious including the highest archetype of the Self. Jung's premise is that all doctrines are one-sided. As the mind works on the doctrine it produces all possible structural variations. The tradition responds to this by defining ever more precisely what the doctrine is in relation to all the rejected heresies. This field of development of positions and counter positions in a dialectical fashion reveals the complete functioning of the human mind which seeks wholeness in the equal conjunction of all the possible opposites. Jung took these materials from our Western tradition and synthesized them into a set of interlocking and cyclical quaternary mandalas which is very similar to the EMS cycle defined in this article. In fact, it is clear that the archetypes are representations of the special systems, as well. Jung clearly distinguishes the unity of the ego and the totality of the self. The unitary ego is clearly an image of the restricted economy of the system and the totality of the self is an image of the global economy of the Meta-system. The problem is that Jung assumes that the totality of the self seeks to exemplify wholeness. Wholeness is defined as the conjunction of opposites in a dialectical manner rather than unity. However the conjunction of opposites in alchemical marriage needs instead to be understood in terms of the kind of conjunction that appears in hyper-complex algebras. And instead of wholeness of the Self we need to think in terms of unbounded meta-systemic fields with global incoherences that exemplify para-consistency and para-completeness. When we make this transformation in our conception of the unconscious, then it is possible to see the main archetypes that Jung identified as images of the special systems. The *shadow* is an image of the dissipative special system. The *animus/anima* is an image of the autopoietic special system. The *wise old man/cathonic female* is an image of the reflexive special system. Each layer of archetype represents a further layer of mirroring in the social field. The reason the archetypes are collective and objective in Jung's terms is that they represent the mirroring structure in every social field which is inwardly mirrored in each individual immersed in a social field. Within each man is the reflection of woman and within that reflection is another reflection of man at the next deeper layer of mirroring. Similarly within woman is reflected man and within that image is reflected woman. As man and woman stand opposite each other, for instance in marriage, these mutual reflections appear as in two facing mirrors. Here we see that the levels of the special systems are equivalent to the various depths in mirroring between the couples in the social field. The couple in

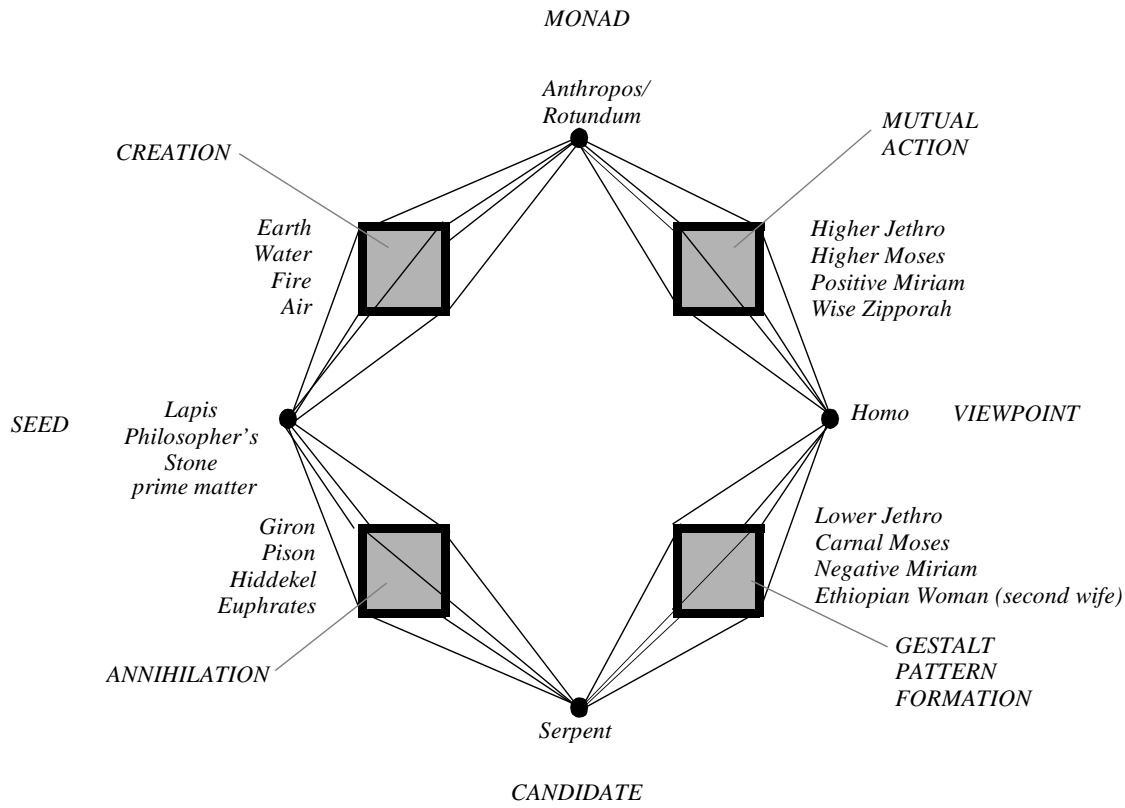
164. Jung, C.G. [1959] *Aion: Researches into the phenomenology of the Self*. Princeton U.P. See also Deinger, E.F. [1996] *The Aion Lectures: Exploring the Self in C.G. Jung's Aion*. Toronto, Canada, Inner City Books.

their marriage produce a reflexive special system that is the field within which two autopoietic systems produce a symbiotic economy. This economy of the household is sharply differentiated from the restricted economy beyond the household. Housework is unpaid for because it is priceless. This pricelessness of housework works to the disadvantage of women who are dominated by men in dualistic relations. However, that pricelessness is reflected in the ministrations to the children of the couple which indeed cannot be done as well by any other care giver and without those priceless ministrations the children suffer permanent ill effects. It is interesting that the various levels of reflections are seen as different points in the life-cycle such that the animus/anima reflects the mother/father of the child while the next deeper reflection¹⁶⁵ is seen as a wise old man or a cathonic female. We each move through these eras in our lives and at different times we take the part of the different levels of reflection for others within the social field. The fact that the archetypes can be seen in this way, as special systems levels within the social reflexive field, means that Jung's psychology can be reinterpreted from the perspective of special systems theory fruitfully. He gives us an image of the Emergent Meta-system in the model of the Self in Aion. He gives us the lower level archetypes that are part of that totality of the self. Ego, Shadow, Animus/Anima, Mentor/Crone and Self forms a precise image of the levels of the special system emergence moving from system to meta-system. This analogy suddenly makes the Emergent Meta-system more interesting if it is indeed a formal model of the Self. It makes the special systems more interesting if we can see their reflection in the depths of the unconscious, because it means that this is a generalized phenomena that goes beyond the realm of the psyche alone. Special systems appear everywhere in nature as rare peculiar unexplainable phenomena that follows a similar pattern in all its manifestations. Once we have a general theory of Emergent Meta-systems we can begin looking for these anomalies both in the realm of physis and logos. What this analogy with the archetypes does for us is shows that these systems can be central to the functioning of our own consciousness and its underlying unconscious substrata.¹⁶⁶

165. Boud, D., Keogh, R. and Walker, D. [1985] *Reflection: Turning Experience into Learning*. London, Kogan Page.

166. Palmer, Kent [1998] *Archetypal Gender Ontology* (manuscript; see <http://dialog.net:85/homepage/ago00v00.pdf>)

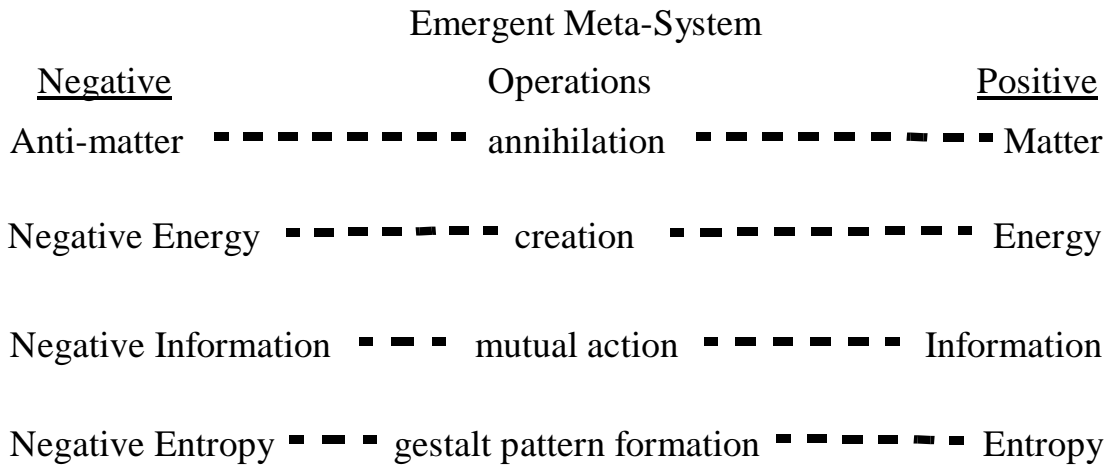
Figure 24: The Self in Jung's Aion and the Emergent Meta-system



Jung has produced out of the heretical materials of the Western Tradition, especially gnosticism and alchemy, a view of the Emergent Meta-system. His is a structural analysis of what has been left out of the official view of reality in the Western Tradition. By viewing the whole tradition along with its heresies he constructs a model of the arising and destruction of things within our worldview which corresponds to the model of the self as our individual totality which is shared with others in our tradition. It is fascinating that Jung sees this process in a way that is directly mappable to the Emergent Meta-system formation which has been discovered from other sources more theoretically based in systems theory and mathematics as well as physics. Thus we are seeing here an image of the EMS formation in the logos. To balance this we might look at a similar image that can be seen in the view of physics developed by the Western science of physics. This image revolves around our understanding of the fundamental constituents of nature seen from the point of view not of forces but of its organization as matter/energy in spacetime. What is not ordinarily pointed out that balancing the matter/energy is information/entropy. Each of these elements may have both positive and negative aspects. Thus we understand that matter is balanced by anti-matter. What is little understood is how energy is balanced also by negative energy. Negative energy occurs when the vacuum is depleted of its normal energy content. Recently it has been learned that there is an interest like effect between negative and positive energy.

If there is a negative energy burst then there must be a greater positive energy burst to compensate for that deficit. If there is a delay between the negative and positive energy burst then the positive energy burst must be even greater. If there were not these interest like constraints on negative energy perpetual motion machines would be possible. We know that information is the ordering of data through relationships. But it is little appreciated that negative information is when data is completely randomized. Chaos for example is a mixture of order and disorder and is not totally random. Randomness is not a ground state of information but rather chaos is that ground state and randomness is like negative energy in the sense that it is a depletion of the minimal ordering of chaos that exists at the groundstate of information. A similar but related idea is entropy. Entropy is the thermodynamic effect of the introduction of disorder over time into systems that occurs in spacetime. Negative Entropy is when order is introduced instead of depleted. Prigogine's work shows that it is possible to have pockets of negative entropy in a far from equilibrium system as long as it is balanced by a greater entropy production that compensates overall.

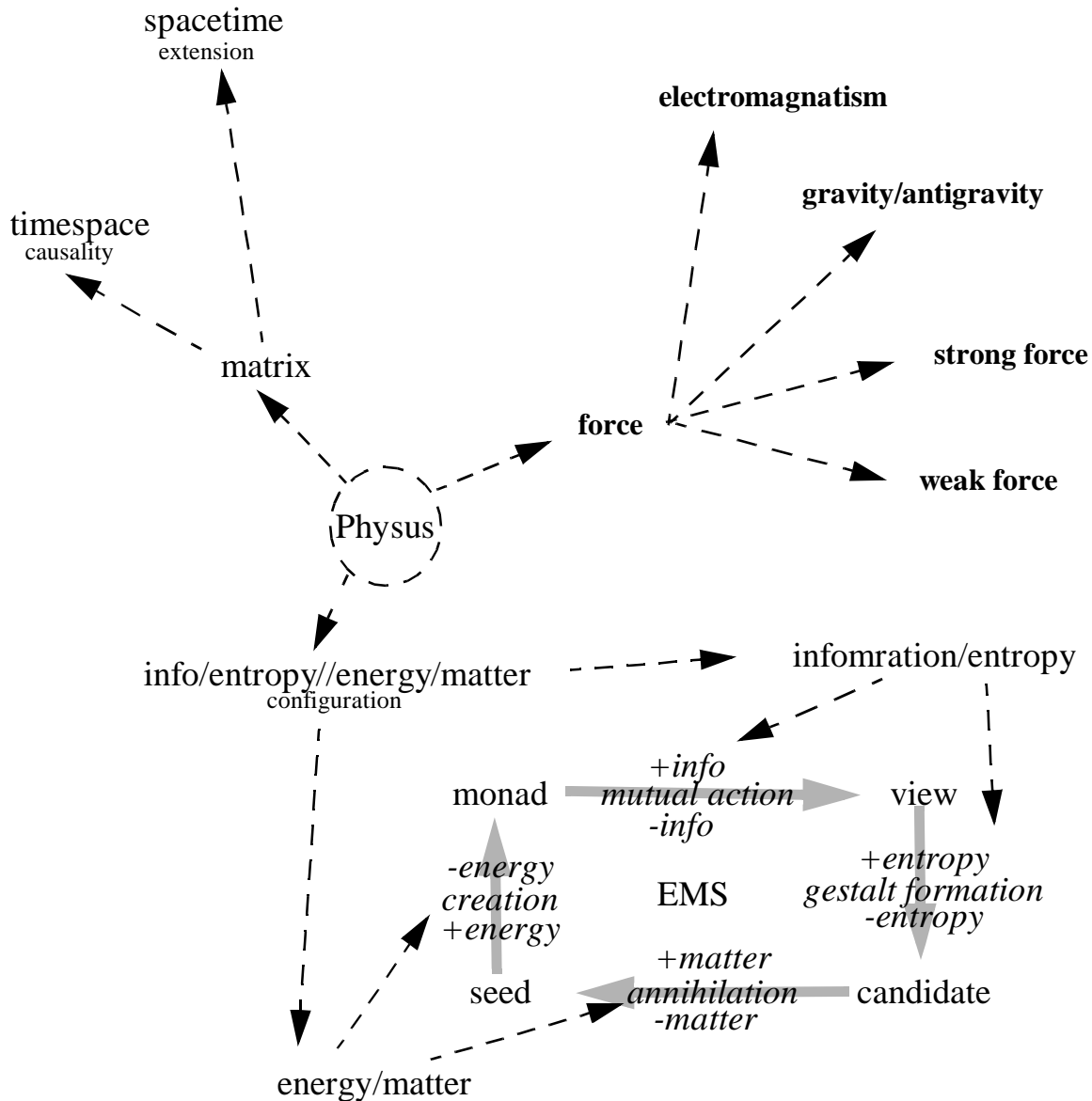
Figure 25: Emergent Meta-system in Physics



These four concepts have an intimate interrelation that defines an EMS cycle though their interaction. So we see by this how the EMS cycle manifests in modern physics in their description of the physus that complements the patterns that Jung found in the Logos. This complementarity of imaging within the fundamental dualities of our worldview is because the EMS cycle is a model of existence which is more basic than this dichotomy in the differentiation of our worldview. What is also interesting is that when we see these concepts within the model of the EMS cycle they form a dance between the positive and negative manifestations by crossing over from positive to negative and vice versa at the point where the static results of the operators appear in the EMS cycle, i.e. at the point of manifestation of the seed, monad, view and candidate. We can see these static produces of the meta-operations of the cycle as the zero points where one switches from one dimension to

another within the four dimensional space of the information/entropy//energy/matter interval that exists within the four dimensional realm of spacetime itself. In effect we can see that there is a higher level interval with the following structure:

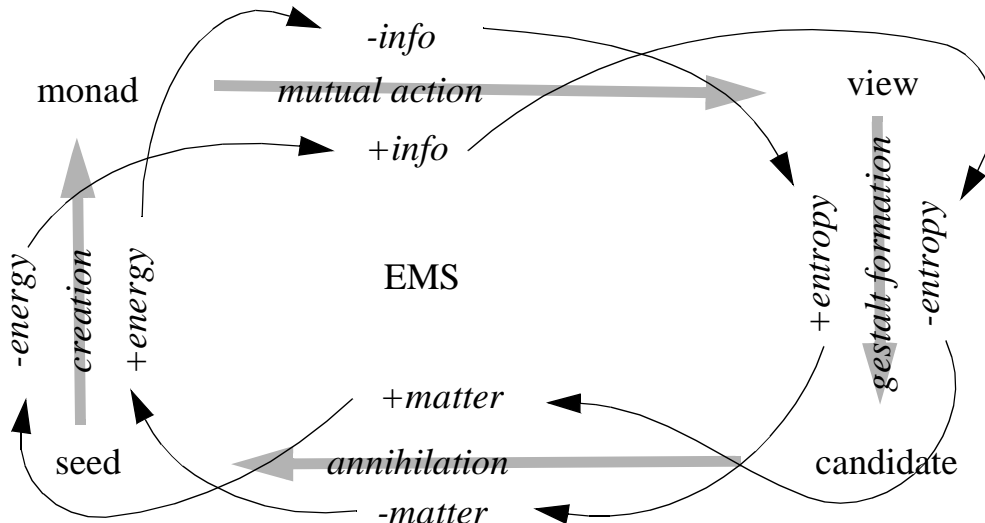
Figure 26: Differentiation of the Phusus



The Phusus includes both thermodynamics and physics of bodies and forces. Thermodynamics is normally neglected and because of that the relations between info/entropy and matter/energy is not widely appreciated. When we place the differentiated info/entropy//energy/matter interval within the context of the EMS we notice that there is an interweaving between the various elements that exchanges between positive values of one dimension into the negative values of the next and vice versa so that the crossover axes in the four dimensional phase space become the

static results of the operators, i.e. seed, monad, candidate and view.

Figure 27: Weaving of physus EMS cycle



Let us now return to the consideration of the Laws of Form and their relation to the Surreal numbers. It is through the combination of these two formalisms that we can capture the intrinsic ordering of this root structure that we see mirrored in both the physus and logos in a model composed in the non-dual nomos that is between them. When we accept surreal numbers as the content for the Laws of Form we suddenly have a complete structural picture of the interrelations of the different kinds of Being. A similar picture can be apprehended by realizing that each of the different kinds of Being relates to different kinds of Mathematics also:

Figure 28: Kinds of Mathematics

Pure Presence Being = Calculus
 Process Being = Probabilities
 Hyper Being = Fuzzy Numbers or Possibilities
 Wild Being = Mathematical Chaos or Propensities

These four kinds of mathematics fit together as an example of how the different kinds of Being form a synergy. We can see a similar but differently broken symmetry in the fitting together of the Laws of Form and the Surreal Numbers. These synergies allow us to envisage how the different kinds of Being interoperate. Each synergy can be thought of as a “Face” of the world. As we look into that “Face” we see the mirroring between our Self and the World which both have the same underlying Nomos based on the differentiation of the Special Systems. Another example of such a synergy is the coming into Being and mutual annihilation of

virtual particles in empty spacetime. The differentiation of this model from physics has exactly the number and kinds of elements necessary to represent a synergy of the Four kinds of Being. No more and no less. Each synergy teaches us something about the integrity of our worlding of the world. We can think of these synergies as the faces of the world where the different modalities of Being draw together and present a coherent configuration that gives us some insight into the inner structure of the worlding of the world. This coherence appears in some cultural artifacts or when an emergent event occurs of the utterly unheard-of appearing for the first time. I have explained these various synergies in several of my working papers¹⁶⁷. When we place the surreal numbers in the laws of form we get a complete picture of the synergetic integration of our worldview and there are other similar formations in different domains.

However, I would like to mention a very important consequence of this formulation of the “surreal laws of form.” Surreal numbers contain infinitesimals and infinities. We can see these as positive feedback loops that produce infinite variety on either side of the decimal point. Surreal numbers also have holes that separate the infinities/infinitesimal from the other numbers within the surreal meta-number system. If we think of the infinities and infinitesimal as very deep peaks and valleys in a tree-like landscape then we can think of connecting them together randomly to get a multiply connected landscape where the valleys connect to valleys and peaks connect to peaks. Or we might even think of the peaks connecting to valleys as the landscape twists around itself. Similarly we can think of the holes in this landscape connecting to other holes to give us wormholes through the fabric of the landscape. But what about the possible connection of holes to peaks or valleys. This possibility actually defines the dissipative system¹⁶⁸ within the multiply connected and wormholed surrealistic landscape. In such a connection there would be the sudden emergence of infinite information from a hole or ‘nowhere’. This is what Stuart Kaufmann calls ‘spontaneous generation of order for free.’¹⁶⁹ It is the emergence from the void of infinite information just like that which occurs in a strange attractor. Only here there is no cycling but only the outpouring of information from a singularity which is the hallmark of the dissipative system that is far from equilibrium but can indefinitely sustain that off-balance poise that appears as negative-entropy. Once we have a model of the dissipative system it is only a matter of conjuncting such systems together to form an autopoietic system and conjuncting them into minimal systems of four dissipative systems to create a reflexive system. So we now see how there arises out of the surreal numbers the possibility of the special systems hierarchy from which the multiply connected fabric of quality/quantity non-duality. That quality/quantity non-duality exists within

167. Palmer, K.D. [1997] *Social Construction of Emergent Worlds* series of essays and *Steps to the Threshold of the Social* series of essays in *Reflexive Autopoietic Systems Theory*. Unpublished.

168. Kaneko, Kuniyiko [1986] *Collapse of Tori and Genesis of Chaotic Dissipative Systems*. Singapore, World Scientific Pub. Co.

169. *At Home in the Universe* and *The Origins of Order*. op.cit.

another non-duality that connects operator and operands in terms of the Laws of Form. The Laws of Form and Pattern (the dual of the Laws of Form) provides the cup that holds the wine of Wild Being. That cup is made up of the three other kinds of Being melded together.

I will try to explain this in the following way. Plato said in The Sophist¹⁷⁰ that there is a hierarchy of the initiated. The uninitiated are the ‘men of earth’ that only believe what is in their hands. Those initiated into the lesser mysteries believe in the Unseen but think that it is all flux, like Heraclitus.¹⁷¹ Those initiated into the greater mysteries believe in the unseen, but believe it is all static, like Parmenides.¹⁷² This hierarchy leaves out the hierophant who distinguishes the seen and unseen and also distinguishes dynamic and static but who knows what we really want is ‘change and changelessness at the same time,’ i.e. non-duality. Now those initiated into the greater mysteries are those that recognize Being as Static like Plato, Aristotle, Descartes, Kant and Husserl which is the meaning of Pure Presence kind of Being. Those initiated into the lesser mysteries are those that recognize Being as a dynamic process of manifestation, like Heidegger, or Sartre for whom Nothingness has similar, yet opposite, characteristics in relation to Process Being. Heidegger constructed out of the two lowest kinds of Being an Ontological Monism¹⁷³ in which the static and dynamic kinds of Being formed a reciprocal closed loop. Michel Henry in The Essence of Manifestation¹⁷⁴ noted this primary assumption of Heidegger’s that there was an ontological monism composed of the two different kinds of Being he recognized. Henry suggested the alternative of Ontological Dualism and posited that there was an Essence of Manifestation that was purely immanent and was never seen. This is like the psychological Unconscious, yet deeper, similar to what Meister Eckhart called the desert of the Godhead which is inaccessible within, not consciousness, but the more general realm of manifestation. Henry said that there was some part of Being that never appeared in manifestation and called that the Essence of Manifestation. Later Heidegger recognized this realm as ~~Being~~ (crossed out) in his essay on Junger called ‘On the Line.’¹⁷⁵ Derrida picked up on this kind of Being and called it DifferA(n)ce in Of Grammatology¹⁷⁶. Merleau-Ponty called it the Hyper-dialectic in The Visible and the Invisible¹⁷⁷ of Process Being and Sartre’s Nothingness¹⁷⁸. Levinas called it the realm Beyond Being¹⁷⁹ where ethics and

170. Plato *The Sophist*

171. Heraclitus in Fitt, M. [1962] *Ancilla to the pre-Socratic philosophers: a complete translation of the fragments in Diels*
Fragmente der Vorsokratiker. Oxford: B. Blackwell.

172. Parmenides in Fitt [1962] op cit.

173. Ontological Monism is defined by M. Henry as the closure of the two lowest levels of the hierarchy of the meta-levels of Being by Heidegger who in Being and Time thought that these two kinds of Being were the only ones that existed. Later he discovered the third meta-level of Being which he called ~~Being~~ (crossed out).

174. Henry, M. *The Essence of Manifestation*. op cit

175. Heidegger, M. “On the Line”

176. Derrida, J. *Of Grammatology*. op.cit.

177. Merleau-Ponty, M. *The Visible and the Invisible*. op.cit.

metaphysics merge in the bearing of the ministrations of the Other. There have been many formulations of Hyper Being in Continental philosophy and its discovery by Heidegger and Henry has left a profound impression on modern metaphysics. This is an originary realm beyond the static and dynamic where, as Derrida says, there occurs a differing and deferring. This origin is where the Hierophant's perception of Manifestation flows from. But there is a matter beyond this origin such as that which appears in Surreal Numbers between quality and quantity and in the Laws of Form and Pattern between operators and operands. This is the matter of Wild Being. In Hyper Being the discontinuities within the continuums of manifestation are discovered to be the source of the continuums. But in Wild Being we go beyond this to realize that there is no difference between the continuity and discontinuity or between order and disorder. This is the realm where Chaos in the mathematical sense appears that is an odd mixture of order and disorder or continuity and discontinuity. In this realm one realizes that there is ultimately no difference between the Essence of Manifestation that never appears and what does appear. They are duals of each other so appearance continually points to that which never appears. Appearance taken as a whole is a complementary and distorted picture of what never appears and what does appear is always fragmented in a way that indicates that which never appears. At the level of the writer of the Sophist dialogue in which the hierophant is played by the wise sophist, i.e. at the level of Plato himself, the dialogue writer, there is the blending of the hierophant's knowledge of the unconscious with that of the initiated and the uninitiated. Plato demonstrates all the levels of Being to us and his comprehension of them in the action of his writing that performs what he thinks which is the synergy of manifestation. These synergies are the source forms. Plato saw the source forms as strange attractors within which manifestation unfolds around the synergies, such as we have been describing in which the four different kinds of Being, and participate together to form a nexus within manifestation of the different kinds of presentation.

In Wild Being there is a synoptic vision of the whole of manifestation in all its different kinds as they fold through one another endlessly. One picture of that from physics is the creation and destruction of virtual particles. Such particles can act on other particles and can be seen together as a kind of dualistic gestalt and so in that we have a picture of the meta-system on the par with that created by Goertzel¹⁸⁰ in his model of the Self-Generating 'Magician' System which is the inverted dual of the general system theory such as that built by Klir. All systems exist within meta-systemic milieus. Thus, the conserved particles are the system that exists within the milieu of the virtual particles that supply their field like properties. Similarly we can talk loosely about the different kinds of mathematics as avatars for the different kinds

178. Sartre, J.-P. *Being and Nothingness*. op.cit.

179. Levinas, E. [1981] *Otherwise than being: or, Beyond essence*. Translated by Alphonso Lingis. Hague; Boston: M. Nijhoff; Hingham, MA: Distributors for the U.S. and Canada, Kluwer Boston.

180. Goertzel, B. *Chaotic Logic* op.cit.

of Being. Calculus gives us determinate continuous functions and the duality between the Integral and Differential. Probabilities on the other hand depend on actualities and have inherent error with mean and standard deviation as well as higher meta-level deviancies. Probabilities are needed to describe actually observed phenomena, whereas calculus describes determinate idealizations. But eventually we are led to formulate the Fuzzy numbers which embody possibilities instead of probabilities. These do not sum to *one* as probabilities must to mimic actualization of possibilities in concrete existing phenomena. It is these possibilities that give us an analogy for Hyper Being because there are absolute differences between possibilities. These absolute differences are the discontinuities lording over the continuities rather than the reverse that occurs in calculus. Probability is a half way house between continuity and discontinuity that emphasizes the individual existent thing regardless of continuity or discontinuity. The individual instants can be seen as part of a normal curve of frequencies, but there is always the discontinuities between individual cases. When Wild Being arises the continuity and discontinuity gets chaotically mixed. Here we have chaotic propensities that link the possibilities to the actualities with the addition of a tendency that throws the possibility toward a particular actualization. Deleuze and Guattari call this a *line of flight* in Anti-Oedipus¹⁸¹. We know that the combination of a possibility and a probability is called a hyper-number according to Kauffman¹⁸². To get a propensity¹⁸³ all we need to do is multiply the two parts of the hyper-number. This gives us our propensity for the actualization of a possibility with a certain probability. Wild Being is composed of a field of propensities or tendencies. The propensity arises due to the fact that order is embedded in disorder with the chaotic regime. The arising of order with disorder confers direction toward which things tend once the order is initiated. Our propensity is to flow within this implicit direction that underlies the implicate order that emanates from the Essence of Manifestation. Coutu called this field the “tendency in situation,” or TINSIT, and said that this was the primal unit of the social system¹⁸⁴. We agree with his analysis, but situate it in relation to the other forms of measure and calculation. The field of propensities¹⁸⁵ is precisely what the social fabric is composed of, and it arises as the distortion in the reflexive action at the level of the octonion algebras. This distortion arises due to the non-associative and non-commutative nature of the octonion algebras. The distortion is what arises first -- then there appears that which is distorted! We see the traces of the things in the distortion pattern and reconstruct the things just as we stare at the field of distorted images and see the three dimensional images embedded in the randomized field. The

181. op.cit.

182. *The Origins of Order* op. cit.

183. Watanabe, S. [1975] “Creative Learning and Propensity Automation” in *IEEE Transactions on Systems, Man and Cybernetics*. Volume SMC-5, Number 6, November, pages 603-609.

184. Coutu, W. [1949] *Emergent human nature, a symbolic field interpretation*. New York: A.A. Knopf.

185. Jullien, François [1995] *The propensity of things: toward a history of efficacy in China*. Translated by Janet Lloyd. New York: Zone Books; Cambridge, Mass.: Distributed by MIT Press.

multiple traces of the distortion allow us to triangulate back to what left those traces. Thus we intuit the Essence of Manifestation that never appears within the distortions in the field of appearance. In that realization we recognize the non-duality of continuity/discontinuity and order/disorder. That secondary non-duality points us back to the primary non-duality of the complete meta-system that lies just beyond the reach of the special systems. In the meta-system there is absolute complementarity that we can only understand in terms of anti-epistemology and beyond that anti-ontology. This complementarity points always to the underlying non-duality of things thorough the continual arraying of complementarities of complementarities. This is what Plotnitsky calls ‘heterogeneous interactivity and interactive heterogeneity’¹⁸⁶ and what Deleuze and Guattari call the rhizome.¹⁸⁷ These complementary antinomies cannot be understood through normal rational cognition, instead we must embrace a supra-rationality which is the dual of paradoxicality. Supra-rationality is seen in the Zen Buddhist practice of giving incomprehensible Koans to students. In supra-rationality the antinomies are held to be simultaneously effective without any possible interaction. In paradoxicality the antinomies mix and interact to produce absurdities. Supra-rationality maintains clarity of the situation in the face of its incomprehensibility while paradoxicality slips into chaos and confusion by mixing and fusion of contradictories.

Another way of defining a formal structural system is in terms of the appearance of kinds of order. Klir hints at this possibility in the section of ASPS where he talks about methodological distinctions.¹⁸⁸ He gives us a lattice of the different kinds of order that a variable can take on in its sequence of values. These form a lattice that has its root in unordered distinction, which gives rise to partial ordering, and then fans out to encompass both linear order without distance and partial order with distance, before merging again at the point where full order that is linear and with distance appears. We can see a system as coming into being by accruing different degrees of order in its variables. We can recognize that some variables may be prevented from achieving full ordering. But the system arises as it attempts to attain full ordering in all its variables. We have shown that differential ordering effects the design of real-time computer systems due to the fact that certain background variables by which other system variables are measured cannot achieve anything higher than partial ordering.¹⁸⁹

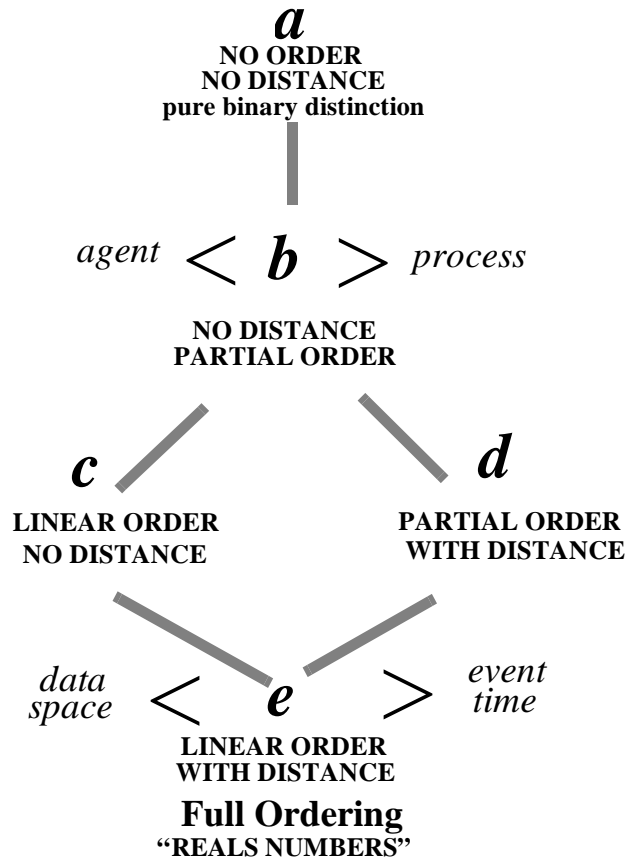
186. *Complementarity* op.cit.

187. *Thousand Plateaus* op.cit.

188. op.cit.

189. Palmer, K. [1996] *Wild Software Meta-systems* (manuscript; see <http://dialog.net:85/homepage/wsms.htm>)

Figure 29: Methodological Distinctions



If we think of systems as sets of variables that emerge by progressive ordering, and that some variables get stuck at various stages of ordering, then we only have to continue this progression beyond the emergence of the illusory continuity of the real numbers, i.e. Pure Presence, by allowing the conjunction of variables to form complexnion, quaternion, and octonion algebras. This conjunction of variables that otherwise might be viewed as real produces some very strange properties in the conjuncted system, that both relativity theory and quantum mechanics take advantage of to describe the strange properties of physical systems. In fact, we could follow Prigogine and refer to the set of uncertainties that he associates with thermodynamics, relativity theory, and quantum mechanics.¹⁹⁰ But however useful these hyper-complex algebras of supra-ordered variables may be to physics their significance for systems theory has never been explored previously. When we view the systems as the progressive ordering of their variables, then when we go past the reals we naturally move into the conjunction of these variables into hyper complex algebras. These algebras are the natural set of relations between these variables which exhibit no surpluses nor lack. In fact, because they manifest neither surplus nor lack, they indicate directly the suchness of existence beyond showing and hiding relations of manifestation.

190. IJGS op.cit.

In a previous article I have mentioned that the ‘Magician’¹⁹¹ meta-systems (a special case of Self-Generating Systems [SGS]) are the dual of general systems of the type defined by Klir. This duality is difficult for us to think about because we are not used to thinking about meta-systems. And to think the duality between systems and meta-systems is even more difficult. But a simple way to explain this functor is to say that systems assume continuity of the gestalt object. Goertzel has attempted to define formalisms that do not assume continuity but instead make the counter assumption of discontinuity. In a ‘Magician’ system you must show how continuity is achieved instead of trying to explain discontinuity as we do in normal systems theory. A ‘Magician’ meta-system is a swarm that persists in spite of fundamental discontinuity. It does not form a system because there is no lasting gestalt. Instead we have a model of the proto-gestalt’s implicate order manifesting over and over again in the patterning of the swarm. This is more a mosaic, or collage, in which mutually self-generating elements create and destroy each other rather than a single gestalt. The meta-pattern is expressed in terms of mutual action and gestalt pattern recognition and generation between the ‘Magicians’ of the SGS. Gestalts arise within the context of this discontinuously changing manifestation. As such the Gestalts are systems within the milieu of the Proto-Gestalt meta-system made up of swarming self-generating elements. The ‘Magician’ meta-systems form the substrate upon which systems are seen as figures. They are figures on the ground of the continual arising of virtual system and anti-system pairs, that annihilate each other in a continuous chaotic morass, that underlies the manifestation of all forms and patterns. The opposite of form is chaos, but as we have learned recently chaos is not the lack of all order, but instead the mixture of order and disorder. That chaotic mixture, as it manifests to us, has a kind of Wild Being. Castoriadis talks about Being specifically as Chaos and introduces the term *Magma*¹⁹² which is similar to the *Rhizome* of Deleuze and Guattari and the *Flesh* of Merleau-Ponty in their intent of indicating the nature of Wild Being. Guattari on his own talks about *heterogenesis* in *Chaosmosis*¹⁹³. It is shot through and through with discontinuities of every kind which lends it a sort of Hyper Being. So that the frozen continuity of Forms and the dynamic continuity of Systems signified by Pure Presence kind of Being (Form) and Process kind of Being (System) that appear as gestalts, or flows, and finds, its opposite between the manifestations of these two strange kinds of Being (Hyper and Wild). ‘Magician’ systems arise out of the gap between these kinds of Being as the dual of systems, that are supported by the more normal kinds of Persistence and Flux, which were first defined by Parmenides and Heraclitus as we understand them from the history of metaphysics, and upon which we implicitly build the ontologies that underlie our systems theory. When we understand the mosaics and collages that are the inverse of our systems, then we are able to understand that ‘Magician’

191. Goertzel, B. *Chaotic Logic op.cit.*

192. Castoriadis, Cornelius. [1997] *World in Fragments : writings on politics, society, psychoanalysis, and the imagination*. Edited and translated by David Ames Curtis. Stanford, Calif. : Stanford University Press.

193. Guattari, F. [1995] *Chaosmosis: an ethico-aesthetic paradigm*. Bloomington, Indiana University Press.

formalisms are not only possible but a necessary part of comprehension of systems from the point of view of meta-systems.

Now consider Peirce's categorization¹⁹⁴ of predicates into Firsts, Seconds, and Thirds. Firsts are the things that appear, nothing more nor less than their appearances. Seconds are the relations between the Firsts. And Thirds are sets of relations that approach the limit of continuity. To these we add another category called Fourths which are synergistic overdeterminations of Firsts, Seconds, or Thirds. Fourths we take from the work of Buckminster Fuller¹⁹⁵ who studied synergies in Geometry. Peirce denied the existence of Fourths, but he only dealt with logic not geometry. Logic can be exhaustively described by the first three categories but geometry needs the additional category of synergy to be understood. Points, lines and planes are reused in higher dimensional forms¹⁹⁶ in an overdetermined way to form synergies that go beyond what can be described by these first three categories and necessitate the introduction of the Fourth.

When we look at the lattice of the kinds of order¹⁹⁷ we notice that the first kind of order defines Firsts alone by a set of distinctions. But that the other kinds of order describe the different kinds of relations that can appear between things. So the whole lattice describes the kinds of Seconds that can distinguish and connect Firsts. So we can see our system coming into existence first as orthogonal distinguished Firsts (something) which then develop Secondary relations between themselves of the different kinds of order that appear in the lattice of Methodological Distinctions. The ability to order different things within the manifold of the system allow continuities to be determined especially when they are compared with background variables such as space, time, agent and function viewpoints¹⁹⁸. Once we allow that there are different instances of variables, then we acknowledge that there can be different ramified meta-levels of relations between things in the system so that the epistemological framework of Klir naturally evolves to solve the paradoxes of spacetime embedding. Also, abstract conceptual ramified sets of higher logical types may appear in order to encapsulate the design of the system. These two kinds of ramified meta-levels are associated with logos and physus dualism that we tend to project on all things. The two ramified meta-level sets interact to define different

194. Peirce, Charles S. 1839-1914 [1931-60]. *Collected papers*. Edited by Charles Hartshorne and Paul Weiss. Cambridge, Harvard University Press, 8 volumes.

195. Fuller, B. [1975, 1979] *Synergetics I & II*. Synergetics: explorations in the geometry of thinking. R. Buckminster Fuller in collaboration with E.J. Applewhite; preface and contribution by Arthur L. Loeb. 1st Macmillan paperbacks ed. New York: Macmillan, 1982, c1975 *Synergetics 2: explorations in the geometry of thinking*. R. Buckminster Fuller; in collaboration with E. J. Applewhite. New York: Macmillan, c1979.

196. Rucker, R. [1984] *The fourth dimension: toward a geometry of higher reality*. Boston: Houghton Mifflin. See also Hinton, C.H. [1976] *The Fourth Dimension*. N.Y. Arno Press. See also Hinton, C.H. [1886] *Scientific Romances*. Volumes I and II. Pater Noster Square. Swan Sonnenschein and Co. Arno Press. 1922.

197. See Klir ASPS for "Methodological Distinctions" op.cit

198. Palmer, K.D. [1996] *Wild Software Meta-systems*. (manuscript; see <http://dialog.net:85/homepage/wsms.htm>).

meta-levels of change and learning¹⁹⁹. Within this dualistic framework continuities exist to trace the dynamics of the instances of things that make up the gestalt of the system as it arises from the meta-systemic background. So, Thirds arise through the positing of instances of objects and continuities that connect them over distances in spacetime, or partially order them, with respect to agency and function. Systems exhibit synergy in which a single part or relation will function in multiply overdetermined ways. Thus, every system, like an organism, exhibits some degree of synergy through the continuities and discontinuities that exist within it. When symmetries exist instead of synergies then we see meta-systemic complementarities instead of systems. Synergies and exclusionary complementarities of symmetries co-define each other so that the thing can be seen as either a whole greater than the sum of its parts or a whole less than the sum of its parts.

So we can see any system as coming into existence by the progressive stages of its ordering, rather than by the appearance of things within it and their relations alone. Each system as a gestalt appears to strive to produce a continuity through which its dynamics can be expressed. This apparent teleology is an artifact of our projection of illusory continuities on existence. We assume that every variable should be fully ordered by the real numbers but often real systems cannot rise to this ideal level of the production of illusory continuity that would give perfect intertransformability as defined by a real algebra. Some systems are incompletely ordered, not just undecidable and indistinct, but under-determined, or only quasi-ordered. Something and nothing are not just articulated by the ramified framework of meta-levels, but also exist in relations of undecidability, indistinguishability, indeterminateness as to kind, and under-determined or quasi-ordered. Each kind of system may be partially submerged in the mire of inarticulateness to a different extent. And this submergence might be intrinsic and essential, not just a product of a lack of rigor or neglect. The lack of complete order in the agent and function views on real-time system design is an example.²⁰⁰

But what happens when a system achieves perfect rigor of complete continuity, determinateness, decideability, and distinguishability, is it possible to move beyond this ideal? This ideal is the definition of the dynamic system gestalt that has been isolated and highlighted by the rigor of science, rendering it clear and distinct²⁰¹ -- cut off from its meta-systemic shadow. But this ideal is difficult to maintain. It *is* possible to go beyond the definition of the general formal-structural system into the realm of the special systems. We do that by moving to the different levels of archetypal algebras beyond the perfectly intertransformable algebra of the

199. Palmer, K. [1995] *Advanced Process Architectures* Tutorial presented at SEPG 95 in Boston. (presentation; see <http://dialog.net:85/homepage/advanced.htm>)

200. Palmer, K. [1996] *Wild Software Meta-Systems*. (Unpublished Manuscript; see <http://dialog.net:85/homepage/wsms.htm>)

201. Descartes, R. [1966] *A discourse of a method for the well guiding of reason and the discovery of truth in the sciences, 1649*. London, Dawsons of Pall Mall.

real numbers. When we move beyond the algebra of the real number into the hyper-complex algebras there are three steps beyond the fulcrum of perfect continuity and complete order. These balance the three steps that led up to that threshold as order congealed. Here instead we get a fragmentation between timestreams of continuity represented by the ordered variables of the system. Different timestreams of continuity are held in conjunction and through that we distinguish between different kinds of numbers which we call imaginary. There are three algebras beyond the real numbers associated with the complexnion, quaternion, and octonion numbers. They are called the alternating division algebras produced by the Cayley-Dickson process. These three thresholds of complexity beyond the threshold of the real numbers are analogous to the dissipative, autopoietic and reflexive special systems. The special systems deal with the intertransfromability between streams of continuity held together, yet apart. They go beyond the normal case of general systems in which a single form of continuity exists, and where all the numbers associated with variables are real.

In both relativity theory and quantum mechanics complex numbers²⁰² are used for particular purposes. In relativity theory they are used to express the strange relation of time to space. In quantum mechanics they are used to express the non-locality of particle interactions in the S-matrix. But rarely do we encounter Quaternions (3 imaginaries) and Octonions (7 imaginaries) in physics. Quaternions were discovered by Hamilton in 1843²⁰³ and soon after Graves discovered Octonions²⁰⁴. What was unexpected was that this series abruptly comes to an end when we attempt to move to the next level called Sedenions²⁰⁵ which have fifteen imaginaries. The division property is lost. These quasi-algebras²⁰⁶ are too weak to give us any of the properties like those we consider normal in algebra. There are an infinite number of these non-associative non-division weak quasi-algebras. Our normal algebra is quite unique and exceptional in the richness of its mathematical properties in contrast to the infinite number of non-associative algebras. The four

202. Cockcroft, W. H. [1972] *Complex Numbers*. Chapman and Hall.

203. "Quaternions were discovered by Gauss. It is in one of his copious notebooks. Hamilton discovered quaternions in 1843. We know the precise date because the discovery has been over-analyzed by historians, it was in October of that year. Rodrigues figured them out independently of Hamilton. It may have been Grassman who realized that both approaches were identical." from Doug Sweetser. See Crowe, M.J. [1967] *A History of Vector Analysis*. London, University of Notre Dame Press. See also Grassmann, H. [1995] *A New Branch of Mathematics* (The Ausdehnungslehre of 1844, and other works.) Chicago, Open Court.

204. McAulay, Alexander, [1898]. *Octonions: a development of Clifford's bi-quaternions*. Cambridge, [Eng.] University Press. See also Dixon, Geoffrey M. [1994] *Division algebras: octonions, quaternions, complex numbers, and the algebraic design of physics* Dordrecht; Boston: Kluwer Academic Publishers.

205. Charles Muses [1966] "The First Nondistributive Algebra, with Relations to Optimization and Control Theory", in *Functional Analysis and Optimization*, ed. by E. R. Caianiello, Academic Press. See also Charles Muses, "The Amazing 24th Dimension". *Journal for the Study of Consciousness*, Research Notes. See also Charles Muses [1960], "Hypernumbers and Quantum Field Theory with a Summary of Physically Applicable Hypernumber Arithmetics and their Geometries", *Applied Mathematics and Computation* 6 (1960) 63-94. See also Lohmus, J., Paal, E. and Sorgsepp, L. [1994] *Nonassociative Algebras In Physics*. Florida, Hadronic Press

algebras associated with the real, complex, quaternion and octonion numbers stand out as being very special within the field of all possible algebras. This is why the systems that are defined by them are considered special. They are like a single peak of perfection in a vast plain of mediocrity of all other possible algebras. Those special systems are isomorphic in structure to these unique and rich algebras that model illusory continuity mathematically. All the non-division non-associative algebras of various kinds including those created by the Cayley-Dickson process produce broken continuities because the division property fails in them. It is only in algebras that uphold and underwrite the division property that can model continuities completely. Within all the other algebras there is an underlying discontinuity with local islands of continuity instead of global continuity based on the operations of intertransformation between number streams.

The meta-systemic operator that corresponds to the system is the creation operator that will be contrast with the annihilation operator that appears at the next level of special system emergence. Where we can think of normal systems as coming into existence incrementally we can see that there are a whole class of systems that are quantal and that spring into existence full blown out of the background of the meta-system. For these systems there is a creation operator that produces from the meta-systemic field (as origin) the whole system. In terms of software applications we can see this as the operation that starts an application as a command given to the operating meta-system. In quantum mechanical field theory there is a similar creation of particle and anti-particle pairs from out of the soup of virtual pairs that are continuously created and destroyed. The quantal creation operation is based on the continuity of the field that forms the background on which the system is created. In this case the temporal discontinuity of the system is based on the spatial continuity of the field that can create the system as a whole out of the fluctuations of the field

206. The Division Algebras over the Real Numbers are:

```
R - dimension 2^0 = 1 - real numbers, with a^2 = 1; (here a is nonzero)
C - dimension 2^1 = 2 - complex numbers, with a^2 = -1;
Q - dimension 2^2 = 4 - quaternions;
O - dimension 2^3 = 8 - octonions.

R is Amalgamative, Commutative, Associative, and Distributive;
C is Commutative, Associative, and Distributive;
Q is Associative, and Distributive;
O is Distributive.
```

Instead of stopping at O, Muses notes that divisors of zero are related to NonDistributivity in that, if a, b, c, ab, and ac are nonzero such that $a(b + c) = 0$ then $a(b + c) \neq ab + ac$ Therefore Muses classifies such higher dimensional algebras as NonDistributive Algebras. They include: (here a and b are nonzero and noninfinite)

```
S - dimension 2^4 = 16 - sedenions S with ab = 0;
SC - dimension 2^5 = 32 - complexified S with a0 = b;
    dimension 2^6 = 64 - M(8,R)
    dimension 2^7 = 128 - M(8,R)+M(8,R) with a^2 = 0;
    dimension 2^8 = 256 - M(16,R) with a^4 = 0
                        and a^2 != 0 and a^3 != 0.
```

Excerpt from Tony Smith's WebPage at <http://www.innerx.net/personal/tsmith/NDalg.html>
Charles Muses' work op.cit.

itself.

The algebras related to the real and complex numbers share the same properties. The complex number algebra arises because certain equations may be solved with them that could not be solved otherwise, because they do not have real roots. Together these algebras can be seen to create and destroy systems gestalts. Through the series of stages of the introduction of ordering of variables we can see how systems are created. When complex numbers²⁰⁷ arise it is necessary to have pairs of variables held in conjunction (together yet apart). If conjunction fails then we cannot distinguish between the imaginary and the real parts any longer. This is why vector mathematics was invented by Hamilton. He realized that there was from one perspective no difference between real and imaginary numbers outside the conjunction. But inside the conjunction a symmetry breaking occurs that differentiates the three imaginaries from the one real component. So annihilation arises as the breaking of the conjunction in the $a+bi$ formation of the complex numbers. When the conjunction fails we fall back into just having two real numbers in a vector formation and the symmetry breaking disappears. So the two algebras that give us the real and complex numbers from a systems theoretic point of view give us creation and annihilation meta-systemic operators.

Similarly, at each further stage of the arising of hyper-algebras that give us the quaternion and octonion we can see from the systems theoretic viewpoint the arising of two further meta-systemic operators. These are associated with the loss of fundamental properties which are different in each case. In the quaternion we lose the commutative property, while in the Octonion we lose the associative property. When we move beyond the alternating division algebras to the Sedenion we also lose the division property. Thus, with each further stage our algebras weaken until we no longer consider them mathematically interesting. The inability to reverse operations leads to the arising of a *mutual action* meta-systemic operator while the inability to re-associate them at will leads to the arising of a *gestalt pattern formation (mutual support or interdependence)* meta-systemic operator. Three of these operators were first identified by Goertzel in a paper refining his ‘Magician’ Self-Generating System (SGS) formulations²⁰⁸. The creation operator was introduced by the author to round out the set and to introduce the spontaneous creation or radical emergence to the SGS theory. These two meta-systemic operators (mutual action and gestalt pattern formation) are complementary pairs like the creation and annihilation operators. Together these four operators define what might be called the Emergent Meta-system. We can see them in the production of virtual particles that form the background of conserved particles in physics. Virtual particles are created out of the

207. Yaglom, I.M. [1968] *Complex Numbers in Geometry*. London, Academic Press.

208. Goertzel, B. [1996] *From Complexity to Creativity Computational Models of Evolutionary, Autopoietic and Cognitive Dynamics*. New York: Plenum Press.

field and annihilate each other before the time limit set by Planck's constant is reached. Thus, space is made up of a soup of created and annihilated virtual particle pairs, that form the background against which so called 'real' particles exist. But the truth is that these virtual particles are needed to represent field interactions of the 'real' particles, so that the 'real' particles could not exist as they do without the virtual particles that they are distinguished from by conservation laws. Thus, the virtual particles, as a condition for the existence of the 'real' particles, are just as real as they are. The two kinds of particles together constitute the reality of particles embedded in a field in spacetime. Virtual particles themselves can mutually interact in the brief time that they exist not only with themselves but also with 'real' particles. And because they can be 'seen' in the effects they have on other particles there is a peculiar gestalt pattern formation associated with the activity of virtual particles. There is, of course, no direct observation of them as Planck's constant defines the limit of resolution. But we see the traces of virtual particles in the effects that occur in bubble chambers on the observable 'real' particles. Thus, we see that because of the observability of effects and the possible mutual action that allows those effects to propagate, virtual particles exhibit all the meta-systemic operators characteristics. And that is because the fabric of virtual particles underlying observable particles is the meta-system that is the arena within the system of conserved and observable particles operate within. The virtual particle background is another name for the meta-system of the system of particle interactions that occur as embedded in spacetime.

Emergent Meta-System (EMS) is a model of the pure meta-system that arises at the sedenion level in the articulation of the partial meta-systems that correspond to the division algebras. Emergent Meta-Systems may be defined as consisting of the aspects that underlie Spencer-Brown's Laws of Form (i.e. something, nothing, leveling and multiplicity) together with the four meta-systemic operators (creation, annihilation, mutual action and gestalt pattern formation) that allow them to become a theoretical construct that extends Goertzel's 'Magician' SGS model by adding the possibility of radical emergence or spontaneous creation (i.e. a true creation out of nothing, i.e. *ex nihilo*, operator). Emergent Meta-Systems are in Peirce's terms 'firsts' which have no external relations to each other to hold them into static formations. Instead, they only have internal projected relations to each other. We define these elements that have only internal relations with each other, yet form a swarm outwardly, as monads, after Leibniz's use of the term.²⁰⁹ However, these monads are very different from those of Leibniz. Each monad has four facets defined by the application of the meta-operators to itself. The monad successively moves through the phases of seed in a pod, monad in a swarm, viewpoint in a constellation, and candidate in a slate. Each of the facets other than that of the monad itself are

209. Leibniz, X. [1902] *Monadology* in *Discourse on metaphysics, correspondence with Arault, and Monadology*. Translated by George R. Montgomery. Reprint ed. Chicago, Open Court Pub. Co., 1924.

imaginaries and the facets form a quaternion with three imaginary facets and one real facet. All the monads in a swarm resonate with each other moving through the EMS cycle together. Each monad is in turn only a swarm of monads. In this way, monads are not-well-founded in as much as they form Hyperlists (not just Hypersets) that violate Russell's dictum about a class containing itself. However, it may not contain itself directly, but only in some mediated fashion. Thus, self mediation of the monads in a swarm by other members of the swarm is what generates the hyper-complex algebraic structures within the swarm. Thus, Emergent Meta-System components swarm and form a rhizomatic collage or mosaic rather than an architectonic structure. The projection onto each other of internal relations by members of the swarm is accomplished by the mutual action and gestalt pattern formation operators. Within the swarm there is a process of communal creation and destruction that produces a life cycle which assumes basic discontinuity rather than continuity of the swarm and its components in time or space. Time itself is split into timestreams which are different for each member of the swarm. Interoperability between time streams is achieved through the successively weakened algebras. But also with individual timestreams there may be discontinuity as members of the Emergent Meta-System appear and disappear in different life-cycle phases. This discontinuity is radicalized when we enter the Sedenion and higher level non-associative non-division algebras where the timestreams themselves become circular as the division property fails. At most only eight timestreams may remain associative within the swarm. This is the radical discontinuity at which point the swarm becomes an utterly interpenetrating. Because of this the meta-system introduces the necessity of the consideration of radical emergence or spontaneous creation as an important aspect of the swarm.

Therefore, we see that from the viewpoint of Peirce in Emergent Meta-Systems continuity becomes fragmented by the splitting of timestreams and eventually the production of circular timestreams (called by some cyclical or eternally returning time) when linearity fails at the Sedenion level. Relations between components are internalized. To that extent the Emergent Meta-Systems components are externally like Leibnizian *monads*, yet with no external relations to each other at all. The only way to get a view of external relations within the swarm is to make a fuzzy summary of internally projected relations. Thus, the swarm of discrete monads exists in a halo of possible relations between the components. Here we see that by taking the view of Leibniz concerning the existence of monads, it is possible to see how they project internal relations instead of participating in external relations with other monads. Thus, the deterministic projection of each monad of relations internally appears externally as a fuzzy summary over all the projections. In this way the monads themselves may remain probabilistic actualities within the swarm, and be seen as discretely quantized in spacetime. But the mixture of the internal continuity and the external discontinuity of probability allows the approximation of rhizomatic Wild Being. The swarm that creates itself as a self-

generating system becomes the ideal model of the chaotic system. But the chaos of creation and destruction of self-generating components exists against the picture of the whole as a fuzzy summary of internally projected deterministic (continuous) relations by each monad on to all the others.

So here we see how the EMS structure uses the four different kinds of mathematics to produce a working model of the dynamic synergies of the meta-system. Similarly we can see how the swarm itself can be pictured as a multi-dimensional grid that contains computational monads²¹⁰ which produce these internal projections which are summarized by a fuzzy maximum or minimum. That set of internally projected relations may be seen as the design of the systems architecture²¹¹. Because we have not allowed external relations between monads but demanded that they have an interior that arises in the laws of pattern, but is denied by the laws of form, then we are able to treat the monadic creation and destruction in terms of a genetic algorithm such as those developed by John Holland²¹². In this way we can see how we might explore the design landscape as an internal representation by successive generations of EMS monads within a swarm. Requirements become fitness relations and monadic swarms evolve to fit those constraints by a evolutionary search for optimal configurations of the internally projected archetypal relations.

This radical suppression of external relations (Peircian Seconds) and continuity (Peircian Thirds) leads to a peculiar form of synergy. That synergy appears particularly in the formation of the quaternion which might be called a mediated hyperlist. In other words the formation is a Non-well-founded Set (Aczel²¹³) with additional list like properties which allows repetition of individuals of the same kind and some ordering. It is called mediated because no set can be directly a member of itself but may be a member of a set that is included within itself. This peculiar synergy in which elements may be reused by themselves but not directly (only through the mediation of another) may be called following George Leonard 'holoidal.'²¹⁴ It is the synergy of global interpenetration. The swarm interpenetrates through the realization of multilevel conjunction under the auspices of the Division Algebras. This is similar to the multi-connected multi-wormholed landscape that may appear in surreal numbers that was mentioned before. The multiple mappings back on itself, and the multiple wormholes through itself, create something analogous to the non-well-founded hyperlist that is reusing itself through the other, in a mediated self-embedding self-recursion through the Other. This is the process of creating the rhizomatic landscape that Merleau-Ponty called 'Flesh'. In

210. Computational monads are built up of aspects of the software design minimal methods that are non-relational.

211. Kelly, D.A. [1976] "Architecture as Philosophical Paradigm" in *Meta-philosophy*, VII, July-Oct, pp 173-190.

212. Holland, J. [1995] *The Hidden Order Hidden order: how adaptation builds complexity*. Reading, Mass.: Addison-Wesley.

213. Aczel, [1988] *Non-Well-founded Sets* Stanford, CA: Center for the Study of Language and Information.

214. Leonard, G. [1978] *The silent pulse: a search for the perfect rhythm that exists in each of us*. New York: Dutton.

Wild Being the self and other are chaotically mixed as are order/disorder, and continuity/discontinuity. Within the disorder of chaos order spontaneously arises, that “order for free” gives an implicit directionality to chaos which we call propensities, tendencies, or dispositions,²¹⁵ which are imperfections in the underlying field at the reflexive level as it intersects with the pure recursive meta-systems. So in the swarms Firsts (as radical emergences or computational monads) and Fourths (as synergies or interpenetrations) predominate over Seconds (internalized relations) and Thirds (broken continuities). This produces a model of the meta-system or general economy which is complementary to the system as defined in General Systems Theory. In the system, or the restricted economy, external relations and illusory continuities are sustained over against synergies of monads. Mutual action and gestalt pattern formation may appear in the Meta-system because of the background of radical discontinuity. Continuities, not discontinuities, must be proven in the meta-system. These are continuities of action and perception that go against the grain of the discontinuities created by continual creation and destruction of monadic components by the swarm. The social character of the swarm is levied against the monadic character of the individual concrete components of the swarm. Via mutual action and group perception production, the collusions are created that allow persistence to exist within the evolution of the swarm. This creation/annihilation represent dynamic forces of discontinuity while mutual action/gestalt pattern formation represent the social cohesion and collusion that makes the swarm a mosaic instead of merely a collage within the rhizomatic ‘Flesh’ of the swarm dancing in the social fabric of Wild Being.

It is of interest that the Emergent Meta-System formation can be seen to have a precise model in the age old game of Go in Japan, or Wu Chi from China. This fact makes it clear that knowledge of the Emergent Meta-System formation is very ancient. Basically we can see this if we understand that in playing the game of Go we are oscillating between Gestalt Pattern Formation, as we look at the pattern of the stones at any turn of play, and Mutual Action when we play a stone and thus diacritically alter the relations between all the other stones. This oscillation occurs in both players of the game of Go, continually getting new pattern formations and continually moving in such a way that it effects the valuation of every stone on the board. But it is only when we consider what goes on beyond the borders of the game proper that we can see the Emergent Meta-System formation in its entirety. We see when the players decide to stop playing there is an accounting that redistributes the stones such that it is clearer who has the most empty spots. It is these empty spots that are counted. This is a reverse gestalt from the one that was developed as one played the game where the stones themselves were the focus of attention. Now the holes that are left and surrounded by a particular player are the most important aspect of the game and defines its true goal which is to control more holes than one’s

215. In Buddhism it is dispositions due to ignorance that start the wheel of samsara or suffering.

opponent. But we go further because we not only decide who won but also calculate the handicap for the next game. This handicap is calculated by taking the winning score and dividing by nine. This calculation gives the number of handicap stones the losing player should have in the next game. These handicap stones are placed on the board at designated spots prior to the beginning of play. The handicap stones are the seeds of the power structure of the weaker player for the next game. They are placed in non-optimal places so that they give support but do not immediately confer advantage. They are placed at just the spots that the weaker player will be able to use them when he attempts to connect his disparate groups of stones in the middle game. So if we understand the handicap stones as seeds then it will be clear that these seeds were truly produced out of nothing, i.e. the holes that the players were attempting to conserve in the last game. So something was produced out of nothing. But beyond that we can see that these holes are the candidates that cancel each other out to produce the seeds for the next game or generation of the swarm of monads (stones). So we see the stones as monads, the handicap stones as seeds and the holes that are conserved as candidates. What we lack to have a full EMS formation is the viewpoints. The viewpoints are seen in the game as the “eyes” that allow groups to become invincible. These special holes make a group viable and when paired make it so that the group cannot be taken by the opponent. This confers a kind of ultra-efficiency to the group of stones by making it invincible. So candidates and viewpoints are special kinds of holes in the Go game while monads and seeds are special kinds of stones. The viable group is the root of a gestalt that will produce the lasting and stable patterns within the patterning of the Go stones. Thus, eye holes in groups are fundamentally related to the pattern formation within the game. Notice that the two remaining operators also appear. The annihilation operator appears in the end of the game when the conserved holes of one player cancel the conserved holes of the other player. Also the creation operator appears when there are seed handicap stones created out of nothing by the rule of nine. Both these operators appear outside the play of the game proper and organize the movement between games which represent the lifecycle generations of the swarming monads. In fact, this analysis of Go may be taken down to its minutest details and we see that the way the game is played by two players across multiple games is a precise model of the Emergent Meta-System formation that we have been describing. That EMS formation has been coded into this cultural artifact by the Ancient Chinese. It is a representation of the archetype of the *Dragon* in their culture, that is a picture of the Kosmic Monad, that is the archetype for the interface between form and formlessness. Between every two Go games radical emergence is simulated as the seed handicap stones are indeed generated directly out of nothing, as a side effect of the cancellation by which one player wins and the other loses. Go shows us that depending on the context ‘nothing’ can take on a very concrete negative form. The precision of this ancient artifact shows us that the EMS formation was well known by the ancient Chinese, and it was a knowledge that they wanted to survive into their culture’s future, so they made a game out of it that would be played by millions of

people for the intellectual pleasure of it, even though they did not understand its meaning. That meaning has finally surfaced again. Go is a cultural artifact that captures the essence of the Chinese worldview similar to the way Chess is an artifact that captures the essence of the Western Worldview.

In Chess there is the fact that the amount of information needed to differentiate the pieces on one side is exactly the same amount is needed to define the board. Thus, there is a transformation between 2^6 and 4^3 , that is between two dimensional surface organization of the board and a three dimensional solid organization of the pieces. Both sides pieces in information terms, map to the whole playing board so there naturally arises conflict. This kind of transformation first happens at the level where there are 64 distinctions. Next it happens at threshold of 729 distinctions. But 64 is the first threshold where such a transformation can be made without losing any information. This transformation is indicative of a basic Indo-European cultural trait that objects that are simultaneously operations are preferred. We can see this in language where the words “shape *shapes*”, “form *forms*” can be either nouns or verbs. This reaches its ultimate with the ontological formulation “Being IS”. G. Spencer Brown has formalized this in his Laws of Form in which *Marks* are both operators and operands. Chess represents this chiasm between the operator and the operand in the fact that the places in Chess and the things that move in those places have the same information content. The pieces are the forms that move and that same information when transformed produces the place within which the movement takes place, and is thus the form of the board within which the forms of the pieces move. The Chiasm between noun and verb represents perfect action within the Indo-European worldview. But notice that in the clockwork mechanism of the Chess game empty space plays no active role as it does in the Go game. Each game is separate and does not contribute seeds of handicap stones from the last game that are created out of the annihilation of the valuable ‘nothing’ produced in the game by the gestalts and the mutual effecting moves. So we can see that the Chess game is blind to the role played by ‘nothing’ in the game. The whole focus is upon objects and their synergistic movements as a team in clockwork complex moves within the empty space of the board. Go on the other hand does not allow for the movement of the stones. Instead the static board is the source of many gestalt formations as we see the board differently as each stone is added to the tableau. This difference between the stasis of Go and the dynamics of Chess is striking. But what is not seen on the surface is that the dynamic in Go is across many games between the same players. If you watch the patterns that occur at the end of play over a series of games one notices the swirling patterns of the final groups after they have been rearranged for counting. So, there is dynamism but it is more subtle and is across game generations rather than within the game itself. The chiasm of noun and verb is an important underpinning of the Indo-European worldview that will produce maximally efficacious synthetic machines. Today we call it the unity of form and function. But the Chinese insight has to do not with form and function’s unity but the relation between form and

formlessness. It has a particular structure that we conceptualize in the Emergent Meta-system formation but which has been available in a concrete embodiment as the game of Go for thousands of years. At the interface between form and formlessness there is a reflective co-production where nothing and something produce each other. Within the Western tradition we only get this insight in some fringe theosophical texts whereas in China it was a central focus of all artistic creation²¹⁶ and, as we see now, their intellectual games as well. It is important to recognize that the EMS structure has an embodiment in Go because it brings it out of the esoteric theoretical realm and places it in a realm of intellectual gaming that everyone has access to. All you need to do is learn to play Go and you will have an intuitive understanding of the Emergent Meta-System formation.

If we need proof that the EMS formation was present in the Chinese tradition as an underlying model we might also look at the I Ching. The I Ching²¹⁷ is an ancient oracle with is thought to be the oldest book. That book is divided into 64 chapters each describing six lines with cryptic phrases. A new version of the I Ching has just been published which give us a glimpse of its earlier history. This version was found among the Mawangdai texts and is dated to the second century BC. It shines light on the Confucian interpretation of the I Ching and along with other texts found at the grave site in 1973 demonstrates the bridge between Taoism and Confucianism in Chinese history which was lost in the preserved tradition. Looking at the I Ching we see another cultural artifact poised at the same threshold of complexity as Chess. But here instead of a game we have a method of divining the future. That divination process is performed using yarrow stalks by a specific series of steps. If we look at the divination process we see an image of the Emergent Meta-system. The stalks themselves are the seeds. They are manipulated to give the first hexagram composed of changing and unchanging lines which shows us the action of the creation operator. Then the young lines change to old lines producing a second hexagram. This transformation depicts a mutual action between the lines of the hexagram that effects a transformation. The two hexagrams are compared to the situation and give a framework for interpreting the situation which prior to the divination did not exist. The comparison of the two hexagrams with the situation framed by the question of the diviner that was recorded beforehand gives a new viewpoint on the situation and allows a gestalt to form. There are many possible actions one might take to respond to a particular situation. These candidate action possibilities cancel each other out in the presence of the interpretation rendered by the divination process. This exemplifies the presence of the annihilation operator in which all the contrary possible actions annihilate to produce the final action as a side effect which is influenced by the interpretation of the situation that falls out from the

216. *The Propensity of Things* op.cit.

217. Shchuskii, I.K. [1979] *Researches on the I Ching*. New Jersey, Princeton U.P. See also Wilhelm, H. [1977] *Heaven, Earth, and Man in the Book of Changes*. Seattle, U. Washington Press.

divination. In divination unconscious proclivities are allowed to manifest and influence actions. Once we decide on an action and act then a new situation is produced and another opportunity for divination presents itself. We can think of this EMS cycle as the way individual moves are decided in the game of Go. Thus there is the macro EMS cycle that governs the cycle of games and the micro EMS cycle that governs the cycle of moves within a game. These two cycles can be seen as complementary to each other. Together they give a coherent model of action based on meta-systems modeling rather than systems modeling, that is based on the assumption of discontinuity rather than continuity. In a meta-systems model the break between games or moves is absolute. The problem becomes how to explain appearance of continuity in spite of this radical break between moves or games. Emergent Meta-systems theory is the answer to that question long known tacitly by the Chinese and preserved in their oldest, and until now inscrutable cultural objects. We find no theoretical formalization of this theory in China, but the implicit understanding that these artifacts connote gives us an extremely precise model of the archetype of the Dragon which swirls in and out of the mist of formlessness in many Chinese paintings like the one in the Nelson Gallery in Kansas City that I admired in my youth. It portrays five intertwined dragons entangled in the mist. These Dragons give us an image of the Five Hsing²¹⁸ or transformations that are the basis of Chinese cosmology. The five Hsing²¹⁹ are named Earth, Water, Fire, Metal and Wood. They form a hypercycle based on the structure of the penthedron in four dimensional space. Here formlessness is identified with the fourth dimension. The EMS formation shows how the Five Hsing²²⁰ might interact with the more traditional four elements²²¹ (Earth, Air, Fire, and Water) which according to Ibn al-Arabi²²² are the receptivities of the Earth (Ard) in relation to the Celestial Causes. When we multiply the five transformations by the four receptivities we get twenty source forms. We can see these source forms if we take out the symmetries of substitution and inversion out of the 64 hexagrams of the I Ching. These source forms also may be seen to appear in the letter forms of the Arabic alphabet²²³ and the Mayan day names. They are the primary archetypal sources that underlie the patterning of the Quran which is based on multiples of nineteen. The pattern is nineteen to twenty²²⁴. In other words

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218. Matsumoto, K. and Birch, S. [1983] *Five Elements and Ten Stems*. Brookline MA, Paradigm Publications. See also Connelly, D.M. [1979] *Traditional Acupuncture and the Law of Five Elements*. Columbia MD, Center for Traditional Acupuncture.
219. Major, J. S. [1984] "The Five Phases, Magic Squares and Schematic Cosmography" pages 133-167 in *Explorations in Early Chinese Cosmology*. Edited by H. Rosemont, Jr. JAAR Thematic Studies, Scholars Press.
220. Lawson-Wood, D.J. [1965] *Five Elements of Acupuncture and Chinese Massage*. Devon UK, Bradford Holsworthy Health Science Press. See also Lawson-Wood, D.J. [1964] *Acupuncture Handbook*. Rustington Sussex UK, Health Science Press.
221. Hauschka [1966] *The Nature of Substance*. London, V. Stuart Ltd.
222. Shaykh ibn Arabi al-Akbar *The Mekkan Revelations*, Chapter 11 (manuscript translation). See also Muhyiddin ibn al-Arabi [1980] *Seals of Wisdom*. Norwich, UK, Diwan Press.
223. Abd al-Qadir as-Sufi [1975] *The Way of Muhammad*. Norwich, UK, Diwan Press. See also Abd al-Qadir as-Sufi [1979] *Indications from Signs*. Norwich, UK, Diwan Press.
224. Sometimes the Alif(ientity element) is counted and sometimes it is not counted.

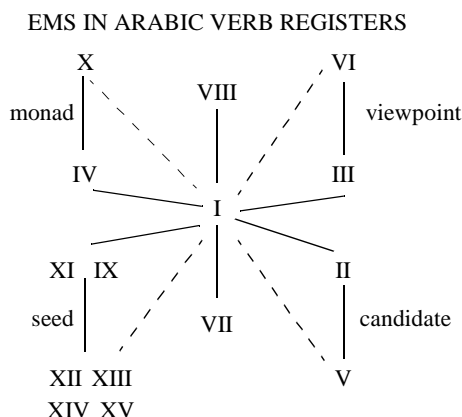
the Alif is sometimes included and sometimes excluded. The Alif is the source of the other letters²²⁵. There are many different embodiments of these nineteen to twenty sources that appear within the mirroring of the I Ching. In Go this numerology appears as the two sets of nineteen orthogonal lines that form the grid of the Go board. Our problem is to understand these sources in a modern context in which they are theoretically meaningful and not merely an incomprehensible archaic numerology. We do this by understanding how these ancient images of the Emergent Meta-System operate and how they tie together to give a significant theoretical explanation of what is beyond General Systems Theory. What is beyond the system is the environment. The meta-systems define the environment as not a unified gestalt but instead a dual and complementary un-unified field. This field has a specific structure and within that structure we see the relation between the fourth dimensional pentahedron interacting with the three dimensional tetrahedron as a model of the interaction of Heaven and Earth, Yang and Yin. Out of this the twenty possible interactions appear and these are given various images by different cultures throughout history. In the Mayan instance these were seen as the daynames which participates in a very complex calenderical system. In the instance of Islamic cultural it was seen as letters which are the non-dual between physis and logos which exist in the context of a complex linguistic milieu which is structured very mathematically through Arabic grammar²²⁶. So we do not merely posit that any random set of twenty things is an embodiment of the twenty interactions between heaven and earth, but rather take into account the entire systems of relations that these embodiments of the twenty interactions appear in each case. And these two examples, Mayan Day Names and Root²²⁷ Arabic Letter Forms strike us as two instances where the whole context taken together seems to be an image of the Emergent Meta-System formation. The nineteen to twenty letter forms, twenty day names, twenty sources in the I Ching and nineteen lines of the Go board represent the fundamental relation between heaven (no-where) and earth (some-where) in the dynamic of interpenetration. In that interaction monads of the Emergent Meta-system are continually coming into existence and then being annihilated. Each interaction of a Hsing with a receptivity of the earth exists as a monadic swarm. In the next moment it has vanished to be replaced by another monadic swarm whose quality is that of yet another Hsing-Element interaction. So the EMS cycle probabalistically moves between different qualitative regimes as the different dragons intertwine. It is impossible to tell if the EMS cycle jumping from quality regime to quality regime or is instead a set of five

225. Letters have been traditionally seen by Sufic writers as the non-dual between Physis and Logos so that they do not accept the existence of materialistic atoms. They are non-dual at every level of the differentiation of the world. As spoken or written they are the non-dual between physis and logos. As they represent the words of God as in the Quran they are non-dual between God (unlimited) and creation (limited) and thus are called uncreated. As the revelation only contains a small number of the words of God according to his revelation, then they are non-dual between having and non-having as we have some of those precious words and not others. As they exist as sources from which things arise they are non-dual between existence and non-existence. See the explanation of Shaykh al-Akbar in the Seals of Wisdom. A good source is Chittick, Wm. C. [1989] *The Sufi Path of Knowledge*. SUNY.Chittick, Wm. C. [1998] *The Self Disclosure of God*. SUNY

different EMS cycles sticking to the same quality regime. Like the painting you cannot tell which sinewy form is connected to which dragon as they pop in and out of existence on this side of the barrier of formlessness.

The fundamental idea which is expressed in chapter eleven of the Mekkan Revelations is that each celestial cause has four ‘wives’. This is to say it has four different receptivities. The celestial cause itself can be seen as unified or as broken up into the various Hsing²²⁸. So when the Hsing hits the ‘Ard’ or Earth a particular set of four interactions occur. This is like dropping four pebbles in a pond. Four different sets of wave rings begin perturbing the surface of the pond. These intersect and interact producing a complex interference pattern. This pattern is viewed in terms of sets of opposites. Those sets of opposites permute to produce a set of possible qualitative states for the entire system. The system as a whole begins popping around or cycling around these various possible qualitative states. We understand these qualitative transformations through the application of the trigrams or hexagrams of the I Ching. But the phenomena we are observing is really the interaction and interference of the four different lines of causation coming from a single celestial cause. Since the celestial causes, Hsing, form a hypercycle on the form of the pentahedron in four dimensional space then there is a coherent relation between the various celestial causations with respect to the receptive media of the Earth. The pentahedron of four dimensional space is made up of two intertwined mobius strips²²⁹ which define together the control cycle that interoperates with the production cycle of the five Hsing. Two intertwined mobius strips have a form similar to the kleinian bottle. The kleinian bottle as we will see is an image of the

226. In Arabic there are fifteen forms (sometimes called types) for each verb which might be better named as registers. These registers are an image of the Emergent Meta-System Formation. Thus each verb can be seen as articulating some of the EMS formation and simulating the fundamental structure of existence..



227. undotted letters

228. Cheng, Chung-Ying [1987] “Preliminary Study of the Question of Categories in Chinese Philosophy” in *Chinese Studies in Philosophy*. Winter, 1986-87, Volume XVIII, Number 2, pp. 29-97. (M.E. Sharpe Inc Armonk NY.) See also Wilcsek, F and Devine, B. [1988] *Longing for the Harmonies*. N.Y. W.W. Norton. The structure of the ‘colors’ of the strong and weak forces have the same structure as the Hsing.

autopoietic systems's surface. So in the image of the four dimensional Platonic solid of the pentahedron we have a fusion of an image of the hyper-cycle²³⁰ of the autopoietic system and the spacetime representation of its boundary. Steve Rosen likens the kleinian bottle with the strange properties of the crucible of the alchemists. This gives some hint of the peculiar properties of the autopoietic system. To us this hyper-cycle which is at the center of Chinese Alchemy appears as an autopoietic special system with its imaginary hypercycle controlling the autopoietic nodes within the autopoietic network. We see it as self-organizing because within the Western Scientific worldview we do not accept the unseen, i.e. the heavens of interpenetration. But to those who do accept the unseen, or heavens, this self-organization is the interaction between unseen causes from the heavens and tangible receptive earth. We see this in our tradition in the description that Heidegger uses in his essay "The Origin of the Work of Art." There he describes earth and its relation to the openspaces in which the earth is enhanced and brought out so that it may be seen from an aesthetic appreciation. In that description Heidegger talks about the fourfold of Heaven/Earth/Immortals/Mortals. This fourfold is an image of the reflexive special system with its fourway mirroring. Thus our tradition is not devoid of an appreciation of what the Chinese traditional scientific viewpoint was attempting to represent which can be found in different ways as part of the Islamic and Mayan traditions as well.

Another example of the EMS formation within the Western philosophical tradition is Skepticism. The process of skeptical engagement in the dialectic can be seen as an excellent image of the EMS structure. The Skepticism of Sextus Empiricus is actually an extremely sophisticated philosophical stance which is caricatured and distorted by many of his attackers. This cultural artifact exemplifies how the EMS structure can appear within the dialectical unfolding as symbiotic with it. In skepticism *appearance* has the position of the seeds. From appearances opinions arise as to the status of non-observables. We jump to conclusions and this is the creation operator that gives rise to judgements about non-observables. The judgements exist as a swarm that together make up the opinion of a particular philosopher concerning the non-observables. Judgements of different philosophers come into conflict which exemplifies their mutual action on each other. Out of the conflict arises philosophical positions which are viewpoints on the field of possible judgements. The skeptic applies his arguments to these judgements disproving all and sundry as a means of attempting to keep the dialectic going. This application of arguments that have the purpose of continuing the debate appear through a process of gestalt pattern formation. Through that process opposite philosophical positions are produced that cancel what ever other arguments have appeared naturally within

229. Bernardi, C. and Moscucci, M. [1980] "Investigating Some Geometrical Features of 4-Space" *Mathematical Gazette* Volume 64, #4, June 1980 pp. 90-99

230. Eigen, M. and Winkler, R. [1981] *Laws of the Game: How the principles of nature govern change*. N.Y. Harper and Row.

field of discourse. These candidate philosophical positions cancel each other and through that the skeptic attains peace. The skeptic suspends the need for a final answer in the process of keeping the dialectic in motion. The skeptic continually uses *neither . . . nor* kinds of argumentation to fend off any final judgement *vis a vis* non-observables. The skeptic thus lives in a symbiotic relation with the dialectician. The dialectician uses *both . . . and* type arguments in order to continually produce synthesis in the process of debate. As the synthesis arises the skeptic produces its antithesis and prevents the dialectic from reaching any conclusion. The point is that skepticism lives within the interstices of the dialectic and can exist as a symbiant to the dialectical process. It perfectly models the EMS formation that assumes discontinuity rather than continuity. With the example of skepticism we can see that the EMS is something that is not completely foreign to our worldview and can have philosophical meaning as a method of dealing with the endless cancellation of antinomies.

We can see the EMS formation as more central to our philosophical tradition if we consider Plato's CAVE analogy in this connection. Plato's Laws and Republic are central texts to the Western Philosophical tradition along with his other dialogues. The Republic exemplifies Rta, or Right, and the Laws exemplifies Nomos, or Order. These are two of the great non-dual concepts, which along with the Good²³¹ and Fate²³², are at the core of the Western worldview. Our Indo-European tradition has a dualistic worldview that articulates itself around these central non-dual concepts. In the Republic justice is considered in the context of the distribution of rights in the city which is proposed as a macro model of the soul. The Republic goes beyond the definition of Rta toward the indication of the next deeper non-dual beyond Rta and Nomos which is the Good. It is in this context that Socrates presents the three analogies of the Sun, Divided Line, and the Cave. The source of the Good is portrayed as the equivalent of the visible sun in the realm of the invisible intelligibles. Just as appearances are distinguished from the real so too mathematical intelligibles founded on axioms are distinguished from intelligibles grounded on the source of the good. The parable of the cave narrates the journey of one who experiences the vision of the source of the Good. The features of this parable are an image of the EMS formation. I was led to realize this by thinking about William Theaux's characterization of the parable of the cave in terms of The Art of Memory by Francis Yates which talks about the mnemonic devices developed as a means of remembering things. Mnemonic devices are techniques for augmenting memory. They were traditionally thought to be discovered by Simonides who remembered the names of crushed guests by which places they occupied when the roof caved in at a symposia at which he was reciting his poetry about the twin gods Castor and Pollux.

231. Nussbaum, M. C. [1986] *The fragility of goodness : luck and ethics in Greek tragedy and philosophy*. Cambridge; New York : Cambridge University Press.

232. Gleven, M. [1991] *Why Me: A Philosophical Inquiry into Fate*. De Kalb, North IL University Press.

Simonides narrowly escaped with the help of Castor and Pollux who repaid his praise by saving him. His ability to remember people in places was turned into a technique by which all sorts of things were remembered until in the Renaissance whole encyclopedic theaters were developed that housed the places and things of secular knowledge just as the Cathedrals of European Christianity did for sacred knowledge before the Renaissance. Theaetetus showed that the inhabitants of the cave were people tied to places and that the escapee who was torn out of the cave was like Simonides who leaves the group and returns. The new knowledge of the escapee is similar to the remembrance of Simonides. Since we know from the Meno that all knowledge is recollected it makes sense to posit this kind of interpretation. Once we have the structure of the mnemonic technique to lay over the Parable of the Cave it is possible to see the EMS formation. This is because we begin to reflect on the difference between the leaving and entering and what is happening inside the cave. What is occurring in the cave is a presentation to bound spectators by Sophists who carry objects that produce the shadows of their appearance on the walls of the cave. This is an image of the projection mechanism of Being. Being is the production of illusory continuity. We see this mechanism in film, TV, computers and other similar media that reproduce the fundamental essence of projection and presentation that is the result of the social construction of Being. The illusory continuum of images, sounds, text, etc. embodies Pure Being. The running of the Projection Mechanism itself is the ready-to-hand infrastructure that embodies Process Being. Hyper Being is the differences between the images and between the parts of the projection mechanism and most of all between the illusion and the mechanism that produces the illusion. All projection is a kind of writing of differences which embody Hyper Being through their differing and deferring (i.e. Differance). In every projection situation is something that never appears. In the Cave the Sophist who carries the objects is in the place of the Essence of Manifestation which is already always hidden behind the appearances. The realization that the appearances are animated by the actions of the Wizard of Oz figure of the Sophist so that *“what is shown is the same as what is hidden”* is the embodiment of Wild Being within the projection mechanism. The differences between the kinds of Being exemplify all the essential aspects of the projection mechanism of illusion within the Western worldview. What we must ask is, What is the nature of the cave itself? Clearly it must have the nature of Non-Being. thus when we look at Parmenides’ three ways we see that appearance is projected by Being in all its kinds onto the screen of Non-Being. Like the rock of the mountain in which the cave exists Non-Being is a seemingly impossible barrier to pass. The only way which seems possible is to submit to the projection mechanism’s working as either sophist or spectator. As we have seen there are different degrees of Sophistry corresponding to levels of initiation. The spectator is a *man of earth* who only believes in what he can hold in his hand. The kinds of Being are different modalities of holding (pointing, grasping, bearing, encompassing) of the spectators being-in-the-world as Dasein (being-there). The Sophist may be initiated into the lesser mysteries and believe in the unseen, but think it is all flux. This one is immersed in

the flow of the projection mechanism that underlies the maintenance of illusory continuity. Or the Sophist may be initiated into the greater mysteries and know like Parmenides that the projection mechanism itself has the nature of the stasis of illusory continuity itself. This means the mechanism producing the illusion is itself illusory and the operator and the operand are unified like the *marks* in Laws of Form. This means there is no difference between the illusion and what produces it. Both are illusory and the mechanism “really” isn’t moving at all. Everything is static like four dimensional spacetime blocks. The cave itself never transforms even though the appearances continuously change. The heirophant knows that “we need change and changelessness at the same time.” He is the initiator of the other lower level sophists. Each level of sophist appears as a man of earth to the one above him. The heirophant knows that the projection mechanism of the cave itself must change erratically in order to sustain showing and hiding processes. This non-duality between change and changelessness is expressed in the saying “the more things change the more they say the same” is the source of emergent events in which the underlying patterning of the projection mechanism shifts for no apparent reason. We call these shifts the arising of new facts, novel theories, radical paradigms, changed epistemes or different interpretation of Being. Emergences can occur at different levels of our tradition. But emergences are what allow things to appear fundamentally changed through the sporadic non-caused alteration of some aspect of the projection mechanism by itself, spontaneously. What remains the same is the projection of nihilism²³³ which is intensified through the drive to create a more and more torturous total environment that encompasses both the sophists and the men of earth who are trapped in a master slave dialectic within the cave. The heirophant is the one who recognizes the emergent event that rewrites history and re-casts the future, but also who has an inkling that this seeming solution to perceived problems will turn out to make things worse once its own side effects are known. The one who recognizes emergence within the cave is the ultimate sophist like the one in Plato’s dialogue who has the cogency of Socrates. In the Republic Socrates is playing the roles of all these sophists for the young men to whom Socrates is talking. He is attempting to lead them up out of the cave step by step. When we escape the cave we essentially go beyond Being out into the openness of existence. Plato describes the crystalline beauty of this world beyond the cave where all the sources of the images and objects within the cave come from originally. This difference between Being and Existence expresses itself in the fact that there is no fifth meta-level of Being. This difference is signified as an interface between Being and the Void of the Taoists, or the Emptiness of the Buddhists. It consists of the realization that the projected appearances and the designated as real projection mechanism itself (i.e. the essences) are both utterly illusory. What exists beyond the cave is the realm of interpenetration of all things. In this sense the appearances may show us a series of systemic gestalts and outside the cave exists the ultimate meta-system. So that as we move out of our immersion in the

233. Rosen, S. [1969] *Nihilism: a philosophical essay*. New Haven, Yale University Press.

illusory continuity of the flowing appearances we fall back step by step through the levels of the special systems on our way out of the cave. The first step is for the spectator to lose their suspension of disbelief and notice the theater in which the movie of appearances is occurring. Then he notices that the images are ordered from beyond themselves by the projection process. This ordering of the disseminating machine which the desiring machine consumes voraciously brings us out to the level of recognizing the action of neg-entropy that is the center of action in the cave. The spectator becomes aware of the process by which the dissipation of order occurs that has enchanted him and thus he breaks his enchantment. Eventually the spectator recognizes there is a relation between himself and the Sophist who is the source of order. This relation is a master-slave dialectic relation due to the Spectator's being bound. Also there is a relation to others who are also bound and enchanted. Eventually the spectator realizes that these relationships are homeostatic. This is to say that there is a closed loop between the performance of the sophist and his audience that exemplifies resonance such that the trance of suspended disbelief is not broken. This is how we see the autopoietic closure appearing as an emergent phenomenon in the cave. The autopoietic phenomenon is shown in the traces not just of the spectator but of all the spectators together and of the sophists who are orchestrating the play of images. The sophist must continually come up with something new to engage the spectators and maintain their interest. This continual differing and deferring of the new is what shows us Hyper Being within the cave. The next level of emergent effect is the realization of the social basis of the maintenance of traces. The cave is the social constitution by everyone involved. Prisoners and Guards collude to produce the alienating social environment. All the traces are the result of social practice and the maintenance of social norms even of cruelty and torture. Eventually this realization of the reflexive level of the special systems manifestation leads us to comprehend Wild Being. Wild Being is the point where the dualities vanish and we see between master and slave, prisoner and guard, male and female roles in society, spectator and performer, the indications of non-dualities. Each member of the audience may attain the view of the ultimate sophist who comprehends the necessity of change and changelessness at the same time. That is a description of the autopoietic system with its changing structure and its unchanging organization. So it is any of them who can first recognize an emergence out of the propensities and dispositions of the production of illusion. Wild Being is the point at which the emergences first appear to those in the cave. Everyone is in rapt attention looking for those discontinuous changes that will end up restructuring the performance, making it at once more fascinating and also more terrible. Emergences very existence tells us that there must be something beyond the cave -- the source form which the utterly new arrives -- which is the inherent diversity and variety of existence. The origin beyond the cave is the dual of the emergent event within the cave. Because there is emergence we have an intimation that there must be a "beyond" outside the projection mechanism of Being that produces illusory continuity of appearances in the cave, i.e. existence. Understanding emergences is an

intelligibility that goes beyond the axiomatics of mathematics. It makes us realize that beyond the images of the intelligible order that we see in mathematical categories there must be intrinsic non-dual order (nomos) itself. Also beyond the nomos must be a series of non-duals that sink ever deeper foundations into the bedrock of existence. The next deeper level is RTA, or Cosmic Harmony, (Right or Arte, excellence) and the next deeper level after that is the non-dual source of the Good, i.e. the origin of the endless variety and bounties that arise from existence. Beyond these are other even deeper non-duals such as Fate until we eventually approach the non-dual origin beyond all the various images of non-duality. Plato's purpose is to show that beyond the nomos of the autopoietic city there is an image of perfect justice where all the rights are distributed among the citizens and that those rights are the citizens and their responsibilities are rooted in the Good because it is the good which gives each their different natures that fit them to different tasks within the city perfectly as we see in the Republic. If you do not think that those ideas are significant for us then ponder the fact that we have a constitution in the US which embodies the nomos of our political life and attached to that is a bill of rights. So for us the nomos is foundational and the Rta is a supplement. For Plato it was the reverse. His best city was based on just distribution of rights and responsibilities and his second best city is based on nomos by articulating an autopoietic law. The rulers of the city of the Laws look out beyond their city at the external world for changes and novelties. The rulers of the inhuman city of the gods seen in the Republic look instead internally at the source of the Good itself from which all variety springs and thus at the source of the emergent events that will restructure the world. Thus, in the Republic the scene is set by the emergence of a new goddess within the city. Our United States Declaration of Independence alludes to the good by saying that each individual has the right to life, liberty and the pursuit of happiness. So both Plato's cities and our modern constitution indicate the same non-dual sources beyond the play of master-slave relations that we imposed on us within the city and which alienate us.

The only real difference is between existence and Being which occurs when we reach the limit of the ascension of the meta-levels of Being. This difference is experienced when Simonides leaves the room to return to find the impious spectators to his performance crushed. It is like the difference that the escapee from the cave of experiences on his return that he finds impossible to express. This difference is absolute. that is why it is marked by the creation and annihilation operators in the EMS formation. Outside the realm of creation lies the seeds which are the order that cannot be axiomized yet remains intelligible. These seeds unfold to reveal the layers of Nomos, Rta, the Good as well as deeper layers of the bedrock of existence like Fate. In the cave are beings which we can identify with monads. These monads are created when they come into being from their roots in existence and they are destroyed when they leave the care of Being and return to the realm of potentials and dispositions beyond Being. The monads encompass everything within the cave and

the Buddhists would have called them dharmas, but we project illusion onto them. The monads in our case are divided into classes. The lowest class is the serfs in bondage. The higher classes are those initiated into the lesser and greater mysteries of the projection system of the cave. These are the various levels in the hierarchies of 'Magicians' and sophists that keep the corporations working and thus maintain the illusion. It is precisely mutual action which is denied in the bond of the spectators enthralled by the performance of the sophist/magicians. What is allowed is gestalt pattern formation by which the appearances are synthesized by the spectators. So these two meta-operators are distinguished by their disappropriate affirmation and denial. Now the viewpoints are produced by the various levels of initiation when see ever deeper into the process of illusion production in the cave. These levels of initiation that Plato talks about in the Sophist dialogue are realizations of greater and greater depths of the interiors of the monads -- whether they are bound to action like the magician-sophists or bound to be only spectators. The candidates are those which realize the possibility of emergences. With emergences new possibilities erupt into the world and others close off. It is the candidates who realize that there must be something beyond the cave and it is among those that certain candidates are forced out to look at existence itself without the covering of Being -- that subtle clinging and craving. Existence is that which is both true and false and at the same time neither true nor false. Existence is that which is both real and unreal and at the same time neither illusory or real. Existence is that which is both present and absent and at the same time neither present nor absent. Existence is that which is both identical and different and at the same time neither identical nor different. Existence is supra-rational beyond paradoxicality of the mixing of everything chaotically within the cave at the level of Wild Being. As supra-rational existence is a realm of crystal clear non-nihilistic distinctions apart from the production of nihilism by the projection mechanism of Being. Supra-rationality and paradoxicality entail each other and spiral around each other continuously falling into each other and becoming each other. Within paradoxicality exists a moment of supra-rationality and within supra-rationality exists a moment of paradoxicality. They interpenetrate like *Yin* and *Yang* which transform into each other, yet are always very distinct, and remain forever separated and isolated. The candidates for the experience of existence are turned away from being and experience the interpenetration of the utterly non-dual realm beyond the play of dualities against each other. These candidates experience not just the loss of illusion but the loss of reality. These candidates experience not just the disappearance of untruth but the evaporation of Truth. These candidates experience not just the vanishing of difference but also the loss of identity. These candidates experience not just the absence of their fellows but the evaporation of the oppressive presence of things as they are projected by the projection mechanism of Being as well. These candidates experience the annihilation of their selves in the sense that Jung uses the term for the totality of the conscious (present) and unconscious (absent and hidden) aspects of ourselves. This annihilation destroys their entire world along with their selves. They become merely non-dual seeds of a future vision when they

return to the cave unable to express what they have seen of the source of goodness. Those seeds are actualized by the creation operator to produce them as emergent events themselves when they reenter the cave. As such they bring a new way of looking at the cave, a viewpoint informed by what lies beyond the cave of Being, yet is not part of the mountain of Non-Being that encompasses the cave. The non-dual exit takes a route that does not encounter the barrier of Non-Being. That route opens up at the point of perfect balance where the anomalous order of the special systems arise and where hyper-efficiency is achieved. As Theaux says, the spectators in the cave are the diners in the banquet of the Symposium. So we meet the same people in Plato's Symposium discussing Love. Love is the reflexive human ultra-efficiency. In the symposium we are given seven different guises for Love which appears when the guests are bound not to drink and the flute girls are sent away. As Sadler says we need to found our social phenomenology upon the sense of hearing and our experience of love. However, he only deals himself with the experience of romantic love which fills the whole world for the love and the beloved. In the Symposium the dualism is between the Older male lover and the Younger male beloved. As we ascend the ladder of speeches we are moving through the successive layers of the special systems. But here we are in the company of free men, not those bound like slaves, or imprisoned like women in the caves of the houses. In the men's quarters where women are excluded it is possible to speak of love freely. Phaedrus speaks of love as a goddess and then Pausanias differentiates between two goddesses of love one ancient and exalted while the other common. Eryximachus, the doctor, turns from immortality to mortality and sees love as harmoniousness between the opposites in the body. He agrees with Sadler who says love is like harmonious music. This speech is interchangeable with that of Aristophanes who is delayed by hiccups. So it is this speech about resonance that shows us a picture of the dissipative special system. Love is seen as the spreading of harmonious order that replaces disorder. This is precisely the nature of a dissipative structure which replaces order or disorder with a neg-entropic spread of a new order creating a symphony of orderly parts under the auspices of a newly organized resonance with a myth of dual people (male-male, male-female, and female-female) who were split and seek always to regain their wholeness. This picture shows us an excellent image of an autopoietic special system as a physical primordial bonding of two bodies. This bonding of two bodies breaks in two and can even break again leaving one footed and one armed half creatures as they do in Epidocleus' vision of the breakdown of love into strife. Bodily bonding for Aristophanes has replaced the bonding of souls. Jung speaks of love as a bonding of the Animus and Anima of a male or female, where the inner female of the male human creature unites with the inner male of the female human creature. This is a much more realistic image of love than the autopoietic fusion of bodies who were split asunder in an act of cosmic sacrifice along the lines of Epidocleus image of love and strife which was meant to marry the visions of Heraclitus and Parmenides. Agathon comes next and calls love the youngest god who walks softly upon the heads and hearts of men instilling the virtues of courage, temperance, justice, and

wisdom and bringing order to even the city of the gods, that inhuman immortal city like the one built in the Republic. This youthful god has replaced the prior rule of necessity with an overflowing of good qualities and has instilled into the community a unity of mind as well as kindness and friendship. Poetry then beyond music takes us into the realm of speech and social intercourse which is our image of the reflexive special system. But Socrates shows us that this speech is flawed because love can be neither beautiful nor good. Agathon has produced a nihilistic image of the Reflexive Social level where a young male love appears out of the split between the ancient female love and the common female love described by Pausanias.

Socrates then tells us that Diatoma, a woman, who taught him the mysteries of love, says that love is the mean between all opposites, i.e. is non-dual. This non-duality of love points us to the other non-dualities like *nomos* between *physis* and *logos*, or *Rta* between *Apeiron* and *Peiron*, or the Good between Having and Not-Having, or Fate between Existence and Non-Existence. Diatoma goes on to say that, contra Aristophanes, we are not seeking wholeness, but instead the eternal possession of the good and access to that is through the form of the Beautiful. But it is not just possession but conception and generation of the Beautiful, and thus the Good. This corresponds to the recognition of emergence. The Beautiful is like the fire that burns in the cave giving off a chemical light but which makes us understand the nature of light²³⁴ and prepares us to experience the Sun of the Good outside the cave, i.e. in the realm of the intelligibles. Diatoma recognizes not just generation, but the generation of the new, as being the key point and so we do so both in body and through the arts by our souls. Diatoma calls this the lesser mysteries of love where one goes from the beauty of one form toward the beauty of all forms to the source of Beauty itself. The recognition of this absolute beauty is the means for preparing to attempt to recognize the absolute Good. The one who knows this absolute beauty will not just bring forth images of beauty but realities. This is the way the mortal attempts to grasp some portion of immortality through the generation of children or through works that bring glory to his name.

At this point Alcibiades who stands in for Dionysus²³⁵ breaks into the party and derails the speeches describing his love for Socrates and how he was spurned. This is our entry into the meta-system or the global economy of desire which Alcibiades displaced on the level of the body rather than looking for love from Socrates on the level of the soul. We have moved up a ladder from a single goddess of love praised by Phaedrus who then split in two in the speech of Pausanias. This splitting caused a splitting of the body of man and the need to distinguish good from bad love. This distinction introduced dissipation of order and harmony which overcomes disagreement when the good love triumphs in the speech of the doctor

234. Good, I.J. [1962] *The Scientist Speculates*. Heinemann.

235. Anderson, D.E. [1993] *The Masks of Dionysos*. SUNY.

Eryximachus. Then Aristophanes offers us a myth of a primordial wholeness which we lost through sacrifice of the primordial man in the way that Yamir or Prusha were destroyed which is the primordial Indo-European image of wholeness lost. The problem is that wholeness and nihilistic fragmentation are opposites and put us under the spell of duality. Socrates' Diatoma showed us that love must instead be the non-dual midpoint between all the opposites and thus a daemon emissary between gods and men. Agathon produces a nihilistic description of love which attributed everything, thus nothing, to him. Socrates following Diatoma showed how this image must be mistaken. But in the process Agathon produces an image of the Reflexive Social level, just as Aristophanes had shown us the bodily autopoietic level in his myth, and Enximachus had shown us the image of the dissipation of order and harmony at the level of the lowest special system. Agathon's image is reflexive because it sees the image of love reflected everywhere and in everything. This also makes it nihilistic. Nihilism is the disease of the reflective field.

Diatoma does not initiate Socrates into the greater mysteries of love. But it is clear that the initiation would be to leave the projector of Being and to go out into existence which is intrinsically void and empty to gaze on the source of the good as we had prepared for by gazing first at the source of light within the cave which is the fire of the source of beauty. Alcibiades interprets the fire as eros instead of the source of beauty that the soul can perceive in laws and institutions or in the sciences. Alcibiades is the opposite of the one who escapes from the cave. He is the Dionysian chaotic daemon that comes in from the meta-system to disrupt the attempt to rise above beauty of the forms. The Aesthetic level where beauty is apprehended in things is the embodiment of Wild Being. The daemonic is what lies beyond the aesthetic level out in the general economy of the erotic. This daemon seeks to bind itself to the teacher of morality, Socrates, who does not respond because he has his sights set on a higher beauty and on a higher good beyond the hedonistic pleasures. Kierkegaard says²³⁶ that between the Aesthetic (Wild Being) and the Ethical (Hyper Being) is the domain of irony. Irony thus exemplifies the reflexive and this is why Plato's works are so ironic that one never knows whether he is speaking what he believes or being ironic. In fact, Plato claimed in the seventh letter never to write about what he was really interested in. Thus we can assume that everything he wrote was utterly ironic. Irony is the hallmark of the social and the fact that Plato's dialogues exemplify social situations full of irony shows us that his dialogs are all

236. This interpretation is based on the work of Dennis Keagy [1993] *The Way of the Poet: A Nietzschean Transvaluation of Kierkegaard's Pseudonymous Architectonic of Human Existence*, Ph.D. dissertation., Newport University: See chapter 1, p. 2: "The teleological thrust of Kierkegaard's pseudonyms began by exploring aesthetic dimension followed by paradigm shifts to the ethical of authentic selfhood and then positing the self as a theological. In the final theological stage the self becomes relativized into the power that has brought it into existence." See also chapter 2, p. 10: "The human teleology of existence for Kierkegaard appears to have begun posited which if chosen absolutely occasioned an ethically authentic existence as a self or spirit. Religious arose from the crisis over the relative status of ethics in and the self in particular. The aesthetic and ethical stages reconciled in the religious stage."

posited at the social level of emergent reflexive special systems between the aesthetic and the moral, but reaching down continuously into the humor that exits at the next emergent level.

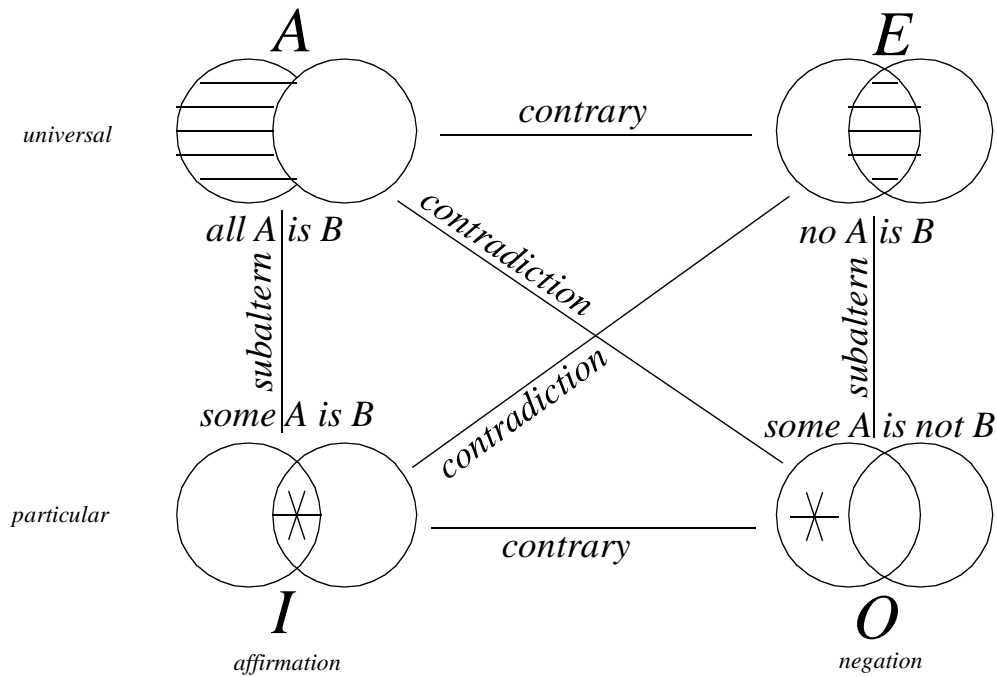
Figure 30:

absurd	system	Aristophanes		Kierkegaard
Transcendental Religion	Pure Being			
paradoxical (supra-rational)	dissipative	Aristophanes		Kierkegaard
Immanent Religion	Process Being			
humorous (crying)	autopoietic	Aristophanes	Plato	Kierkegaard
Morality	Hyper Being			
ironic (ridicule)	reflexive		Plato	Kierkegaard
Aesthetic	Wild Being			
daemonic (eros)	meta-system		Plato	Kierkegaard

Kierkegaard in his works produces a picture of the entire spectrum from the daemonic to the absurd which spans the gulf between the secular and the holy in his opinion. This same spectrum need both Aristophanes (Clouds) and Plato (Symposium) to produce an equal coverage. Aristophanes with his ridicule of the Young Socrates and Plato with his comparison of Aristophanes and Epidocleus in the Symposium, and this implies that he is a sophist too, show how these two authors are locked together with mutual reference. In the Clouds we see Aristophanes outlining the basic components of the metaphysical era by distinguishing physis from logos and the unlimited (freedom from debt) from the limited (debt). As Mary Nichols points out, Plato is directly responding to Aristophanes' critique and his jabs at philosophy while showing how the nihilism inherent in every day life pushes men into the untenable position of philosophy. Oedipus was the first philosopher, according to Gaux, due to the failure of the heroic initiation. Those who fail at life seem to be prone to the philosophical weaknesses. Plato picks up the radical idea of communism and equality of the sexes from Aristophanes treating them ironically while seeming to take them seriously. So not only do the references interlock but so do the ideas that serve as the counterpoint to daily life by dreaming up the most absurd and paradoxical situations possible and playing out their implications on stage. Aristophanes represents his play as a pious observance in the Dionysian rituals. Dionysus is the one god who has tasted death - the forerunner of the Christian mythos that wells up from Indo-European sources, like Odin who sacrificed himself to himself and hung on a cross for nine days. Self destruction is the inverse image of self-production. The myth of Dionysus/Shiva is the story of death and resurrection

which moves from the immanent plane to the transcendental plane. Strangely by an immortal dying a similar effect is gained as the immortality of the mortal gained by reproduction or glorious works. The god experiencing death and resurrection and the mortal striving for remembrance by offspring or his city have much in common while yet being worlds apart. The human raises himself out of the morass of hedonistic pleasure, exemplified by Aesthetics, toward immortality through the consideration of morals while similarly by a god dying and resurrecting produces out of an immanent polytheism, where all the gods are different, but similarly perfect, the image of the Avatar or god-man who knows death as we know it. The point of overlap between these two visions is humor and crying which Palmer in his brilliant phenomenological study showed were both ambivalent states that may transform into each other (we laughed so hard we cried or our tears ended in laughter). Of all the philosophers since Plato, only Kierkegaard seems to have experienced and articulated this whole spectrum which humanizes the meta-levels of Being and the interleaved meta-levels of special systems in human terms. The upshot of this is that we can squarely place the Emergent meta-system and the special systems hierarchy at the center of our tradition and we can point to how it expresses itself in the human dimensions it articulates while we see that Kierkegaard's existentialism is the only philosophy of religion, or religious philosophy, that can deal with this entire spectrum. The parable of the cave is a model of the Emergent Meta-system that is central to philosophy by being found at the center of the Republic as the indication of its central riddle. And as Theaux says the banquet is an image of the same scene and there we find articulated the levels of the special systems in the speeches about the human ultra-efficiency of love. If we are to attempt to build an existential social phenomenology we could pick no better starting point in our tradition. The picture of the EMS cycle is not as clear as in skepticism, but what it loses from lack of clarity, it gains by having alternative pictures of the EMS formation and the special systems in the two dialogues we bring into conjunction, just as we bring Aristophanes and Plato into conjunction. In Kierkegaard the conjunctions are between his different alter egos who in his writings take up different philosophical and religious positions along the spectrum he was attempting to illustrate.

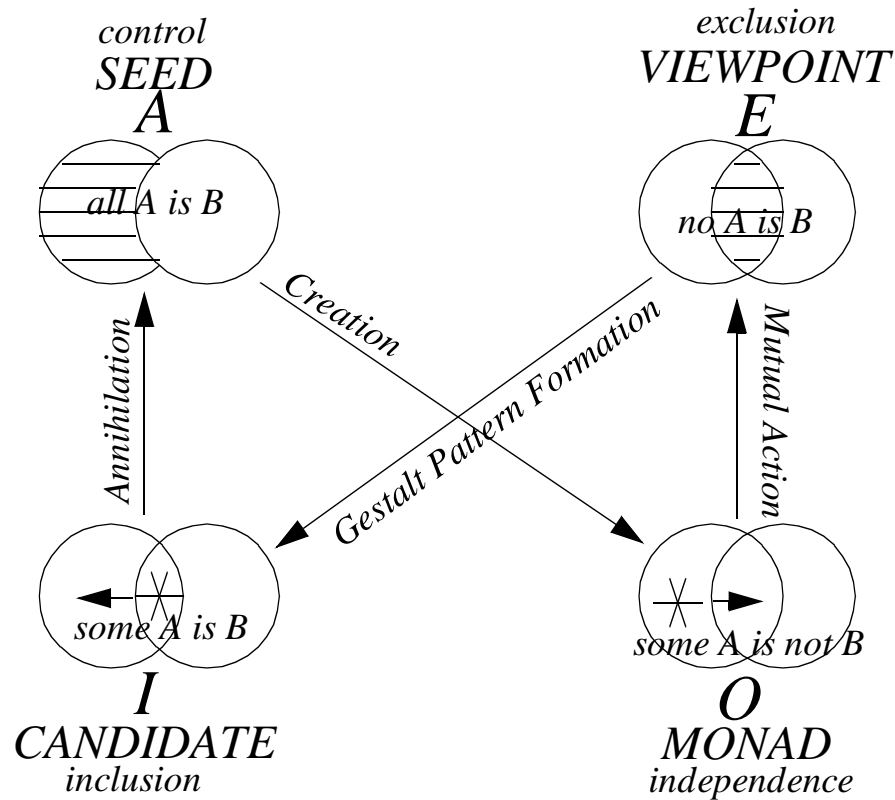
Figure 31: Square of Contraries from Logic



Another example of the Emergent Meta-system formation we might cite the square of contraries from logic that gives rise to the Greimas square. That square has some of the properties of an Emergent Meta-system. It can be seen as dynamic if we move around it in the way pictured in the following diagram. When rendered dynamic we see that the square of contraries is a model of the worldview of Epidocleus where we move from harmony to strife except here we are moving from complete domination by one of the opposites to complete separation of the two opposites. The particular statements are half-way houses between these two end points where some of the opposite is not the same. It is this movement from utter domination to utter separateness which can be seen as similar to the emergent meta-system formation. We posit that Aristotle took this formation from Plato and coded it into his logic as a means of preserving it but that it has been forgotten there in logic ever since. The fact that we can find some semblance of the Emergent Meta-system formation in logic tells us that this is a very central idea in the Western worldview which however has become obscured over time as the connection between the square of contraries and the Emergent Meta-system representations in Plato has become lost over the centuries. It is important to realize that the Emergent Meta-system lies hidden among some of the things we take for granted and are so familiar that we do not think about them twice. We need to revitalize our view of our tradition by looking for the Emergent Meta-system formation in places like this which we take for granted without thinking through thoroughly. If the Emergent Meta-system has been coded into Logic then that places it at the very center of our tradition. It is a strange idea that an image of Existence in the form of the EMS is coded into the structure of logic itself which deals with truth and identity in Being almost

exclusively.

Figure 32: EMS in the Square of Contraries from Logic



Finally we can give the example of the EMS structure from mythology that appears in the story of Cadamus founding Thebes. In that story the sacrifice of the cow that stopped is interrupted by the discovery of a dragon. Cadamus kills the dragon who has killed his men and he sews the dragons teeth (seeds). The men of earth spring up (creation) to form an army of soldiers (monads). They argue amongst themselves (mutual action). Cadamus sees this and throws a stone among them (gestalt) which causes their disagreements to become a full scale fight of each against all (the scene that opens the Republic and Socrates' fear). The army kills each other until only five are left (annihilation). These five (seeds of strife) and harmony help found Thebes. The five men to one woman theme is seen in the Mahabharata. The image of five soldiers and Harmonia is an image of what Eryximachus denies that harmony and disagreement may coexist. The fact that the EMS cycle appears at the founding of Thebes is another indication that this archetype exists on the boundary between form and formlessness and that as Jung says in *Aion* it symbolizes the totality of the self. That Self is constructed out of the ego (system) and the other

archetypes which also correspond to the special systems.

Figure 33:

ego (unity) (I' of I-It)	system
shadow	dissipative special system
animus/anima	autopoietic special system
wise old man/cathonic female	reflexive special system
self (totality) (I' of I-Thou)	meta-system

That self is precisely what is annihilated if it is pulled out of the cave and made to stare at the source of the Good which causes blindness so that the returning escapee is like Tereseus and the other seers. That self then becomes an emergent event within its former worldview when it reenters it. Socrates wants to convince his guardians that they are born of earth like the army of the dragons teeth. If the spectators of the cave were not bound they would likely do each other harm as well. It is precisely mutual action and particularly this destructive mutual action that is precluded. So annihilation cannot be mutual self-destruction but must be instead be a transformation of the soul by a vision of empty non-dual existence. Instead of someone leaving Cadamus introduces a stone. Socrates says he is turned to stone by the previous speeches in the symposium. This stone is mentioned in the Aion of Jung as the philosophers stone (lapis). It is a catalyst that turns lead into gold. It allows the latent emergent propensities to manifest. The dragon is the serpent which appears in the Aion model of the self. The Anthropos is the whole man that Aristophanes defines which is the reference for comprehending the particularity of the normal human being (homo). The god Aion which appears in Mithraic iconography has a lion's head and a snake wrapped around its body with its head over the top of the head of the lion looking forward. This figure stands on a sphere. Aion is a synthesis of the different phases of transformation: Lion, Man, Serpent, Stone that symbolize the EMS cycle in Alchemy and Gnostic religion. Jung manages to produce an image of the Emergent Meta-system out of his various Alchemical and Gnostic materials. What led him to this is not clear but he definitely was on the right track from the point of view of this study of historical examples of the EMS formation. This image of transformation is similar to the old man of the sea who Menelaus wrestled and held onto or Thetis who Peleus married. The EMS formation is purely transformational because it assumes discontinuity rather than continuity and then tries to explain the later not the former. So looking at the transformational scene the focus should not be on the different forms per se, but instead on the transitions between forms, then the entity sinks momentarily into formlessness, out of which form and anti-form appear, only to cancel each other out again like virtual particles are meant to do. The definition of the edge between form and formlessness is more important than any of the forms as such. The definition of this boundary symbolized by the Dragon

(winged and wingless) is the basic function that the EMS cycle plays. We see it in Go, I Ching, Skeptical Philosophy, parable of the Cave in Plato and in the Symposium as well as certain myths and other sources²³⁷.

Emergent Meta-Systems contain a meta-algebra with four operations (creation, annihilation, mutual action, and gestalt pattern formation) that operate upon the aspects that underlie the Laws of Form/Pattern (something, nothing, layering, and multiplicity). Each operator of the meta-algebra derives from either normal algebra or one of the hyper-complex algebras through the emergence of properties at each algebraic level. It is the emergent properties of the algebras that become the meta-systemic operators of the meta-algebra. We will now track this unfolding process step by step through its four stages. Assuming that the system may be created by the imposition of order that reaches culmination in the production of continuity, we start from that foundation that defines the possibilities of General Systems Theory to explore the successive arising of the emergent special systems (partial meta-systems or faceted systems) until we reach the limit at which the pure meta-systems arise. This series of stages allow us to build complex analogies between Hyper-complex algebras and the theory of special systems and meta-systems. The analogy has the form:

Figure 34: Special Systems Analogy

real : system
:: complexnion : dissipative special system
:: quaternion : autopoietic special system
:: octonion : reflexive special system
:: sedenion (or higher) : meta-system

This analogy exists because the mathematical necessity of alternating division algebras as a very special structure is embedded in the nomos beyond the split between logos (mathematics in the mind) and physus (physical systems). It is the intrinsic non-duality of existence that gives force to the analogy. But the analogy only holds in very special circumstances that occur beyond the restricted economy of systems as we move out toward the comprehension of the meta-system. They are invisible as long as we are only looking at systems and ignoring their meta-systemic shadows. But in the very special circumstances, where conjunctions of the type that manifest in hyper-complex alternating division algebras can be sustained in physical, chemical, organic, psychological or social realms, then these special systems arise in reality and exert a tremendous influence on the environment as we can see in our world from the existence of life, consciousness and social formations. This is because these special conjunctions are ultra-efficacious and as such have a tremendous advantage over normal systems that are entropic. These are not perpetual

motion machines. Instead they are the inverse of perpetual motion machines. Those machines attempt to circumvent entropy by conserving or creating energy. Instead, special systems do not circumvent entropy to become ultra-efficient. Instead they operate far from equilibrium and thus use energy but in a way that is neg-entropic through the conservation of information, and thus order, in the face of, and in spite of, entropy. Special systems are perpetual information producers instead of perpetual motion or energy producers. Information flows out of nowhere to continually reorder the dissipative, autopoietic and reflexive special systems and this is what allows them to be neg-entropic locally in spite of the dominance of global entropy.

3. Dissipative Complexnion Special Systems

Conjunction of timestreams of continuity occurs at specific thresholds of complexity that are defined algebraically. The first threshold arises when the real numbers are conjuncted with another kind of number that we call imaginary. This is defined by special group²³⁸ relations of intertransformability between continuous timestreams. This algebra treats the vectors of combined real and imaginary numbers and has all the properties of the algebra of real numbers. But the strange thing is that

237. Some of these other sources are Sufic works such as that of Sidi Ali al-Jamal [1977] *Meaning of Man*. Norwich UK: Diwan Press. In this work there are four groups of people: Kafir, Common Muslim, Elite Muslim and Elite of the Elite Muslims which are singled out for intense study. These form an Emergent Meta-system cycle as noted on page 274 bottom paragraph when it refers to “Your Lord finished with the four he created.” We interpret these groups of people in terms of the System/Meta-system, Reflexive Special System, Dissipative Special System and Autopoietic Special System respectively and note that they form an EMS cycle. This interpretation makes *The Meaning of Man* a handbook on Special Systems Theory as these groups of people are described throughout. Another image of the EMS cycle occurs on page 316 first complete paragraph. Another source is Muhyiddin Ibn al-Arabi who in the Mekkan Revelations Chapter 10 describes the four creations Adam, Eve, Mary, and Jesus. These are an image of the EMS cycle as well. In the *Fusus al Hikam (Seals of Wisdom)*, Norwich UK: Diwan Press, 1980) he describes the special systems by saying on page 46: “It is the same for nature and what is manifest from it. We do not see it diminishing by what appears from it nor increasing by the lack of what other than it manifests. That which is manifested is not other than it, nor is it the same as what is manifested according to the variety of forms in principle. This one is cold and dry, and that one is hot and dry. They are joined by dryness, and distinct by another quality. The common source is nature and the world of nature is composed in one mirror. Rather it is one form in different mirrors. {paragraph} There is only hyra by the dispersal of perspectives. Who ever knows what we have said is not confused. If he is increased in knowledge, it is only from the principle of place, and place is only the source of a source-form in which Allah varies in locus of tajalli. Conditions vary, so He assumes every condition. There is no condition except for the source in which He makes tajalli of Himself, and there is nothing except this.” These references give a clear indication that the Special Systems and Emergent Meta-systems Theories were a part of the core wisdom of the Islamic Sufic tradition based in revelation. In fact, the one part of the Sharia which is most precisely delineated in Quran is that concerning distribution of property when someone dies. The complexity of that caused the Muslims to create Algebra. The Special Systems arise from the relaxation of the properties of Algebra. Thus, the mathematical basis of Special Systems Theory arises from a mathematical discipline which was produced in direct response to the Quran. The *locus classicus* of Emergent Meta-systems Theory in the Quran may be seen by an interpretation of the story of Musa, Kidhr, Pharaoh, and the Bani Israel scattered throughout the Quran. These stories show the relations between the four kinds of people that Sidi Ali al-Jamal speaks of in *The Meaning of Man* (page 274) and also use the four aspects of the Meta-system, i.e. source, origin, arena, and stream, to indicate the relation to the meta-system of the EMS cycle of these four kinds of people. The Theory also shows up in Islamic Kalam (Theology) in the Asharite theory of Temporal Atoms. It may also be seen to be etched into the Arabic language in the guise of the fifteen Verbal registers (or often called types or forms).

there is a twist in the transformation that is much like an Escher waterfall. The Escher waterfall is built upon the concept of the Penrose Triangle which is the sine quo non of optical illusions in which coherent local relations are combined to form a globally paradoxical and impossible figure. But what is impossible in three dimensions becomes possible in four dimensions. What is not normally realized is that the Penrose triangle is the dual of the mobius strip which offers local duality and non-local non-duality in a concrete geometrical form. The Penrose triangle uses the non-local discontinuities that appear in Riemann geometry to create an overall picture that is paradoxical when expressed in three dimensions. Four dimensionality allows the forbidden connections that make the figure impossible in three dimensions. But this connection to globally discontinuous space allows us to see that the Penrose Triangle represents the local/global disconnect in terms of space while the mobius strip offers the same disconnect in the figure that inhabits the space. Thus, the Penrose triangle and mobius strip duality fit together closely as the disconnected global space and the lack of duality in the global nature of the figure in the space. On the other hand, there is the local continuity of the space the figure occupies at the same time as the figure itself embodies duality locally within itself. Both the mobius strip and the Penrose triangle exemplify dual perspectives on a certain higher dimensional twist that exists in nature and in mind in terms of mathematical objects. This higher dimensional twist is exactly the form that the dissipative special system needs to define itself. In fact, we can say that the neg-entropy within the dissipative system is equivalent to the reversal of time in which non-intuitively things fuse back together on a continual basis, rather than falling apart as we would normally expect like in a film which is run backward through the images of an explosion. This only occurs in some very special anomalous cases but when it does occur as a rare event in special circumstances it has spectacular consequences. Witness for example the effects of living systems²³⁹ on the planet, or consciousness or social organization of organisms²⁴⁰. Dissipative systems pour order from nowhere into somewhere to create the dissipative structures that progresses from a central singularity to an outer boundary with the environment. The imaginary numbers define this singularity as the square root of negative one in the number field and allow the twist that would make it possible for order to come as if from nowhere, where it is really being filtered through a potential trough shaped like an Escher waterfall that connects the singularity to the boundary of the system. The disordering of the environment outside the boundary becomes the source for the order that continually pours into the system from nowhere. Another image of this that is less paradoxical is the mobius strip that defines a non-dual duality. Singularity and boundary are tied together in a non-duality that makes them globally one even though locally they appear as different. Thus the mobius strip is a topological anomaly that describes how the

238. Budden, F.J. [1972] *The Fascination of Groups*. Cambridge U.P.

239. Miller, J.G. [1978] *Living Systems*. N.Y. McGraw Hill,

240. Adams, R.N.[1988] *The Eighth Day*. Austin, University of Texas Press.

singularity and the boundary of the dissipative system can be bound together even though they appear separate to us. So the mobius strip is an image of the non-duality inherent in the Dissipative Special System.

Dissipative structures have boundaries and interior singularities from which ordering patterns arise that push out toward the boundaries and beyond to enlarge the reach of the dissipative system. Dissipative systems are neg-entropic as they are self-ordering dynamics far from equilibrium that push out disordering the environment as they impose their own ordering as the boundary expands. In the dissipative system there is local neg-entropy within a field that preserves entropy globally. This means that there is a local imbalance in the global entropic field that makes it possible for a negative entropic situation to occur. But the connection between global disordering and local ordering forms a whole that globally maintains entropy. This relation between global and local order can be thought of in terms of a mobius strip. The mobius strip is globally one-sided but locally two sided. So the local two sided effect is an illusion created by our perspective on the mobius strip at one particular point. Similarly we can see a dissipative system as recycling order through a trough of potentiality so that the disorder to the environment can be seen as reentering the system as order from the singularity within the dissipative system. We notice in fact that the ordering of these systems is preserved over time and follows certain rules. We can model these systems with cellular automata in which the rules for the cells that apply to all cells can be seen as the source of order from nowhere and the apparent patterns that occur from local interactions among cells is really an illusion of difference that flows from looking at local context. The patterning of the cellular automata by local interactions of globally constant rules display the same dissonance between local/global patterning that occurs in the dissipative system. So when we describe the dissipative system we can see it as an circular flow of order that goes out from the singularity toward the boundary and that at the boundary enters a potential trough and is recycled back to the singularity. This ordering cycle interacts at the boundary of the dissipative system and disorders the environment as the boundary expands. It is as if the ordering principle bounces off the boundary and deflects back toward the focus of the singularity. In fact, this is very similar to the model of the way solitons are maintained in their troughs as partial waves bounce off the walls of the trough to maintain the soliton. This interaction which accelerates the disordering of the environment before submitting it to a new order is where the surplus of disorder is produced that re-balances entropy equation. The boundary is larger than the singularity in its influence so there is on balance always more disorder produced than there is order.

The meta-systemic operation associated with the dissipative complexnionic special system is annihilation. That appears as the breaking of continuity in the timestream longitudinally instead of crosswise. Crosswise breaks occur after the division algebras have been exhausted. We are cutting down the middle of

continuous strips instead of across them. These form mobius strips. When we cut a mobius strip longitudinally we get two two-sided strips called lemniscates but when we realize that they are part of a higher unity then we go to the next level of mobius twisting which is the kleinian bottle. When you cut a kleinian bottle in half you get two mobius strips. We posit that there is also a hyper-kleinian bottle²⁴¹ which when cut yields a two kleinian bottle which when cut yields two mobius strips that when cut yield two lemniscates, or two-sided strips, i.e. normal continuities.

Steve Rosen posited the existence of the hyper-kleinian bottle in 1975²⁴². In a recent discussion with him, he said that he still did not know the form of this hyper-kleinian bottle. Therefore, I set out to discover its form in a series of posts to the Octonion Appreciation Society email list²⁴³. In that hyper-geometrical exploration I eventually hit upon what I believe to be the correct form of the hyper-kleinian bottle. It is possible to construct both the mobius strip and the kleinian bottle by taking a figure eight shaped tube and twisting it either 360 degrees to form a mobius strip or 180 degrees to form a kleinian bottle. If instead we take a tube shaped like a four leaved clover and apply the same twists then we would get a pair of intertwined mobius strips sharing the same edge by twisting 360 degrees²⁴⁴. Or by twisting just 180 degrees the same four leaf clover shaped tube we may get a pair of intertwined kleinian bottles sharing the same crossover circle. Of course, two intertwined mobius strips are a kleinian bottle so the 360 degree twist with a clover leaf tube is equivalent to a 180 degree twist of a figure eight tube. The new figure is the double kleinian bottle sharing the same circle of ambiguity where each bottle self-intersects. This sharing of ambiguity means that there is no way of telling if there are two kleinian bottles or one composite hyper-kleinian figure.

It is possible to take this strange figure and map it into four dimensional space. Since four dimensional space may be intersected by a three dimensional hyper-plane we can see the two circles of ambiguity as generating a sphere of ambiguity in the three dimensional hyper-plane with each kleinian bottle appearing in the *ana* or *kata*²⁴⁵ four dimensional spaces either side of the hyper-plane. If we construe the *ana* and *kata* four dimensional spaces as mirrors then we can construe the kleinian bottles as horns of the sphere that reflect each other in the two mirrors. In this way we realize the hyper-kleinian bottle as a three dimensional enantiomorphic rotation which is the hallmark of the next higher twist beyond the kleinian bottle. The sphere of ambiguity might be seen as traced out by the two independent circles of the hyper-sphere (xy) (zw). So there is an intimate connection between the hyper-sphere and the hyper-kleinian bottle. The volume of the hyper-sphere is the same as that of the torus. This

241. This speculation is unverified.

242. Rosen, S. [1994] *Science, Paradox, and the Moebius Principle*. SUNY See page 11.

243. octonion@dialog.net. See <http://dialog.net:90/octonions/>

244. This is the image of the pentahedron in four dimensional space.

245. Rucker, R *The Fourth Dimension* op.cit.

is because the torus is a fusion of two independent circles. The difference is that in the sphere of ambiguity we do not know the mutual orientation of the two circles of ambiguity from each kleinian bottle that is part of the hyper-kleinian bottle. They may as in our first example coincide. Or they may retain the same center but freely rotate in three dimensions, thus forming a sphere of ambiguity which is localized incoherence or paradoxicality. Or in four dimensional space they may form a hyper-sphere. If they form a hyper-sphere then the two kleinian bottles are contained within it as the tracings of the two independent circles that map out the two self-intersecting kleinian bottles as subsets of all the possible circles within the hyper-sphere. From this we can see that the twin kleinian bottles are embedded in a hyper-sphere and intersect either at the same sphere of ambiguity or at the same circle of ambiguity. A kleinian bottle is produced by twisting a torus through itself. The two kleinian bottles thus represent the two mirrored twisted toruses that mirror each other in *ana* and *kata* four dimensional spaces either side of the hyper-plane that contains the sphere of ambiguity. One independent circle from the hyper-sphere traces out one twisted torus while the other independent circle from the hyper-sphere traces out the other twisted torus. These are two images of the same torus enantiomorphically reflected in the facing mirrors of the hyper-space. The surface of the intersection of the two reflections is the three dimensional hyper-plane that separates the two mirrors.

Once we know the form of the hyper-kleinian bottle it is possible to understand the series of anomalous topological surfaces that provide an emergent series of non-dual, yet simultaneously dual²⁴⁶, models. This was recognized earlier by Steve Rosen who has explored the implications of these non-dual models and related to Merleau-Ponty's concept of Flesh. However, we differ in the fact that he emphasizes the paradoxicality of these figures while I wish to point out the insights they give us into super-rationality. Our two points of view are harmonized by the realization that what Rosen refers to as the lemniscate, which appears as a two sided ring when a mobius strip is split down the middle, may be seen not just as a distinction but as a non-nihilistic distinction. Non-nihilistic distinctions are supra-rational rather than merely rational. They are the kinds of distinctions such as that between enlightenment and non-enlightenment which are clear and distinct but eluctable, i.e. not comprehensible by rational discourse, like the non-concept non-experience of *emptiness* (*sunyata*) in Buddhism or the *void* in Taoism. If we take the simple lemniscate to be not an ordinary distinction²⁴⁷ like those that Spencer-Brown talks about, but a supra-rational non-nihilistic one, then we can see the series of non-dual topological surfaces as falling away from the supra-rational distinction by stages toward the paradoxicality produced by the sphere of ambiguity at the level of the hyper-kleinian bottle. Between the pure non-nihilistic supra-rational distinction and the sphere of pure paradoxicality are two steps through phases of non-dual

246. Steve Rosen makes this point.

247. Zerybavel, E. [1991] *The Fine Line*. The Free Press.

duality modeled precisely by the mobius strip and the kleinian bottle. As Rosen points out it is the middle gap in this series between the mobius strip and the kleinian bottle that has some interesting and strange properties. Once we recognize that the series of lemniscate => mobius strip => kleinian bottle => hyper-kleinian bottle is a set of stages taking us from the supra-rational to the paradoxical, and back again, via emergent stages where new properties are introduced at each stage, then we have a key to the unfolding of paradoxicality into non-nihilistic distinctions or the devolution of the supra-rational into paradox. These two conditions form the limits of reason. On the one side reason fails when it encounters paradox because it becomes utterly confused as distinctions fuse together. On the other hand, reason cannot understand supra-rational koans (Zen Buddhist sayings such as “what is the sound of one hand clapping?”) that allow for opposite propositions to be affirmed simultaneously without mutual interference. Paradoxicality is a result of the breakdown of the principle of excluded middle while supra-rationality is a product of the kind of thought which never allowed the possibility of excluding the middle to arise in the first place. This kind of thought is called by Loy *NonDual* which is prior to the arising of dualities and has the fundamental form enunciated by Nagarjuna. Buddhist logic extends traditional Indian logic which includes the middle by going beyond it to define emptiness. Indian Logic accepts statements of the form *both...and...* as well as *neither...nor...* in addition to affirmation and denial. Nagarjuna goes beyond these statements to define emptiness as “the difference that makes a difference²⁴⁸” between *both...and...* and *neither...nor...*. Emptiness is non-dual, supra-rational and is a non-nihilistic distinction. Aristotle explicitly denies the four propositions of Indian Logic in his positing of excluded middle as the highest principle of metaphysics. Consequently there is no possibility of recognizing the supra-rational which Nagarjuna indicates. Therefore, there is little in our tradition which allows us to appreciate the importance of supra-rationality. But when we look at Zen Buddhism, Chinese Taoism, and Islamic Sufism we get a taste of the kind of thought which is rooted in supra-rationality. A supra-rational distinction is by definition non-dual and thus beyond or prior to the arising of nihilistic opposites. In such a distinction opposites are allowed to be simultaneously true as *both...and...* while at the same time being *neither...nor...*. These two conditions are simultaneously true without interfering or contradicting each other. This state is called non-affirmation of the antinomies by the Buddha. He refused to speak of them and thus indicated the emptiness of both antinomies. When we fall out of this state of silence the first thing we encounter is the mobius strip which is locally dual and globally non-dual. From there we devolve further into the kleinian bottle formation where the distinction itself vanishes and the circle of ambiguity at the point of self-intersection appears. Finally we devolve to the hyper-kleinian bottle which is utterly ambiguous due to the fact that the circles of ambiguity of both bottles coincide so it is impossible to tell if there is one figure or two. This ambiguity is an image of pure

248. See Bateson, G. *Steps to the Ecology of the Mind* op.cit.

paradoxicality. When we lose all reference to a frame for the sphere of ambiguity and we fall into it like a blackhole then we reach the ultimate extreme of ambiguity called absurdity. That is like the progression up higher and higher levels of hyper-kleinian formations indefinitely.

We can align the steps of the super-rational/paradoxical series into a ladder isomorphic to that of the reflexive autopoietic special systems theory.

Figure 35:

systems theory	topological surfaces	paradoxical images
Meta-system	lemniscate	supra-rational
reflexive special system	mobius strip	tesseract
autopoietic special system	kleinian bottle	nekker cube
dissipative special system	hyper-kleinian bottle	escher waterfall or penrose triangle
system	sphere of ambiguity	paradoxical

This mapping is precisely the opposite of what we might expect. That fact causes us to suspect that the supra-rational/paradoxical series is telling us something different from the series of special systems. What it is telling us seems to be that a function of a pair of autopoietic systems in a reflexive milieu is the continual re-establishment of their own boundaries. This distinguishing of boundaries is supra-rational because the boundaries of an autopoietic system is a balancing of two dynamic boundaries of symbiotic dissipative structures. In those two orders are expanding in relation to each other such that they establish equal pressure and thus a stable autopoietic boundary maintained homeostatically. The balancing of dissipations of orderly structures against each other may be clearly two sided like the lemniscate. But more likely the autopoietic systems will have difficulty keeping the two dissipative structures perfectly balanced so the distinction will devolve by a series of steps into paradoxicality. Autopoietic theory itself is an image of this ultimate paradoxicality. The autopoietic system may be likened to the sphere of ambiguity because it is simultaneously open and closed. It is closed to external observations, yet open to perturbations. This simultaneous openness and closure which has been previously called “cloture” can be seen as either supra-rational or paradoxical depending on one’s disposition. We may distinguish completely the singularity and boundary of the dissipative structure or we may recognize that they are related non-dually. What is completely separable and non-dual at the same time is supra-rational. When we fall out of the supra-rational non-nihilistic distinction between the singularity and the boundary we encounter the mobius strip which is

locally dual but globally non-dual. The escher water fall is the dual of the mobius strip. It is locally coherent but globally incoherent. The reflexive special system has the nature of the mobius strip while the dissipative special system has the nature of the escher waterfall/penrose triangle. The penrose triangle is one in a series of paradoxical shapes which includes the nekker cube²⁴⁹ and the four dimensional cube (tesseract). We relate the tesseract to the reflexive special system and the nekker cube to the autopoietic special system. These paradoxical figures cannot exist in three dimensional space. They are the duals of the non-dual topological surfaces which do exist in three dimensional space. They form an inverse hierarchy to the topological hierarchy. By looking at the duals at each level we can get a better idea of the underlying patterning of the hierarchy of special systems. Where the escher waterfall/penrose triangle configuration models the dissipative system externally the hyper-kleinian bottle models it internally. Where the nekker cube models the autopoietic special system externally the kleinian bottle models it internally. Where the tesseract models the reflexive special system externally the mobius strip models it internally.

The dissipative special system cycles information instead of energy like the escher waterfall. The perpetual motion machine is the dual of the dissipative structural system. Pretending to cycle energy in a way that folds back on itself. Energy recycling is impossible due to entropy, but in very far from equilibrium systems recycling of information actually occurs in nature which we call negative entropy. Negative entropy can be seen as the influx of order from nowhere via the singularity and its dissipation out toward the boundary with the environment. If the environment is itself dissipating order then we suddenly have the mutual dissipation of order from two singularities forming a common border where they are each disordering the other. Such a boundary may become static and if it then becomes homeostatically maintained an autopoietic system suddenly pops into existence. Each autopoietic system can be modeled topologically as a kleinian bottle which expresses its strange openly closed character. The self-intersection of the kleinian bottle stands in for self-production of the autopoietic system. The boundary of the autopoietic system can be seen as similar to that of the kleinian bottle which is the same one-sided surface on both the inside and the outside. Thus, the autopoietic system has one surface for its boundary which is both inside and outside at the same time. If we see this surface in motion then we would see it involuting and passing through itself. The involution of the kleinian bottle is analogous to the act of self production while the static self-interference is analogous to the self-identity or sameness over time. When we look at the dissipative system we see that all the conditions of the production of the autopoietic system are present which manifest when the dissipative systems are conjuncted. This presentiment is symbolized by the

249. Dobbs, H.A.C. [1972] "Dimensions of the Sensible Present" pp. 274-292 in Fraser, J.T. and Harber, F.C. *The Study of Time*. N.Y. Springer Verlag.

relation of the dissipative to the hyper-kleinian bottle. The hyper-kleinian bottle represents the implicit potential structure of reflexivity which appears even at the dissipative level. The oneness of the boundary (event horizon) and singularity as in the black hole is encapsulated in the structure of the hyper-kleinian bottle. This oneness produces the sphere of ambiguity of the singularity embedded within the boundary of the dissipative system. Information cycles through the physical structure and the backflow occurs in a potential trough which is not visible in the physical flow. The relation between the visible and invisible flows are in the position of the twin symbiotic kleinian bottles. Each flow is independent but when conjuncted they produce neg-entropic dissipation of order which is a strange phenomena. The boundary of the dissipative system physically is counter balanced by a four dimensional boundary which is invisible and these two boundaries together are fused together into one figure which is visible and invisible at the same time. The singularity and physical boundary are the points of contact between these two flows making a single circuit. This seemingly impossible circuit exemplifies paradoxicality in the fact that the singularity and boundary are separate physically but are the same from the viewpoint of logos. Here in the dissipative system the split between physis and logos becomes compromised and paradoxical as they are seen to intertransform before our eyes. The logos appears as ordering from nowhere which effects the physis and then evaporates again at the boundary. It is only when we look harder we see the circuit back to logos which reconnects to the manifestation of order again at the singularity. Logos and physis produce a single paradoxical cycle in the dissipative special system. We see this as an escher waterfall of ordering information externally but internally we see it as the potential for reflexivity manifesting in the production of paradoxicality in the interaction of physis and logos. Note that what is manifest in this interaction is nomos or order. So the non-dual beyond or prior to the physis /logos split is what appears in the dissipative system's involution where the kleinian bottle of physis intersects with the kleinian bottle of logos. So as we move up the hierarchy from dissipation toward reflexivity we are moving from paradoxicality toward increased supra-rationality and the potential of the hyper-kleinian bottle which is there from the beginning as the interference between logos and physis that reveals nomos successively unfolds. This is contrary to expectations. The direct external comparison of the hyper-kleinian bottle to the reflexive is more obvious and natural. But this does not explain the relation of supra-rationality to paradoxicality. As we move toward the meta-system we are moving toward supra-rationality. This can only be accommodated if we identify the lemniscate with the meta-system. This means that the dissipative system must be related to the hyper-kleinian bottle formation which makes little sense until we realize that it is a model for the intersection of logos and physis that occurs at the dissipative level. Then when we see that the hyper-kleinian bottle is the potential of reflexivity manifesting at the dissipative level then it is clear that the reversal between these two series is what ties them together and gives them over all unity.

When we look to the other end of the spectrum we see how at the reflexive level there is an inward relation to the mobius strip and an outward relation to the tesseract. Notice that the inward is being simpler and the outward more complex. What we notice is that as we move from penrose triangle to nekker cube we are trapped in two dimensionality. But suddenly at the level of the tesseract we have spilled over into four dimensionality skipping the third dimension. Thus in terms of outward appearances we have suddenly moved from a flat projection of paradoxical images to a full blown four dimensionality of images which is an example of overflowing and ecstasy we would expect at the reflexive level. So isn't it amazing that our model so precisely mirrors the overflowing of paradoxicality of images as the expansion from two dimensional paradoxical figures to the fourth dimension which is equally difficult to capture in the third dimension as the nekker cube and the penrose triangle. Internally we see the mobius strip as the potential for connecting autopoietic systems within the reflexive milieu. Thus simple local duality and global non-duality is in effect at the reflexive level where two autopoietic systems are made one by conjunction in the reflexive field while each are still isolatable and separate at the same time. The full force of reflexivity we saw in potential at the dissipative level is now fully manifest externally in the structure of the reflexive field. Externally the two kleinian bottles which represent autopoietic systems are producing as their mutual self interference the reflexive field, but internally this paradoxicality is mirrored by a much simpler non-duality of the mobius strip. Beyond the apparent paradoxicality within the field is an actual non-duality which unites the two autopoietic systems. Each of them are made up of two intertwined mobius strips so that their shared reality is the mobius strip. It is this shared reality that allows them to unite essentially as the image of non-duality which becomes fully manifest in the meta-system. So think of it this way: The potential of the hyper-kleinian that appears in the dissipative becomes fully manifest externally as the reflexive field. As this occurs we find internally a reduction to the mobius strip as the essential shared reality of the autopoietic systems encompassed by that field. The autopoietic systems are essentially non-dual in themselves and in relation to each other despite the paradoxicality that proliferates externally in the reflexive field itself. The autopoietic systems themselves enter an ecstatic overflowing at the reflexive level which we can see as the move from two dimensional paradoxical images to the coherence of four dimensional forms. These forms are no less paradoxical than the nekker cube and the penrose triangle in terms of their images that appear in two and three dimensional space. But the coherence of these forms in the fourth dimension shows us the ordering of the synergies of the nomos. These spill out in ecstasy from the two autopoietic systems locked in symbiosis. Logos becomes purified and manifests as this outpouring.

So here we see that by recognizing the inversion between the two images from topology and algebra we discover a much deeper model of the special systems. The non-inverse identification is also possible but it does not bring into account the

paradoxical images which we have seen model the outpouring of ecstatic order into the reflexive environment. All this shows us how deep the model of the dissipative can be. The entire series is implicit in the definition of the dissipative special system. It seems simple but the more we look into it the more we see the implicit reflexivity which will unfold through the series of hyper-complex algebraic stages.

We can move on from here to define the dissipative special systems as “openly closed” in relation to its environment. It is open to energy which drives it far from thermodynamic equilibrium, but closed to information which circulates impossibly from nowhere into the system. This order production radiates from the singularity out towards the boundary where the system expands disordering the environment, creating more disorder in the environment than order in the system. And the transformation of order of the system into disorder for the environment causes the dimensional transgression which allows the information to loop back around re-entering the singularity. Think of this loop as a kind of regulation mechanism that continues a certain load of order production because it encounters no resistance in disordering the environment. If the environment does resist then it would shift to a new kind of order revealing something of the implicate order (cf. Bohm) behind the order production of the dissipative system. Extending the paradox even further we realize that the information driving the dissipative system is infinite and is revealed to us as a strange attractor if we look at the phase space of the system. So although the information loop is closed due to the strange attractor formation there is infinite information traveling around that loop so that this feedback loop is strangely open. Also, the system that is open to energy is actively producing its own spatiotemporal boundary creating a closure which is finite. Thus, the dissipative special system embodies paradox which we see as neg-entropic propagation of order in spite of the predominance of entropy in special cases of non-linear thermodynamics as described by Prigogine²⁵⁰. We note that there have been a continual history of attempts to produce perpetual motion machines which try to realize the escher waterfall formation as a functional physical system. This is not possible in three dimensional space, but is possible in four dimensional space. We live in four dimensional space, so it follows that perpetual motion is only possible in an evolving system, i.e. one in which time is dynamically unfolding. This dynamic unfolding is seen as an influx of information into a three dimensional system. The second and third laws of thermodynamics deny that possibility with respect to energy. Perpetual motion machines set over the dichotomy between dynamic reversal and irreversible thermodynamic systems as a paradoxical formation which would seek to connect them in such a way as to produce energy or at least maintain the energetically non-entropic system without energy inputs. But this is an impossible paradox to sustain

250. Prigogine, I. [1984] *Order Out of Chaos: man's new dialogue with nature*. with Isabelle Stengers Toronto; New York, N.Y.: Bantam Books.

physically. The closest we can get physically is the soliton formation which is super-efficient not ultra-efficient. Super-efficiency gives unexpectedly high persistence without complete permanence to the isolated dissipative system. Ultra-efficiency only arises at the autopoietic level. However, where we cannot achieve energy closure or energy production it is possible to achieve information closure and production. Thus, the perpetual motion machine is the dual inverse of the dissipative special system. What the perpetual motion machine fails to produce in terms of energy is exactly what the dissipative system succeeds in producing from the point of view of information. We note following Stonier²⁵¹ that information and energy are intertwined such that potential energy is really situational information, so that physical systems are continuously transforming energy into information and vice versa as they produce and then use potential energy. A dissipative system merely produces a loop in this potential trough such that the energy converted into information is returned from the boundary of the dissipative system to be reconverted into ordered energy (information encoded energy) that radiates from the singularity appearing from nowhere at the center of the system. The loop through the potential space of the recycled information creates a surplus of ordering and maintains the influx of order in the dissipative system within its boundary as that boundary expands.

We can understand this potential loop by considering again the duality between the penrose triangle and the mobius strip. The former allows us to compare global incoherence to local coherence whereas the latter allows us to compare global non-duality to local duality. The paradoxicality of the dissipative system may be expressed as the conjunction between these two local/global distinctions which are construed together to create a single paradoxical meta-formation. What is surprising is that it is possible to create embodiments of this paradoxical formation unlike its perpetual motion dual. In other words, there are potential troughs that can be made reentrant for information whereas this is apparently impossible for energy. Thus, to create an infinite information machine is possible by intertransformation between energy and information and using strange attractors as the information generators. But this can only occur locally while global entropy is maintained in the total energy economy. The point where information disappears at the boundary of the dissipative system is directly connected to the singularity where it re-appears at the center of the system. At that point we enter an actively contradictory state which is at once globally non-dual and globally incoherent. This dissipative system itself embodies local dual distinctions and local coherence. Inside the finite dissipative system is entirely locally coherent. The dualistic distinction of relevance is between the singularity and the boundary that encloses that local distinguishability and coherence. It is the global non-duality and non-coherence of this system that allows

251. Stonier, T. [1990] *Information and the Internal Structure of the Universe. An Exploration into information physics*. Springer Verlag, London.

it to manifest its startling properties of neg-entropic order production that violates our thermodynamic expectations. The coincidence of global non-duality like that which appears in the mobius strip and global non-coherence like that which appears in the penrose triangle make the dissipative special system formation especially incomprehensible. In other words, we get a property we want which is global non-duality at the cost of global incoherence. The mobius strip is a finite formation that is possible in three dimensional space. We see that the Penrose triangle has the same structure as Riemann spacetime which also has global non-Euclidean properties combined with local Euclidean properties. Note that spacetime is the ultimate meta-system and as such it has both global incoherence and non-duality in that without something inhabiting space there is no distinctions between places or times. This analogy with the meta-system extends to the micro-quantum level where we see spacetime as a soup of virtual particle pairs that are continually created and destroyed. These virtual particles also display the operations of the Emergent Meta-System as has been mentioned previously. Thus whether looked at relativistically or through the lens of quantum mechanics spacetime has inherently the nature of the meta-system²⁵².

So when we put these two formations together we get a meta-formation that uses global incoherence from four dimensional space to wrap back around creating a closed loop through the potential space that stands outside physical spacetime. Local distinctions that are dual collapse into non-dual modes as it passes through the incoherent discontinuities in the global spacetime. The fact that this occurs in spacetime means that the dissipative system must be a dynamic irreversible process in order to accomplish its strange feat of neg-entropy production. When we combine the penrose triangle and mobius strip duals the combined structure is an image of the cosmic monad.

The arising of a nexus of non-dual non-coherence is precisely our entry point into the meta-systemic. Each successive special system takes us further toward the utter incompleteness and inconsistency, as well as incoherence, of the meta-systemic background of all systems. In meta-systems we have nexuses of complementarities whose existence forces us to an anti-epistemological stance that is advocated by Arcady Plotnitsky in his study of Bohr, Derrida and Bataille called Complementarities²⁵³. It also forces us into a similarly anti-ontological stance that leads to positing of emptiness (sunyata) over against any type of Being. Each special system can be seen as a partial meta-system. We are building up from a nexus of complementarities step by step. In the autopoietic special system we get a balance between non-dual non-coherence toward a nexus of complementarities step by step.

252. We see this too in the difference between the view of the Matrix as either spacetime (x+y+z-it) or timespace (past-present-future+nowhere, the Minkowski view). The Matrix refers to what lies beyond these complementary views that is not accessible to observation.

253. op.cit.

In the autopoietic special system we get a balance between non-dual non-coherent dissipative formations and then finally in the reflexive special system we get a minimal system of non-dual non-coherent nexuses. The reflective special system is a nucleated systemic formation analogous to the Vector Equilibrium²⁵⁴ of B. Fuller defined in Synergetics I & II²⁵⁵. So the minimal system of non-dual non-coherent nexuses is directly related to the close packing of spheres around a nuclear sphere. Working backward we can see that the pair of non-dual non-coherent nexuses is related to the tetrahedral minimal system and the dissipative system with a single non-dual non-coherent nexus is related to the triangle. That triangle may be construed as the Penrose triangle or as a mobius strip in which each corner is a twist. We build up the tetrahedron from triangles. The interaction of the tetrahedral minimal systems can be expressed by the fusion into octahedron or the interpenetration into cubes. With the cube the square appears. Cubes and squares together produce the vector equilibrium structure. As Onar Aam²⁵⁶ has shown the associative properties of the Octonion are related to the vector equilibrium and the associative properties of the quaternion are related to the triangle. The vector equilibrium is the chiasmic non-dual balance point between octahedron and cube. Its associativity comes from the interaction of the triangle and square that appears in the octonion as relations between imaginaries. But prior to the interaction of tetrahedra that gives rise to the square there is only the interaction of triangles that form the tetrahedron. We can see the tetrahedron as the set of rotations of the triangle producing a symmetry space. We can see the Vector Equilibrium as a set of rotations of a triangle and square that introduces a higher order symmetry space. When we look at these symmetry spaces we see that they have an inner structure of quaternion and octonion algebras. Higher algebras like the Sedenion have islands of associativity within an overall non-associative algebraic formation like the jewels in Indra's Net of Interpenetration. When commutativity, associativity, and division properties disappear we have full global non-coherence of the meta-system. It is precisely at that point we also enter into full non-duality of the anti-epistemological and anti-ontological emptiness (void) which expresses a universal interpenetration. Between the arising of the nexus of non-dual non-coherence in the dissipative system and the full fledged interpenetration of the Sedenion and higher order non-associative non-division algebras produced in the Cayley-Dickson process there are two more states where partial meta-systems arise as thresholds of complexity of a very peculiar kind of defining anomalous and strange special systems that spontaneously arise between systems and meta-systems.

At the dissipative level there is a chiasmic fusion of pattern and form. We have seen that Spencer-Brown's Laws of Form may be used to define a calculus of Form

254. An Archimedean polytope made up of points of the closest packing of spheres with squares and triangles for faces.

255. op.cit.

256. Onar Aam, a member of the octonion appreciation society. (onar@hsr.no)

through a particular combination of the aspects of form (something, nothing, layering, and multiplicity). These laws of form have a dual which may be called the “laws of pattern” which assumes the opposite axioms.

Figure 36: Laws of Pattern

$()() = \text{“nothing”}$

$(()) = ()$

The laws of pattern emphasize or reward layering instead of multiplicity. Multiplicity emphasizes outward differentiation whereas layering emphasizes inward differentiation. Content is the inward differentiation of a form and the ordering of that content represents a patterning. The calculus of pattern is eschewed by mathematicians because it is considered more shallow than a formal calculus that represents dualistic transcendence over content. In fact, only Grenander²⁵⁷ has developed a mathematical exposition of Pattern. Patterns can easily break the rules of isomorphism and homeomorphism that mathematics cherishes. Patterns can be realized as the subtle sets of overlappings of the shadows of forms and no mathematics of overlappings exists. We posit that such a mathematics could be thought of as a fuzzified category theory²⁵⁸. Such a conception has allowed the definition of anti-categories such as the annihilation mosaics²⁵⁹. Emergent Meta-systems can be modeled as annihilation mosaics. In the annihilation mosaic there is a set of eventities and anti-eventities that annihilate each other continuously like particles and anti-particles in the soup of virtual particles that serve as the field for conserved particles. Each annihilation can produce a set of side-effects such as other particles which may produce annihilation cascades that in turn may form loops. These loops in annihilation mosaics account for the persistence of things in the face of constant annihilation. We may postulate that what the forms contain as contents is precisely these annihilation mosaics that allow us to see pattern rather than form.

Pattern has four kinds associated with process, structure, value and sign. Process and Structure have been defined by Klir in Architecture of Systems Problem Solving. He calls process the production of an infinite series of meta-models while structure comes from an equally infinite series of meta-structures. These two series produce the horns of his epistemological hierarchy. Sign and value have been defined by Baudrillard in Critique of the Economy of the Sign which shows how signs function also as commodities in a market so each social artifact has both sign and value at the same time. When we recognize that all four of these aspects are different ways of looking at pattern then we realize that this patterning fourfold (value, sign, process and structure) underlies the fourfold aspects of form

257. Grenander, U. [1976, 1978, 1981] Pattern Synthesis Volumes 1, 2, & 3. Springer Verlag, New York.

258. See “Deep Mathematics and Meta-systems Theory” by the author.

259. Palmer, K *Steps to the Threshold of the Social* series of essays in *Reflexive Autopoietic Systems Theory* op.cit.

(something, nothing, layering and multiplicity). Something is a formal mark which may be present or absent. When it is absent it leaves a hole. This is different from the imaginary anti-mark. We only see emptiness in the mutual annihilation of mark and anti-mark not as Spencer-Brown says in the relation between mark and the blank background on which it is written. Something may participate in layering (distinguishing inward from outward) and multiplicity (distinguishing multiple possible external places). But nothing also may be articulated by layering and multiplicity which produces the ramified hierarchy of meta-levels (or higher logical types). But this formalism may also be seen to contain content by giving the marks diacritical marks (rather than surreal content). The diacriticals may indicate process (meat-models), structure, signs (reference) or value. This diacritical level is produced directly out of the kinds of Being acting at the level of pure content. Pure content is itself never seen as Husserl says of “hyle” which is formed by the “intentional morphe.” So we can see hyle as a kind of pre-entity. Butchvarov discusses these kinds of pre-entity associated with material identity and reality. If we extend his analysis we find that each kind of pattern is a particular kind of pre-entity associated with a particular aspect of Being.

Figure 37:

identity	structure	reduction
reality	value	exclusion
presence	process	concatenation
truth	sign	reference

Identity, reality, presence, and truth by their combination at the formal level produce six properties:

Figure 38:

coherence
consistency
clarity (well-formedness)
validation
verification
coherence

While at the level of pattern they produce the kinds of content which forms may contain, these form hierarchies of meta-levels and intertwine chiasmically as

process and structure do in Klir's epistemological hierarchy. Pre-entities of content never appear outside of the context of forms. But we still approach them through phenomenology, hermeneutics, dialectics, and structuralism.

Figure 39: Humanistic Scientific Approaches

Phenomenology approaches value content as essence
 Dialectics approaches process content as transformations (meta-essence)
 Structuralism approaches structure content as opposites
 Hermeneutics approaches sign content as meaning

In this manner we deepen our appreciation of the nature of patterning. This allows us to understand how annihilation mosaics can produce side-effects. This is due to the four dimensional nature of hyle. Processes unfold through the meta-changes of structures²⁶⁰. Structures are made up of binary oppositions. Thus pre-entities can cancel each other out if they are opposite types. But cancellation that occurs at discontinuities in a process may produce either side-effects in the realm of signification or value. For instance, in a general economy destruction of objects may produce a transcendental value or some sort of significance.

In annihilation two somethings yield nothing so that multiplicity is constantly collapsing. But, instead of the multiplicities this process produces layering. The layering piles up within the form as overlapping shadows that continuously reduces to just the form itself. So patterns of overlapping elements create forms that in turn annihilate. The "laws of pattern" would merely vanish if it were not for the fact that annihilations can produce side-effects that cascade and can create loops. It is these loops that form stable dynamical structures similar to the stable static structures of forms. The pair of static stable and dynamic stable structures together form a gestalt that can be construed as a system. In fact, we recognize this as a temporal gestalt in which forms produced by the buildup of layered patterns and forms together produce multiplicities that may be manipulated by the laws of form calculus. From a notational viewpoint we can distinguish between laws of pattern and laws of form axioms by introducing brackets around laws of pattern expressions: ((0(0))0){0((00)((0)0))}(((0(0)))0). But this contrast between pattern and form does not complete the story because the laws of pattern merely defines the dynamics of overlapping and annihilation. Still we must consider the nature of the content itself. We have already seen that it is necessary to posit that the forms contain a representation of field propensities in order for our model to be complete from the point of view of the four kinds of Being. We represent these field propensities via Surreal Numbers. Surreal numbers may represent either quality or quantity. They represent quantity in the way that Conway²⁶¹ and Knuth²⁶² have defined by

260. Watzlawick, P., Weakland, J.H. and Fisch, R. [1974] *Change: Principles of Problem Formation and Problem Resolution*. N.Y. W.W. Norton.

261. Conway, J. *On Numbers and Games*. *op.cit.*

progressive bisection that generates all real numbers plus all ranks of infinite numbers and infinitesimals from a single symmetry breaking operation. By producing bifurcations of up and down markers at various ordinal levels all possible numbers are produced as well as some holes or anti-numbers which prevent us from integrating under the surreal numbers. Thus, the surreal numbers naturally form a broken semi-continuity. When numbers define sets of entities and we interpenetrate these entities, then we get the possible qualitative states of a system. In this we move from n^2 to 2^n that numerically defines the relation between quantity and quality for a given system of elements. If we take any set of components, the Lano N^2 diagram²⁶³ defines the static relations between these components that appears in a gestalt pattern formation that glosses over all the components. But then there is also the mutual action of the components with each other that we only see in their interaction in which they form a dynamical system, or a moving gestalt. These interactions give rise to systemic qualities. These qualities are expressed as the tension between foreground figure component and the rest of the components forced into the background in a particular gestalt view of the dynamical system. The tension between one component and the rest has an affinity with the relation between the interpenetrations of the components within the overall system. The possible interpenetrations are 2^n where n is a set of distinctions that can be hierarchically combined to produce a set of possible states. The dynamic system has a normal trajectory through this state space. But all possible qualitative trajectories are represented within the state space. The interpenetration of the different kinds of things in the initial set can be seen as the dual of the set of possible qualities of those things interacting dynamically. Each combination of ups and downs may represent, besides numbers, instead a particular qualitative permutation of possible distinctions that make a difference for that system and thus define the possible system states. Thus surreal numbers may define either the quantity or quality using the same notation. When we realize that propensities are exactly half way between qualitative possibilities and quantitative probabilities then we see that it is reasonable for the surreal numbers within the forms to represent moments of the field of propensities thus: $(\vee \wedge \wedge \vee) \{ (\wedge \vee) \} ((\wedge \wedge \vee \wedge \wedge) \wedge \wedge \vee)$. Now what is amazing is that the surreal numbers with their infinities and infinitesimals and holes are a perfect model for the meta-systemic field. In that field there is the representation of the primary complementarity between up and down arrows. That field contains blackholes and miracles of decreasing and increasing positive feedback represented by the infinities and infinitesimals. But the field also contains holes or gaps in continuity similar to those that the division and non-division algebras introduce. If we take the infinities or infinitesimals and randomly connect those bumps on the surreal surface OR we take the holes and randomly connect them we get a multiply connected surreal

262. Knuth, D. *Surreal Numbers*. op.cit.

263. Lano, R.J. [1979] *A technique for software and systems design*. New York: North-Holland Pub. Co. and Elsevier North-Holland Pub. Co.

surface. That surface represents the true nature of the global economy of the meta-system. If we think of that surface as involuting then each hole takes in the entire surface and then reproduces it again from inside itself. This is the essential vision that Ben Goertzel had in mind when he produced the ‘Magician’ SGS model of the meta-system²⁶⁴. Every toroidal hole is taking in and projecting the whole surface connecting all the toroidal holes. When we put this together with Donaldson’s discovery that there is a possibly infinite number of fake four dimensional topologies we see that the multiply connected surface is a four dimensional Swiss cheese structure with infinite mappings between holes and holes or infinities and infinitesimals within a surreal four dimensional manifold.

However, if we think instead of connecting holes and infinities we get a completely different kind of structural formation, as has already been noted, that is analogous to the dissipative formation. Suddenly we see that this cross-wise connection between infinities (or infinitesimals) and holes gives us the possibility of infinite information appearing from nowhere within the multiply connected surface. The stream of infinite transcendental digits would appear out of a hole in the continuum as a set of random fluctuations. But infinite irrational numbers would appear as cyclical order that arises from nowhere. Either way infinite numbers connected to holes in the continuum is a precise model of the dissipative system that naturally arises within the context of surreal numbers captured by the laws of form equations. Those equations allow us to manipulate the field of propensities and even convolute the field of tendencies represented by the four-dimensional “Swiss cheese surreal” surface. Each hole represents an Emergent Meta-System component within the swarm of holes. Each hole is involuting the entire surface producing the whole out of all its parts. This gives us a dynamic model of interpenetration. And we realize that it is the conjunction of holes which produces the various models of special autopoietic and reflexive systems as well as meta-systemic higher order formations. All the holes taken together are the swarm. Within the swarm there are islands of associativity and smaller islands of commutativity. But the swarm as a whole as a meta-system is incoherent and non-dual to the extent that it represents a model of interpenetration. Things in the swarm are literally empty as they are actually holes mapped to either increasing or decreasing infinities from elsewhere on the same surface through which order flows into the surface itself. We can see that the laws of form/pattern equations may be taken as the means of producing the mapping between points on the surface. So in this way it is possible to see the combination of the laws of form/pattern and surreal surfaces as a complete picture of the meta-systemic formation with its special subsets. This is because once we have a picture of how dissipation arises from out of the quality/quantity non-dual substrate of the field then by conjunction of dissipative structures we can build autopoietic and reflexive special systems. Autopoietic special systems appear as homeostatic and

264. Goertzel, B. *Chaotic Logic* op.cit.

symbiotic pairs of dissipative systems whereas reflexive special systems appear as minimal systems of these dissipative structures held in conjunction.

4. Autopoietic Quaternionic Systems

When we move to the quaternion threshold of algebraic complexity we enter the realm of multi-level conjunction. A quaternion is a conjunction of two real-imaginary vectors. It is at the same time a pair of dissipative systems and a whole new emergent special system that is analogous to the autopoietic system. The emergence of the level of the autopoietic as opposed to the dissipative is seen in the symmetry breaking of the quaternion which opposes one real to three imaginaries instead of the two imaginaries as balanced vectors. In the autopoietic system two dissipative systems combine to form a self regulating hyper-cycle. That is to say that the disordering of the environment by one is the ordering of the other and vice versa. This occurs at the quaternion level of complexity that embodies four dimensional rotation. That is the kind of rotation that allows perpetual motion in four dimensional space. Since our spacetime is four dimensional apparent perpetual motion is possible in very rare instances such as in the phenomena of superconductivity. The autopoietic system maintains its organization homeostatically by the feed back between symbiotic dissipative systems locked into an embrace where they feed off of each other and do not need to interact with anything outside themselves.

At this level one of the important algebraic properties is lost: commutative property. The loss of this algebraic property gives rise to mutual irreversible action and thus behavior in general. Basically this means that an action between nodes in an autopoietic network may take many actions to be reversed and perhaps cannot be reversed due to asymmetries in action. This irreversibility in actions makes mutual action visible within the network of autopoietic nodes. It also makes time appear as the asymmetries of action complexes. So we say that the meta-systemic operation at this level is mutual action. These are actions that may have side-effects or supplements that cannot be reduced to the original action. In other words the many actions it takes to reverse an action can be seen as the supplement to that action which makes action cycles and sequences long chains where they would be simple reversible atomic actions otherwise. So an autopoietic system has autonomous behavior as a visible characteristic that does not appear at the dissipative or the general systems levels of the hierarchy of kinds of systems.

An autopoietic system has a boundary that is maintained with its environment. This boundary is permeable and events along the boundary are treated as perturbations that are compensated for by the homeostatic action of the autopoietic system. Within the boundary are nodes that have the function of producing the components of the systems own organization out of the sub-structure of available sub-components. This process of self-production is controlled by a hyper-cycle that

is self-regulating. This hyper-cycle exists in the imaginary realm beyond the embodied system as the relations between quaternionic elements. This imaginary realm may be seen as the intersection of sign and value patterning while the autopoietic nodes themselves may be seen as existing under the auspices of process and structure. So we can see how differentiation of the kinds of patterning sets the stage for the internal differentiation of the autopoietic system. Process and structure define spacetime from the point of view of data generation. Value is one no-where and significance is another no-where. Each dissipative structural process can appeal to a different no-where so that the autopoietic special system by containing its two dissipative structures unites all four kinds of patterning in a single eventuality and produces an imaginary sign-value subspace for the hyper-cycle to inhabit. In the hyper-cycle the different elements form a holographic non-well-founded set in which each control element represents the whole of the system at a particular moment in its cyclic homeostatic development. Each holographic control element contains information about the whole system by subsuming all the other holographic control elements as parts of itself.

These holographic control elements are vectors of sign-value which in software may be represented as a combination of a pointer and a value of a variable. Associated with this sign-value vector is some kind of rule. We can see this as a primitive petri-net control structure. A more sophisticated version would be a colored petri-net. The petri-net controls the behavior of the nodes of the autopoietic system. Those nodes must continually distinguish themselves from each other while maintaining their self identity. If we follow Jung's definition of self then that includes the totality of conscious and unconscious contents²⁶⁵. We can see awareness as something produced as a by-product of self-production. We might think of it as the interface between sign-value and process-structure. Each node when it interacts with the sign-value net must relate that control to process and structure aspects of the node. There is a continual rotation through the plane that separates sign-value from process-structure. We might call the interface awareness which becomes intentional when the sign-value control cycle directs change or learning at some meta-level of work²⁶⁶. The unintentional is when the control net does not intervene in process-structure. We understand the network of autopoietic nodes as an active medium in the sense used by Goodwin in How Leopard Changed It's Spots²⁶⁷. The sign value imaginary hypercycle acts like the DNA in the active media of the cell. The DNA provides the nudges to control the active media's natural proclivities to action and interaction. DNA does not do everything, but instead functions as a guidance mechanism in perfect symbiosis to the meta-system of the cell environment which in turn lives in a larger level meta-system outside the cell.

265. Brooke, R. [1991] *Jung and Phenomenology*. London, Routledge.

266. See *Advances Process Architectures* tutorial by the Author. op.cit.

267. op.cit.

The crucial distinction at the autopoietic level is between structure and organization. At the dissipative special system level these two cannot be distinguished. But within an autopoietic system there is the distinction between the structural nodes and the organizing epicenters. The structural nodes exist in real spacetime and they produce each other. The organizational epicenters are an articulation of the nowhere beyond the singularity of the dissipative system. In fact, each structural node is a singularity of the type that appears in the dissipative system. So both the singularity of the dissipative system and the imaginary higher dimension become articulated when we move to the autopoietic level of special systems differentiation. The structural nodes are holographic in that each singular node contains an image of the entire system as a template that allows it to build one particular piece of that network that fits in synergetically with all the other pieces produced by the other structural nodes. And this process is driven by the pentahedral hyper-cycle of imaginary organizational epicenters which the Chinese call Hsing that control this ordering in spacetime from beyond spacetime. Likewise the organizational nodes are holographic in that each of them is a part of all the others so that they can create a complete compensating control ring that can maintain homeostasis in the midst of perturbations from beyond the boundary of the autopoietic system. Notice here that the boundary of the autopoietic system is assumed to be stable and not expanding and that instead of disorder coming from the dissipative system into the environment as the dissipative system expands, that the disorder is coming from the environment into the autopoietic system which that homeostatic system must continually compensate for in order to maintain its organization in the face of continual structural transformations. The special feature of the autopoietic system is that it may react in multiple ways based on the same input due to differing internal compensatory states.

It is also important to note that homeostasis is based on the ability to have negative feedback loops and that these loops can be seen as attractors within the autopoietic system boundary that keeps the system cycling close to balance. In fact, we can posit that these homeostatic feedback loops can be used to compensate against each other within the autopoietic system and thus produce stasis as the multiplication of homeostasis against itself. We will call these static structural elements within the autopoietic network structural invariants and contrast them to the homeostatic aspects of the network that do not immediately cancel the action of others. This is what defines the organizational aspect of the autopoietic system which is flexible and will cycle back to a balance when perturbed. The organization controlled by the imaginary hypercycles is the flexible aspect of the autopoietic system that allows it to be within a perturbing environment and maintain its internal balance despite continual unbalancing from the outside.

The autopoietic system is a chiasm of living/cognitive properties. This means that it is a description of a machine that organizes itself and this is taken as a

definition of life. But this definition of life does not allow an objective view of the system because it recognizes that the cognitive component is intermingled with the living component so that they cannot be separated. We see this in the fact that we cannot predict as observers what the output of an autopoietic system will be based on any known input. Thus, the autopoietic system becomes something that is completely opaque to the external observer who projects his/her theoretical models on this opaque and inexplicable behavioral black hole. And on the inside too the autopoietic system has its own cognitive apparatus fused with the processes of living. So even though theoretically we can separate the structural singular nodes from the organizational imaginary epicenters that produce the hyper-cycle, in practice it is impossible to differentiate these two kinds of nodes. It appears instead that individual singular nodes are acting intelligently within the autopoietic network because the chiasmic nodes are holographic in terms of system patterning on the structural level and holographic in terms of control patterning at the organizational level. So the cognitive and living processes form a phased interval that can appear more or less intelligent from different perspectives. The point is that the nodes themselves as embodied within spacetime are acting in ways that can be ascribed to the attributes of an intelligent living whole which Rescher has broken down into the attributes of a system but which are fused together synergistically in the bodymind of the living thinking organism.

We can follow Shapiro²⁶⁸ in his book on embodied reflection in saying that structure is the exploration of the possibilities of a form in action. Patterning occurs at the level of content and Formation occurs at the level of the boundaries of things. When we explore the structure of a thing it undergoes deformations in which the contents are transformed and the boundaries containing the boundaries are changed. These are associated with the difference that Husserl makes between noema and noesis when he says that every activity in consciousness is a mixture of the transformation of contents and actions. So the formal-structural system is merely a whole in which both form and content are dynamically changing over time. We assume along with Aron Gurwitsch that this always takes place on some background and so this dynamism occurs as a gestalt to the observer. The inability to separate noesis and noema or pattern and behavior means that it forms an interval which from different viewpoints can be seen as contributing more or less content and thus making more or less boundary contribution to the overall effect of the gestalt. We note that the inverse dual of the gestalt is a flow in which the background is brought to the foreground and the figure becomes a stationary reference point the formal structural system mediates between these duals of flow and gestalt. Structure attempts to comprehend the flow, especially discontinuous flow, while the system attempts to comprehend the gestalt.

268. Shapiro, K.J. [1985] *Bodily Reflective Modes*. Durham, Duke University Press.

We also can follow Shapiro who distinguished between the virtual shadow of perception which is the imagination and the virtual shadow of behavior which is mimicry. These shadows we identify as the meta-systemic side-effects that appear as a halo around the perceptions and actions of the organism. The autopoietic system reinforces its behavior through mimicry and it reinforces its perceptions through imagination. It projects its homeostasis back on itself recursively by mimicking itself and by imagining the possibility of perfect balance that it is approaching iteratively as an asymptotic limit. In the autopoietic system mimicry and imagination are tightly coupled shadows of perception and behavior. Perception is the accepting of perturbations from the environment which is reacted to as the homeostatic system attempts to return to its equilibrium. The behavior is decoupled from the stimulus because the return to equilibrium may not be by a direct path. Because the commutative property has been lost a circumlocutious route back to balance may need to be taken. As the special system weaves its way back toward balance other perturbations may arise to be compensated for and so the actual behavior of the system could be very different given the same stimulus just as it is with all animals where simple stimulus-response models fail except in extremely constrained environments. The autopoietic system is producing itself to an imaginary template. The main behavior of the autopoietic system is the self-production in which it attempts to mimic itself. So the shadows of imagination and mimicry are tightly coupled because imagination of the balanced system and of the system organization guides the behavior of rebalancing in the face of the loss of the commutative property and the reproduction of itself in the face of constantly shifting structures underlying the organization of the autopoietic system. At the next emergent level these shadows of perception and behavior decouple to allow the projection of the world and self-similarity that can accept difference.

Part of the inspiration for this view of autopoietic systems theory and its relation to the social comes from an in-depth study of Plato's Laws in the author's philosophical opus The Fragmentation of Being and the Path Beyond the Void²⁶⁹. In that study it was found that Plato's description of his "Second Best City" is a representation of an autopoietic system in terms of a human city. Most of the studies of Plato concentrate on the best city described in the Republic which is clearly unlivable and is really a description of a city of the gods. Plato's Laws is the first work on systems theory as it gives a complete representation of an imaginary city in a systematic way. This imaginary city, Megara, has many strange features that can be explained easily once you realize that he is describing an autopoietic unity of the kind described by Varela and Maturana. But the use of autopoietic theory in this way raises the question of whether human social entities can be autopoietic. On the basis of this work I decided that autopoietic theory needed an extension that explained the

269. A series of fragmented working papers on the underlying structure of the Western Worldview by Kent Palmer (also known as Abd al-Alim al-Ashari) (manuscript, see <http://dialog.net:85/homepage/fbpath.htm>)

nature of the social in relation to its constituent organisms but had its own emergent properties. I found the perfect model for this emergent jump from the autopoietic to the social in the jump from the quaternion to the octonion algebras. These analogies then attained a life of their own as I began to work out the counter-intuitive implications of the analogies which ended up explaining some of the most vexing problems in social and psychological science and led also to the realization that knowledge of these structures are encoded into mythology. To be precise the story that predates the Iliad and Odyssey of the voyage of Jason and the Argonauts, but which was recorded later by Apollodorus is a narrative about the formation of the reflexive system out of the ruins of the broken autopoietic system. These mythic parallels plus the evidence of Plato tells us that the knowledge of ultra-efficacious systems is ancient. In Plato the image of the reflexive city was Atlantis while the image of the dissipative city is the Republic or Ancient Athens. Ancient Athens and Atlantis have a war with each other which Ancient Athens wins and after which Atlantis is destroyed. The war provides the background against which the Autopoietic Second Best City of the Laws is presented. In Plato the Dissipative City (Republic and Ancient Athens) wars against the image of the Reflexive City (Atlantis) and this war frames the creation of the Autopoietic City (Megara of the Laws).

We can also see it inscribed in Chinese Traditional Sciences²⁷⁰ like Acupuncture²⁷¹. The study of Acupuncture and Homeopathic theory which is anomalous with respect to generally accepted Western medical models has also informed this work²⁷². These medicines each assume that there is an ultra-efficiency that is operant in the human body that can be effected by unconventional medical techniques. They are excellent examples of specific practical sciences that embody special systems theory in different forms. Varela has written in The Embodied Mind about the connection of autopoietic theory with Buddhism. But the connection with Acupuncture theory is even clearer and in the case of this Ancient Chinese medical practice there is no religious foundation that has to be accepted in order to appreciate the theory. Instead, one must only accept the basic tenants of autopoietic theory and apply those to the human body and then see how well Acupuncture theory embodies those principles. Homeopathy²⁷³ on the other hand is dissipative instead of autopoietic. These two medical practices are duals of each other and are mutually elucidating.

270. Holbrook, B. [1981] *The Stone Monkey: An Alternative Chinese Scientific Reality*. N.Y., Wm Morrow.

271. Mann, F. [1972] *Acupuncture: The Ancient Chinese Art of Healing*. Vintage/Random House. Chen Chiu Hsueh [1981] *Acupuncture: a comprehensive text*. Chicago, Eastland Press.

272. See "Advanced Homeopathic and Acupuncture Theory and Beyond: A Holonomic Approach based on Special Systems Theory and Emergent Meta-systems Theory" by the Author.

273. Coulter, H.L. [1980] *Homeopathic Science and Modern Medicine*. Berkeley, CA, North Atlantic Books. See also Vithoulkas, G [1980] *The Science of Homeopathy*. N.Y. Grove Press.

There is a special science called holonomics that is more sublime than the crude normative models of Western science that applies to living things and social orders and other anomalous phenomena that cannot be dealt with easily with reductionism. Extreme reductionism makes clear the emergent boundaries between different phenomena at different layers of the scale of emergent phenomena. Once we accept this emergence then we can look at the emergent properties of hyper-complex algebras as a guide to the understanding of the strange twists that are introduced as we move up the scale of emergent special systems that dominate dissipative, autopoietic, and reflexive phenomena.

We need to remark that another image of the Autopoietic Special System is the kleinian bottle. In that figure the inherent non-duality of the autopoietic system is captured. An autopoietic system has a boundary. That boundary is closed from one aspect, but from another aspect it is open so as to allow perturbations in from the environment. This openly-closed nature of the Autopoietic system would not make sense if we did not have the kleinian bottle to act as an image of how that kind of dual non-duality might work. The kleinian bottle has a single surface that is both inside and outside at the same time. If we imagine that every Autopoietic System is a kleinian bottle then we can see that closure and openness is meaningless for an autopoietic system because the same surface that is closed is the one that is open and vice versa. The transition between open and closed occurs at the circle of self intersection which is a nexus of ambiguity for the kleinian bottle where it folds through itself. This self-reference is very similar to the kind of self reference we have when we talk about self-production, self-maintaining, etc. This ambiguity is the source of the paradox that lies at the center of the Autopoietic System. It is a formation that is both non-dually dual and paradoxical or ambiguous at the same time. The kleinian bottle is composed of two reversed mobius strips. In that conjunction the edge distinction is lost. This composition of the kleinian bottle out of a pair of mobius strips mirrors the way two complexions are conjoined to form the quaternion or two dissipative systems are brought into an interplay to form the autopoietic system. The kleinian bottle composed of intertwined mobius strips points us to the pentahedron of four dimensional space which simultaneously embodies the surface of the autopoietic system and its hyper-cycle projected in the imaginary space beyond spacetime.

Similarly we need to remark that the soliton that as a physical phenomena describes so well the ultra-efficiency of the dissipative system can be paired with its opposite (the negative soliton) to form the Breather Complex. This standing wave formation allows the negative and positive solitons to fall into each other continuously. This complex is a half way house between the soliton and the instantaton. In the instantaton there is a potential trough that separates the locations of manifestation of the instantatons in space time so that they seem to pop into and out of existence at different spacetime locations without seeming to cross the

intervening distance. A breather does something similar in place where the negative and positive solitons turn into each other continually transforming into their complementary opposite. The conjunction of two solitons into a breather is similar to the constitution of the kleinian bottle out of two mobius strips. These two anomalous structures, one topological and the other physical waves are both images of the same underlying autopoietic possibility in existence that is further defined by the quaternionic algebras.

5. Reflexive Octonionic Special Systems

Autopoietic systems are closed and homeostatic. As models they do not seem to apply very well to social phenomena or psychological phenomena that has the fundamental trait of openness to a world or openness to the self. Therefore, we wish to extend the autopoietic model to include this emergent level of phenomena that goes beyond the simple living/cognitive chiasm and opens out another level of chiasmic interdependence between the social and the psychological. We can think of this in terms of the dual aspects of the unconscious inside and outside the individual²⁷⁴. The unconscious within the individual is well attested in the work of Freud²⁷⁵. The social unconscious is attested in the work of Marx²⁷⁶ and Jung²⁷⁷ in very different ways. At this new emergent level we find that the special systems are not homeostatic but instead what we might call heterodynamic. Plotnitsky calls them “heterogeneously interactive and interactively heterogeneous”²⁷⁸. This brings us to realize that at this level the sharp division between the imaginary hypercycles that control the autopoietic system and the organization of the embodying nodes has been destroyed so that there is a single rhizomatic structure which is variously seen as imaginary and embodying at the same time. This is because the same network of nodes can be seen from different perspectives as inside various individuals and so we recognize it as an essentially substructure that is shared among various individuals of the same socius. Socius is a term introduced by Deleuze and Guattari in Anti-Oedipus and A Thousand Plateaus when they deny the reality of the individual and instead see people as desiring machines (partial objects) embedded in a social context. Castoriadis instead speaks of the Imaginary Institution of Society²⁷⁹ where institution is an active term which produces distinctions in the indistinguishable *magma* that underlies all social discriminations. From this perspective the social and the psychological views of things are merged and fused into a single chiasm. The

274. Lichtman, R. [1982] *The Production of Desire*. Free Press, New York.

275. Freud, S. [1938] *The basic writings of Sigmund Freud*. Selections. Translated and edited by Dr. A. A. Brill. New York, The Modern library.

276. Marx, K. [1975-1998] *Collected Works*. London: Lawrence & Wishart.

277. Jung, K. [1966-1979] *Collected works*., Editors: Sir Herbert Read, Michael Fordham [and] Gerhard Adler. [Princeton, N. J.] Princeton University Press [1966-79; v.1, c1970] 20 v.

278. Plotnitsky, A. *Complementarities*. op.cit.

279. Castoriadis, Cornelius. [1987] *Institution imaginaire de la société*. English. *The Imaginary Institution of Society*. Translated by Kathleen Blamey. Cambridge, UK : Polity Press.

reflexive autopoietic system is the social organism which can be seen as a network of desiring machines in a social context. The individual bodies are merely the carrier of the nodes in this network that together produce the social field. This extremist view shows the meta-systemic viewpoint on the system of the individual. Deleuze and Guattari are taking their extremist stance in opposition to the traditional extreme of identifying people with their bodily individuality as overriding every other influence. A correctly balanced view accepts both the meta-systemic and systemic views as complementary and recognizes that the autopoietic networks that make up the individual organisms are in fact strung together within a social field. This means that a particular desiring machine component may be carried by one individual but used by another within the same social field. This is what makes us complementary and interdependent as social beings. But when we look inside ourselves at our cognitive apparatus we also see that we can model ourselves with the metaphor of the society of the mind.²⁸⁰ Thus, when we look within ourselves we see that the autopoietic nodes must cooperate socially to build a whole living/cognitive organism and when we look at individual organisms in their environment we also see that they must cooperate together to live as socially organized groups. Thus the inside and the outside mirror each other. The social is a mirror of the psychological and vice versa. The reflexive special system embodies this mirroring that was implicitly in the autopoietic network.

The reflexive social system is full of distortions. These distortions are so intense in some places as to become opaque. The mirrors may either be transparent, translucent, reflective or opaque. That opaqueness may either be within or outside the individual. If it is inside then we call it the repressed individual unconscious of Freud. If it is outside we call it the social structural unconscious of Marx. Either unconscious may present intractable constraints on the individuals within society. Reflexivity is embodied in the facticity of our own production together of the constraints within which each of us operate. The inward and outward aspects may be luminous as well as opaque. If luminous we can identify them with the archetypes of Jung which are at least partially social in origin. The individual as a system is caught in the partial meta-system of the socius which appears in turn luminous and opaque beyond what appears possible in the overt and conscious behavior of the individuals themselves. As mentioned by Lichtman, Freud does not imagine the structural unconscious of Marx and Marx does not imagine the interior opacity of consciousness itself that appears as an “it” to itself. Neither imagine the production of social thought inwardly as archetypal dreams and outwardly as archetypal mythology that was discovered by Jung. Buber speaks of the difference between I’-It and I’’-Thou. In each case the I’ or I’’ mean different things. We might identify I’ with the unified ego of Jung where we identify the I’’ with the Self as totality described by Jung. Thus both Freud and Marx’s concept of the It of the unconscious

280. See Minsky *The Society of the Mind* op.cit.

are inherently anti-social while the concept of Self we get from Jung includes both of these in the Self-Thou social relation that we recognize as truly reflexive. In that reflexivity we may ‘swing to the side’ of the other while maintaining ourselves as separate selves. This is a way of describing the symbiosis of the dual autopoietic systems within the reflexive realm. They line up the separate self-intersections so that they become the same circle of self-intersection and when this occurs they become mirror images of each other and enter into the non-dual dual Self-Thou relation of paradoxical ambiguity. We can think of the universe of the desiring machines as complementary to their dual: disseminating machines.²⁸¹ Disseminating machines together through a resonating and socially constructed consensus produce ideology for mutual consumption which simultaneously distorts and hides while it reveals and clarifies. This production of ideology through consensus is based on the ideational process that continuously provides a gloss woven out of logos across the landscape of the unfolding physus. Both logos and physus are socially rooted in the nomos. The ideational gloss of disseminating machines weaves together the desiring machines into a living and intelligent social field at the reflexive emergent level. Disseminating machines are the inverse in the logos of the desiring machines in the physus. They are both called “machines” in the sense of Deleuze and Guattari which say that when we move to the non-dual level of Flesh there is no difference between the mindbody and the machine. This is a radical and reified position. But it is similar to the position taken by the theory of autopoiesis which also sees living things as machines that reproduce themselves. This extreme reductionism changes the meaning of the machine through its nonduality which sees the living and cognitive as fused in the autopoietic machine and which sees machines as embodying desires in the picture painted by Deleuze and Guattari. Both kinds of machines, desiring and disseminating, emanate orthogonally out of the unconscious. Desiring machines emanate from the individual unconscious called (by Deleuze and Guattari) the body without organs. Disseminating machines emanate from the social structural unconscious of Marx as the ideological surplus. We might call this the social body without organs. The term “body without organs” refers to the numinous aspect of the interior unconscious that can range in intensity. We can similarly think of the external structural unconscious of Marx as numinous. In other words the external structural unconscious is not always alienating. For the Entrepreneur taking advantage of structural dislocations it is positively exhilarating. This intensity within the interior or exterior social body without organs may vary in extremes of intensity. But what appears orthogonally out of the external social unconscious are the disseminating machines and they appear out of the physus and are seen as nodes of logos. As a complementary aspect within the individual there are desiring machines appearing out of the inner body without organs as orthogonal emanations that are

281. The concept of Disseminating Machine was proposed by Aiyub Palmer. I have recently realized that there are actually four kinds of machines: Desiring Machines and its dual Repulsive Machines, or Receding Machines, as well as Disseminating Machines and its dual Absorbing Machines. Any combination of these four may make up a reflexive field or socius.

apprehended as appurtenances of physis supplementing the logos that unfolds within the individual. Disseminating machines appearing out of the social unconscious producing ideological glosses, mythos and other justifications and legitimations interact with the desiring machines that appear out of the fragments of the shattered selves producing connections that ‘work’ among themselves even across the boundaries of individuals. Between the Disseminating machines and the Desiring machines there is a tension and a complementarity that defines the boundary of the individual within the social field through the myriad transactions that appear between disseminating machines themselves, desiring machines themselves, and between sets of the two that makes up the social field. Deleuze and Guattari make the same mistakes of the Marxists and Freudians when they do not realize that the unconscious must be bifurcated because it is a meta-system instead of a totality. Detotalization is not enough. Sartre produces a picture of the detotalized totality as an image of the meta-system of the Fighters in the ring which can be thought of as an archetypal conflicted situation between system and anti-system. But the boxers are themselves detotalized. Thus dual detotalization produces two complementary faces of the pratico-inert which Sartre failed to recognize. These were correctly identified as two exclusive unconscious aspects that are interior and exterior to the individual by Lichtman. We can add to this Goleman’s realization²⁸² that the unconscious has two completely different modes. There is the fight-flight response and there is its opposite which allows us to “play dead”. When we realize that the inner unconscious has two modes then we can expect the outer social unconscious to also have bifurcated modalities as well. We see this bifurcation appearing in social theory as the difference between alienation and anomie. Alienation is the self-estrangement where as anomie is the loss of meaning. These are very different phenomena at the social level by which the social environment becomes coercive back toward the individual. Desiring machines must have an inverse outside the individual that might be called disseminating machines. When desiring machines are caught up in trauma they first react to the threat by adrenaline speed up and then by shutdown. When disseminating machines produce trauma it is by the realization of alienation and then anomie, or self-estrangement and then hopelessness. One arises from the structural unconscious and the other from the interior repressed unconscious of the individual. One is a social logos that supplements the economics physis while the other is an individual physis that supplements the interior speech of logos (thought). Desiring machines are dissipative structures that combine to create the homeostasis of the organism. But desiring machines can also connect across the boundaries of organisms to create physiological and logophysical networks. This rhizome of connections that weave together bodies are controlled and shaped by the production of a logos that is supplemental to these connections without *why* that ‘work’. Disseminating machines produce a consensus beyond the individual as a social thought process that

282. Goleman, D. [1985] *Vital Lies, Simple Truths: the psychology of self-deception*. New York: Simon and Schuster.

continually reshapes the rhizomatic connections imposing multiple hierarchies on the rhizomatic autopoietic network graphs. Thus the arborescence that Deleuze and Guattari repudiate finds its natural home in disseminating machines. Sartre calls the primordial social structure a fused group²⁸³ and Canetti calls it a pack²⁸⁴. We will call it a disseminating machine which at once produces warpings in the social fabric and attempts to iron out other warpings. In this way the social fabric becomes a palimpsest in which the social writes itself on the social itself. Disseminating machines working with and against each other create the distortion that inundates the social fabric seemingly from no where that constrain the desiring machines floating within the social field. Imagination and mimicry that are fused within the autopoietic homeostatic living/cognitive special system become divorced within the field of disseminating machine. This is why Dawkins can think of ideas on the model of viruses and call them memes.²⁸⁵ Memes are traveling waves or packets of mimicry interchanged by Disseminating machines. Similarly there is an aspect of the imagination that is independent of the one who imagines which is called the imaginal because it is not projected but appears as if it were autonomous and from the outside of the individual. The archetypes appear as imaginal realities that appear both in myth and dreams as universal numinous beings. True social thought like that which appears in myth link the imaginal and the mimicry. Onur Aam speaks of mimickers instead of desiring machines. This view is possible because desiring machines can resonate within the fields set up by networks of disseminating machines. Desiring machines can set up mimicking behaviors which when combined with imaginative projection gives rise to resonances between individuals through communication between partial objects that makes up their fragmented subjectivities. Disseminating machines can be thought of as autopoietic special systems plus one dissipative special system. Or we can think of them as dissipative systems outside the autopoietic system. In this way we realize that there is a veritable “chemistry” of combinations of the special systems. We may have autopoietic systems with attached dissipative systems. We may have reflexive systems with attached single autopoietic or single dissipative systems. These unbalanced combinations of balanced special systems produce a complex series of possible configurations that are partially balanced and partially imbalanced. That imbalance produces the possibility of dynamism within the special systems as they attempt to compensate for unbalanced molecules of balanced special systems. As with chemistry the combinations of elements produce emergent effects with their own qualitative and quantitative determinants unique and peculiar in each case and discovered only empirically.

The autopoietic network that is inwardly distributed socially cooperating cognitive agents and is externally distributed socially cooperating organisms de-

283. Sartre, J.P. *Critique of Dialectical Reason*. Volumes 1 & 2 op.cit

284. Canetti, E. [1962] *Crowds and Power* London, Gollancz.

285. Dawkins R. [1976] *The Selfish Gene* Oxford: Oxford University Press.

couples the mimicry and imagination shadows of action and perception. Through the imagination we project our world ecstatically beyond our perceptions to pre-order the world within which the perceptions arise. Through mimicry we allow social organisms to reflect each other and build up norms of behavior in which difference can be tolerated and understood in view of an underlying invisible order. But the key is that out of the de-coupling of imagination and mimicry comes the ability of organisms to resonate simultaneously with each other. At the social level the behaviorists who concentrated on stimulus-response missed the primary phenomena of synchronicity recognized by Jung that gives life to the social. Desiring machines do not just float around independently in the field of the socius but instead they form a resonating swarm which allows them to react as if they were a single organism and thus interface with the bodies of the organisms that contain them. The utter lack of this resonance is schizophrenia. So in this we can see that the extremism of the Deleuze and Guattari position which would only look at the schizophrenia of the destroyed social field. Instead we must look at the polyphrenia of cognitive/living creatures that swarm and resonate together as well. In other words we must look at not just the hollowness of existence but its social wholeness as well. Wholeness and Hollowness come from the same root and are opposite sides of the same coin. What we want to do is look at the non-dual middle between these nihilistic images by means of the lens of our new holonomics. The social is resonance of the many such images that they appear as one. This happens internally within the autopoietic network of the organism and externally within the social field of the individual organisms. In fact, the psychological and social are merely mirrors of each other. Psychological imbalances merely mirror distortions in the social field externally and vice versa.

When we think of the reflexive autopoietic special system it is clear that what occurs at this level is that the organization and structural elements of the autopoietic system dissociate. In the autopoietic system the homeostatic feedback loops could either work against each other producing structure or merely effect each other producing flexible organization. At the reflexive level positive feed back loops are added to the mixture that cause divergences from balance. These divergences take us to the edge of chaos. The positive feedback loops may lead either to out of bounds increase or decrease. They must be compensated for by the organizational feedback loops which are no longer merely free to provide flexibility. Instead they must provide counter balance for the positive feedback loops that are added to the autopoietic system at the reflexive level. If too much positive feedback is added either for increase or decrease of some variable then the reflexive autopoietic system self-destructs. But if less positive feedback is added than the limit that can be contained by the organization of the autopoietic system then it can function very far from balance without losing its internal meta-stability. Thus the reflexive autopoietic system can be seen as continuously projecting beyond itself and overflowing itself due to the positive feedback loops within it, yet it does not disintegrate because it

does not allow any of the positive feedback loops full reign and compensates for their run away behavior through the in-built organizational flexibility that was only used to re-balance things in the autopoietic system. In the reflexive system the edge far from equilibrium is always pushed to the limit and seems to continually over-spill that limit, yet the special system continually recovers by transforming itself internally into something new to compensate for the utter transformation of its environment via its own projection of a world upon that environment. The reflexive autopoietic system is continually transforming itself essentially into something different. Thus the autopoietic reflexive system is continually undergoing spurts of emergence. G.H. Mead in The Philosophy of the Present²⁸⁶ defines the *social as emergence*. That is to say the social has the unique capability of being able to generate and sustain utter transformation of its essence and the essence of its environment in order to be able to support operation very far from equilibrium. Just as the whole edifice is about to collapse it turns into something else which is essentially different that can sustain that imbalance and turns it into a new kind of balance at a different emergent level. The reason that this is the last level of the emergence of special systems is that it is with the reflexive autopoietic special system that emergence appears. With the appearance of emergence there are endless emergences which continually transform all the levels of the tradition: facts, theories, paradigms, epistemes, ontos, existence and the absolute.

Our worldview can be seen as being formed on this model. The worldview projects the illusory continuity of the aspects of Being called presence, truth, reality and identity upon existence as a process of showing and hiding. But at the point where the timestreams first split to produce the imaginary which is opposed to the mimicking repetition of the structural underpinnings of form there is a projection of extreme reduction on the physus which via Western scientific approaches gives us the emergent levels of ontos, i.e. that which defies extreme reduction and is recognized as *sui generis* levels of phenomena externally to the social community of scientists. One recognized set of ontic emergent levels might be: sub-quark, quark, fundamental particle, atom, molecule, macro-molecule, proto-cell, living/cognitive cell, multi-cell, organ, organism, society. Notice that the last possible emergent level in the series is the social. To produce a social phenomenology we invert this ontic hierarchy and say that all the other levels arise out of the social. In other words, we can recognize emergent phenomena in other spheres because the reflexive social ontic level produces emergence as part of the self-transformation effected within itself. But this production of ontic emergent levels in the physus is mirrored by the production of ontological emergent levels that reflect in the mirror of the logos. The dissipation of reductive projection appears at the next algebraic level up as the autopoietic ring of ontological emergent levels already described as revolving from

286. Mead, George Herbert.[1932] *The philosophy of the present*, by George Herbert Mead; edited by Arthur E. Murphy, with prefatory remarks by John Dewey. Chicago, London, Open Court Publishing Co.

the pluriverse to the facet. These are formed by a conjunctive combination of any two adjacent levels that bound any particular level. So for instance, Form gives us figure while the meta-system gives us the background to produce a gestalt which conjuncts figure and background to form a picture of the system. This formation moves up the series of ontological emergent levels and at its top (pluriverse) connects to the bottom (facet) of the hierarchy to form an autopoietic ring. Finally at the reflexive level two other series of emergent levels appear which interweave to social cultural levels of emergent change with the individual thresholds of comprehension. Thus at the final level of the worldview we get a split and interleaved structure with the following form.

Figure 40: Twin hierarchies at the reflexive level

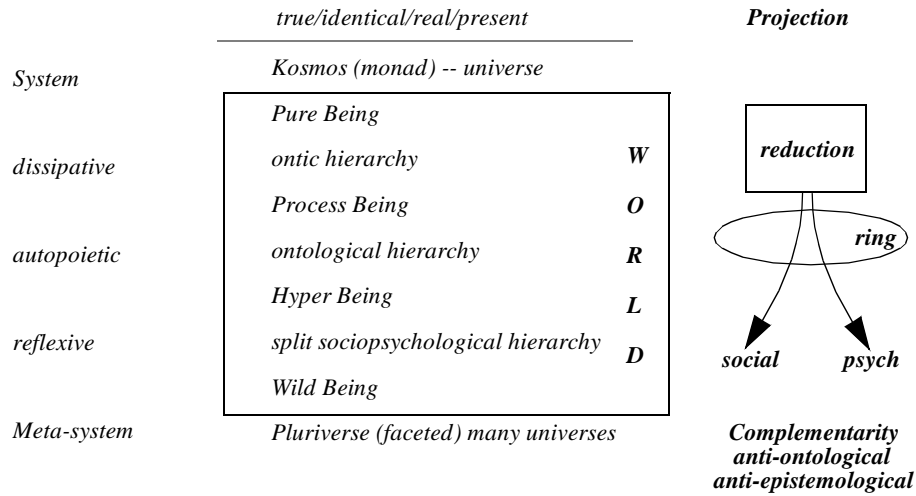
absolute (sociological)
 INSIGHT (*STAYING*) (psychological)
 existence (sociological)
 REALIZATON (*GNOSIS*) (psychological)
 ontos (sociological)
 WISDOM (psychological)
 episteme (sociological)
 KNOWLEDGE (psychological)
 paradigm (sociological)
 INFORMATION (psychological)
 theory (sociological)
 DATA (psychological)
 facticity (sociological)
 GIVEN (psychological)
 thusness, suchness, thatness (sociological)

The upper levels of this hierarchy from the psychological perspective are taken from Shaykh al-Naffari²⁸⁷ who identifies realization, or “staying,” as a station beyond insight, or “gnosis.” Sidi Ali al-Jamal calls it “Fixity by Change”.²⁸⁸ Thus, the world has the inner structure built upon the pattern of special systems that appears as this series of hierarchies. These are interspersed with the Kinds of Being to form a structure that moves from the system of the Kosmos (monad) to the meta-system of the pluriverse (facet).

287. Shaykh Naffari [1978] *The Mawaqif and Mukhatabat*. Translated by A.J. Arberry. London, Luzak and Co. Shaykh Naffari distinguishes Knowledge, by which he means what I am calling Wisdom, Gnosis and Staying as the fundamental levels of information beyond what is called Knowledge in this hierarchy.

288. Shaykh Ali al-Jamal [1976] *The Meaning of Man*. Darqawi Press, Norwich UK, page 72

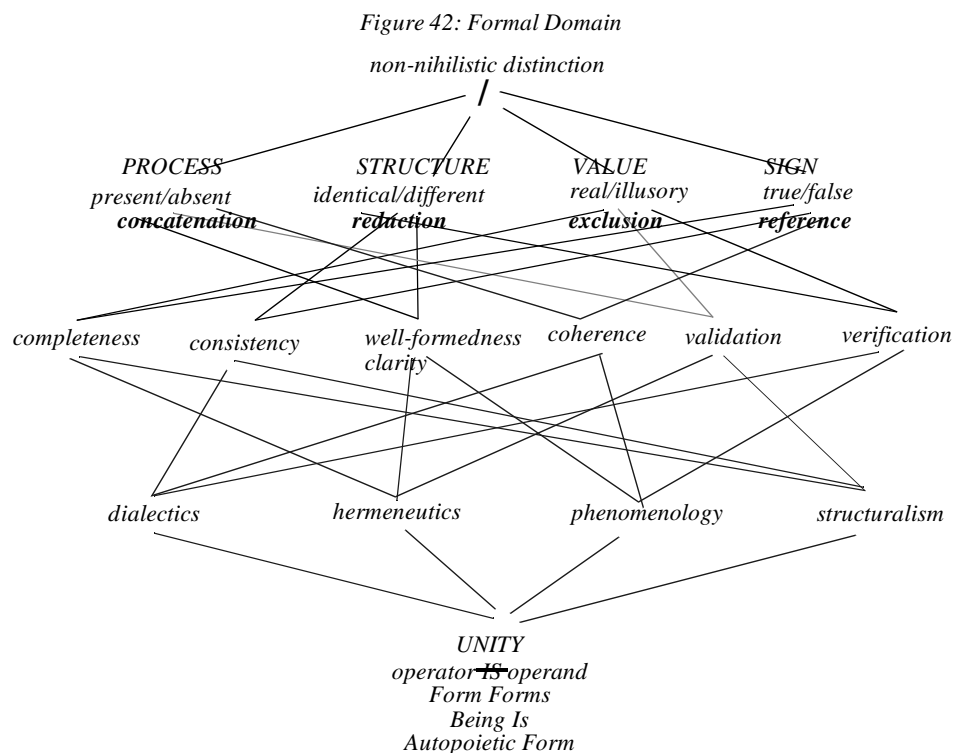
Figure 41: World Pattern



This formulation of the structure of the world gives us for the first time a clear idea of the internal differentiation of what Heidegger calls the fourfold of Heaven, Earth, Mortal and Immortal. In The Fragmentation of Being and the Path Beyond the Void²⁸⁹ we discover the opposite feminine metaphysical principle articulated by Aristophanes in the Birds composed of Chaos, Night, Covering, and Abyss which we must invert to get another picture of the fourfold: Order, Light, Uncovering, and Grounding which are related to the male in the cultural mythology of the Greeks. Heidegger tells us that the Positive fourfold engages in mutual mirroring. When we think deeply about the negative fourfold we realize that it is a negative image of the four non-duals, i.e. Order, Right, Good and Fate. Order is the opposite of Chaos, Uncovering which is the opposite of Covering gives us the Beauty of Right, i.e. manifest cosmic harmony. Grounding which is the opposite of the Abyss gives us access to the Good which is the source of the endless variety production in creation. Fate which appears as Light in the day which is the opposite of night. Fate is represented as a rainbow both in Plato's myth of Er and also in the Covenant between God and the survivors of the flood. That mirroring we discover to be the unfolding mirrors of the imaginary algebras. Out of the singularity of the Real we get an orthogonal imaginary mirror. These two mirrors reflect each other to produce the fractal distortion or interference pattern of the Mandelbrot set. Three mirrors give us the algebra of the hyper-complex quaternions as discovered by Onar Aam. Building on his inspiration I posited that an inwardly mirroring tetrahedron should produce the octonion hyper-complex algebras. There are no higher dimensional simple reflective configurations. Thus the series of hyper-complex algebras come to an end and beyond that are the infinite non-division algebras of which the sedenion is the primary example because it is produced by the Cayley-Dickson procedure as the first

289. (manuscript, see <http://dialog.net:85/homepage/fbpath.htm>)

non-division algebra beyond the octonion algebra. Beyond the inwardly mirroring tetrahedron of the octonionic reflexive level there are only infinite recursive fragmented mirrors. The octonionic inwardly mirrored tetrahedron is the mathematico-optical image of the fourfold. The reflexivity²⁹⁰ of the social appears as what Onar Aam calls the tetrahedral Mirrorhouse in which the rays of light are completely trapped in a closed algebraically defined chamber. The world unfolds into this mirrorhouse of the fourfold first articulated by Socrates. Heidegger's intuitive understanding of this strange structure of the world of mutual mirroring has now been underwritten by a mathematical model which sets up analogies for the transition between systems and meta-systems that reveal the special systems as layers of difference that separate the kinds of Being that synergistically produced the synthesis of the world.

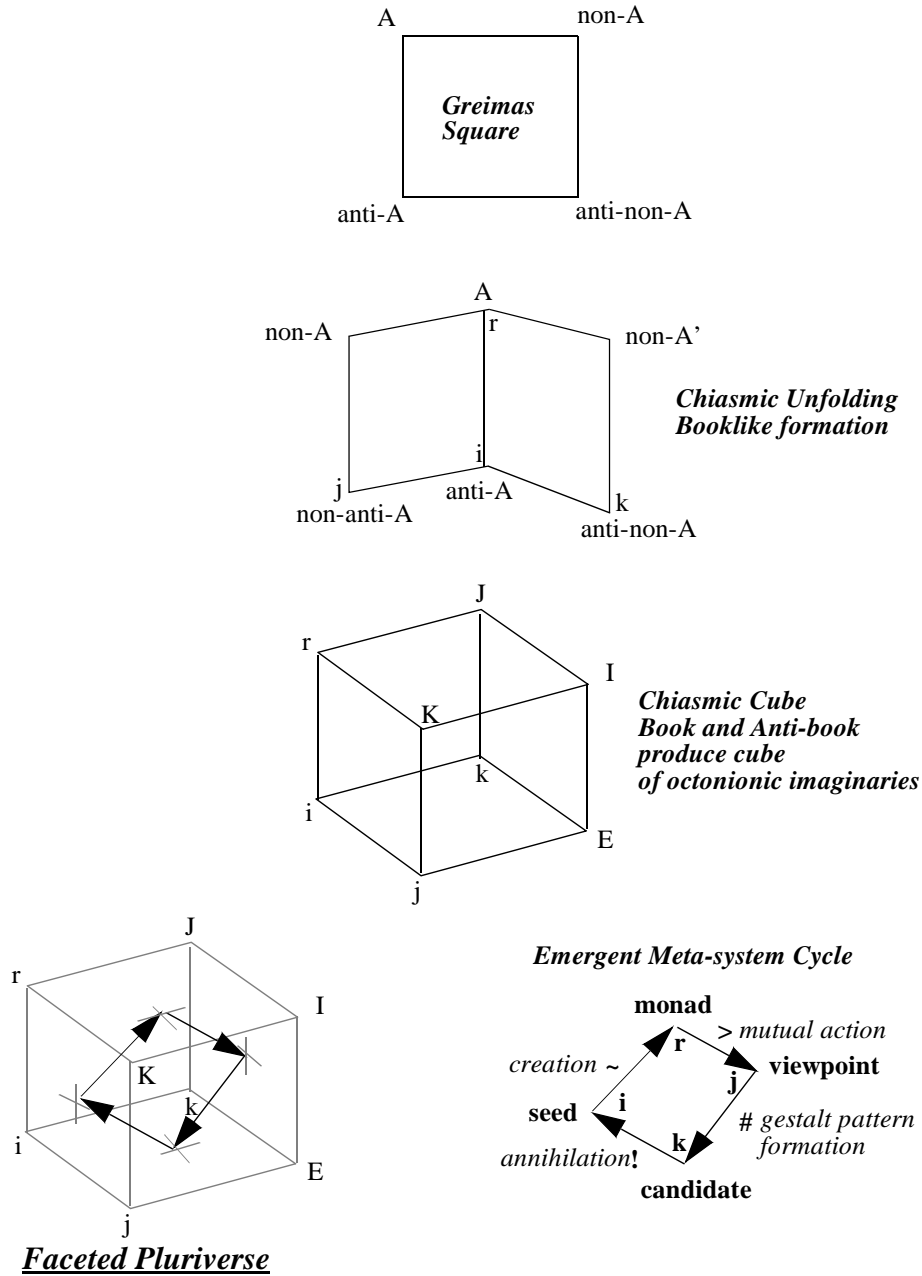


We see the world as embedded in a series of conjunctions between the opposite layers of the ontological ring centered around the special system. The Kosmic Monad is the image of the Emergent Meta-system which is the archetype on the edge between form and no form. The World Pattern appears as the layers of the kinds of Being that are interspersed with the special system structures. The Formal Domain is composed of a lattice that begins with the non-nihilistic distinction and separates into the four aspects of Being, i.e. real, identical, true, and present. The combination of these give us the six fundamental properties of every formal system

290. Sandywell, B. et. al. [1975] *Problems of Reflexivity and Dialectics in Sociological Inquiry: Language, Theorizing, Difference*. London, Routledge Kegan Paul.

which are completeness, consistency, well-formedness, verification, validation and coherence. These properties combine again to give us the four fundamental disciplines of hermeneutics, structuralism, dialectics and phenomenology. These four combine again to give us Unity in which the operator is the operand, or where the noun is the verb as in the statements 'BEing IS' or 'Form Forms.' The Faceted Pluriverse is produced by the unfolding of Greimas' square into the chiasmic cube. This occurs by recognizing the difference between the 'anti-non' and the 'non-anti' reversible pairs. This allows the book of the unfolded Greimas square to be contrast with the anti-book which gives us the Chiasmic cube made up of two complementary unfolded Greimas squares. This cube becomes the inwardly mirrored cube on which the EMS cycle reflects. The Faceted Pluriverse is a chiasmic non-dual substrate beyond all the dualities which can support the mirrored reflection of the EMS formation. It turns out that every platonic solid has a single path that traverses and bounces off all its surfaces to return to the same side going in the same direction. This path is the unique path of the EMS cycle in the various platonic solids. This means that there is a family of such cycles. These paths are found by stacking the solids to find a path that is straight through all the centers. This stacking of each platonic solid shows us the pluriverse that appears infolded as chiasmic facets within it.

Figure 43: Chiasmic cube unfolds from Greimas square that supports EMS cycle



When organization de-couples from structure and the organization takes on the character of periodic emergence at various levels of cognitive organization, then there appear invariants within the world or the cognitive field that would not be visible otherwise. Consider that the reflexive system adds in positive feedback loops that are compensated by the organization of the special system. These positive feedback systems allow variables to run wild and be varied randomly to test their extremes. The whole system compensates for these extreme variations by

transforming it from one plane to another within the organization within the special system. But this allows the special system to explore the external constraints on its internal adaptive behavior. Emergences always take place by finding a niche of special organization within a broader set of constraints. Through the addition of compensated positive feedback the organism is able to explore the general constraints of its internal and external environments and find the niches that can be exploited by the creation of emergent properties that exploit that organizational niche. When it inhabits that organizational niche we say that an emergent event has occurred. But the emergent event was prepared for by the creation of mutant attributes that were then varied wildly with positive feedback until an organizational possibility hitherto undetected is found and exploited by the continued variation of that attribute and associated attributes that allow the cognitive/living system to change itself essentially to take advantage of those organizational niches. When this happens externally to the species of embodied individuals we call it evolution, i.e. it does simulated annealing. When it happens internally within the cognitive space we call it creativity. In either case, what the cognitive/living creature is doing is unmasking invisible invariants and making them visible by taking advantage of them. This unmasking of constraints that are invisible at the social level we call science. At the individual level we call it the exploration of the unconscious cognitive infrastructure. Either way what is occurring is that invisible things are becoming manifest as the living/cognitive creature transforms itself utterly to respond to these invisible invariants that organize the social field. So, for instance, electromagnetism was invisible until various phenomena that displayed it were organized by a theory. At first that theory separated electricity from magnetism but later a paradigm shift occurred that made theorists realize that these two very different phenomena were two complementary sides of the same thing and they could intertransform. Thus, an invisible invariant of our universe, a fundamental force, was made visible and then was able to be put to use to transform the world in many ways by harnessing electromagnetism. Electromagnetism itself is invisible, and only its effects are seen. But by putting all these various phenomena together into a cogent theory we are able to see this invisible force creating a myriad of phenomena in our world which leads to the invention of many devices that harness that force. Thus social cognitive/living creatures have the ability to disclose invisible features of their environment through the transformation of themselves and their environments in essential ways. This is why Plotnitsky uses the phrase “heterogeneously interactive and interactively heterogeneous.” It implies that the many heterodynamic features of the reflexive system interact to produce an essential expansion of heterogeneity and this new expanded heterogeneity interacts with what was there before to throw it into an hitherto unimaginable future which causes it to rewrite the past. The heterogeneity is self interacting and self spawning. It is the essential variety production²⁹¹ of the heterodynamic system that informs all living

291. Beer, S. [1979] *The Heart of Enterprise*. NY, John Wiley.

things. And the variety is constantly changing as new kinds of things are constantly being produced which continually changes the context within which each other kind is viewed and its significance, relevance, value and aesthetic charm is measured.

So where a system is a gestalt, or showing and hiding structure, and a meta-system is a structure that continually hides something that it does not disclose, so too the reflexive autopoietic dissipative special system is a disclosive structure. It discloses invariants that have always been there, but were “unthought,” by changing the rules of the game in spurts, so that the entire space of possible rules is explored. It does not show everything, nor does it completely hide anything, instead it strikes a balance in which it shows something, but hides something else, by itself transforming itself. What it hides is the world it used to project, and what it shows is the new world it is now projecting. But, in fact, everything appears to be still visible, but seen from a completely different viewpoint that elucidates it, and reveals the hidden invariants that lurked under the surface of phenomena. The social gives a special power to the cognitive apparatus of the living creature that it would not have on its own. That is the power to see invisible things that are constraints on its possible orderings. Because the social autopoietic special system can learn, and adapt flexibly to its environment, and, in fact, change both itself and its environment essentially, producing genuinely new kinds, it is able to create knowledge which is the most persistent thing, and which summarizes the invisible invariants, laid bare within the complete flux of an impermanent world. As Durkheim so insightfully remarked, Kant’s Categories are social. That means more generally that whatever our categories, or highest level concepts, they are socially constructed in the process of our own essential transformation, as we explore all the possibilities within the organizational constraints of our world. An excellent example of social categories are those formulated by Ingvar Johansson in Ontological Investigations²⁹².

The next level of conjunction beyond the quaternion is the octonion. The octonion is composed of seven imaginary variables that define timestreams and a single real variable. These are different kinds of numbers that only appear different from each other in conjunction. While it was Hamilton that discovered quaternions, it was Graves that went on to discover Octonions (or octaves). While quaternions are well explored in the mathematical literature, not so much work has been done on octonions and their associated algebra. At the level of octonions the organization of our reflexive autopoietic dissipative special systems find their analogy. Reflexive level special systems are simultaneously four dissipative systems, two autopoietic systems and one reflexive system. The two quaternionic autopoietic systems are locked together into a marriage in which they are mutually compensating or forming a symbiotic relationship. The emergent properties of the octonion appear when the

292. Johansson, Ingvar. [1989] *Ontological investigations : an inquiry into the categories of nature, man, and society*. London ; New York : Routledge.

broken symmetry of one real to seven imaginaries is produced instead of two quaternions vectors. We can see that the dissipative systems are the model of the desiring machines level, and the autopoietic organisms are the embodiment at the level of the individual, while the reflexive system embodies the social field (socius) itself. Thus, each level of reality of organization within and outside the autopoietic individual has a form of ultra-efficacious organization. The symbol of this ultra-efficacious organization at the reflexive level is symbiosis among organisms, or marriage contract, which is a non-nihilistic social form of organization that gives the basis of the formation of the partial meta-system called the household within the city. The adumbration of invisible constraints leads to the establishment of non-nihilistic distinctions within society. Within the reflexive level partial meta-systems are created as the mode of organization. These partial meta-systems, or deconstructed systems, function as holons standing between the complementary meta-systemic and systematic views of phenomena. Our model of partial meta-systems, or deconstructed systems is the holon that allows us to see something as either part or whole depending on our perspective. The octonion formation gives a mathematical analogy for this structure that is half way between system and meta-system without being either. This is to say, that at the reflexive level there is a grounded representation for the holon as simultaneously a partial meta-system and a deconstructed system. It is a meta-system in that it appears as a field containing four dissipative systems distributed among two autopoietic individual organisms. The field is reflexive and the two dissipative systems are sub-components of the individuals involved in the field. But the fact that we can see the organisms as symbiotic allows us to see that the dissipative systems that make them up can actually interact between them, instead of just within the individuals. Thus when there are four dissipative systems present within the field there is created a possibility of six virtual autopoietic systems that cross the boundaries of the autopoietic organism. At the reflexive system level this leads to the possibility of fifteen different virtual reflexive systems made out of the pairwise combination of the six virtual autopoietic systems. We know that there are 480 different representations of the octonions so this means that each virtual reflexive system is composed of at least eight minimal systems of elements if all the possible worlds are to be represented instead of merely the one being projected at the moment. We will call the simultaneous embodiment of all the different possible virtual octonion representations the Pluriverse and will reserve for the Universe the particular embodied representational configuration that is being existentially embodied, or actualized, by the social cohort at any one time. The possible universes interact and form the ground of the current universe.

In fact, this is an interpretation of quantum phenomena. As David Deutsch remarks, it is possible to resolve the problem of the impact of the observer on observations in quantum physics, if we instead consider that whenever quantum indeterminateness occurs, then we are witnessing the overdetermination of the

phenomena by multiple universes in the pluriverse. These two models are complementary opposites of each other. One projects depth within the observer and the other projects depth outside the universe to account for the undecidability and indistinguishability within the universe. Either way the universe is not allowed to be a system that is rigorously complete and consistent but instead it can also be viewed as an incomplete and inconsistent meta-system. Either the observers have depth that disturbs observations of this indeterminateness, or other universes from the pluriverse are disturbing it. Both answers are unacceptable. One leads to the intrusion of the world of logos into the realm of physis which has carefully isolated itself from contamination by subjective consciousness. The other leads to the postulation of innumerable universes being created in any moment by all the quantum events that are decided. But instead of these two scenarios that are nihilistic opposites we can instead realize that there is a grounded balanced alternative to them. That alternative is that there exists a reflexive autopoietic dissipative special system that allows the observers to become symbiotic and allows them to project a single world together through mutual resonance. Thus, the creation of the myriad universes of many worlds theory does not take into account the annihilation of these universes. A continual process of creation and annihilation of universes is taking place as part of the social construction of the lived shared world which we project together.

Ben Goertzel describes this process in terms of his 'Magicians' model of chaotic processes. In that model there is a swarm of social organisms called 'Magicians' (autopoietic systems that make up a reflexive structure). They are called 'Magicians' because like the sorcerer's apprentice they pop into and out of existence according to the socially expressed need by the entire group for them to exist. The 'Magicians' mutually interact with each other forming gestalt patterns. One of the patterns is their own organization so they are autopoietic. Then, on the basis of their interaction they nominate which set of 'Magicians' should continue to exist in the next living timespan of the swarm. They vote by annihilating each others nominations till the nominees that remain are the candidates for the next embodiment of the swarm. This formalism assumes discontinuity instead of continuity. It allows us to switch between a system and meta-system view of the swarm by adding discontinuities between the life spans of individual incarnations of the swarm. In other words if none of the members of the swarm exist across the discontinuity between life-cycles of the swarm then there is a meta-system rather than a system. Goertzel's 'Magician' formalism can be used to understand how reflexive special systems solve the problem of the continual resolution of the world from the pluriverse by social interaction. What happens is that in this model the four beginning dissipative systems within the social reflexive field can be seen as a 'Magician' system. These dissipative systems project a shadow of virtual autopoietic systems that transcends their actual embodiment. This explains why we seem to be different people in different social situations yet are able to have enough continuity

to be seen as having a unified personality. From these virtual autopoietic systems that are like a ghost haunting the actual embodiment of the organisms which contain their own dissipative systems, we get a host of virtual organisms that represent the other possibilities that are not embodied. This host of virtual organisms (fictitious persons) project a penumbra of all the possible worlds that could be embodied as a background against which the actually embodied world is seen. So we imagine as a shadow to our perception of the designated as real world all the other possible worlds. And we mimic as a shadow to our actions in the designated as real world all the actions of the other possible fictitious organisms. The projection of the real world takes place on the background of the possible worlds. That projection is a social project. What happens is the virtual organisms and the virtual worlds in which they live are nominated as possibilities and then annihilated in order to see what organisms will be left in the next instant in what projected and designated as real world. So the many universes are constantly being created, but then annihilated again, to create the designated as real universe that is socially constructed and agreed upon by the embodied cohort²⁹³. This social construction includes the mutual action between desiring machines and the gestalt formations including their own organization. That continual projection and annihilation results in a pervasive phenomena of emergence (the creation of new kinds and varieties) which is the hallmark of the social. So many worlds are created and many worlds are annihilated in the chiasm of mutual action and gestalt formation that gives us the world as a universe (i.e. a socially agreed upon and enforced construction). The observers of that world are not just reactive and passive. They are instead projecting the world in resonance with each other. They are not just reacting to stimuli but actually acting in harmony simultaneously together to create and affirm their mutual world. The symbiosis, or marriage, of the subjects within the world via the special system formation takes them from being passive observers to being proactive participants in their world that they are simultaneously living in and projecting. Thus, there is a social phenomenology in which the relation between individuals is more important than the individuals themselves.

Heidegger's 'dasein' is a social group of dissipative reflexive systems which is not just "with" (mitsein), but instead are actively interacting to create the world through "heterogeneous interactivity and interactive heterogeneousness." They are participating through each other in the mutual creation of the world such that it is a meta-hologram which we call the proto-gestalt that is not just holographic in its contents but in the viewpoints on that content. This is to say that it is the very model of interpenetration and can be viewed logically as a hyper-set²⁹⁴. This means in this special logic a set can be a mediated member of itself as well. In fact, there is a hyper-power set in which each member of the set contains the whole set each of which is a

293. See Desan W. [1972] *Planetary Man* New York, Macmillan.

294. See Aczel *Non-Well-Founded Sets* op.cit.

member of itself. In the view of the world grounded in special systems it is not the observers that contaminate observations of quantum phenomena nor is it that there are infinite universes in the pluriverse that interfere to cause the same effect. Instead there is the social creation of a finite number of possible universes that continually cancel within the pluriverse to yield the designated as real universe, that is socially constructed by active participants that are symbiotically linked via systematic forms that are analogous to the algebras of the octonions. Physus and logos are at their origin non-dual. That means that beyond the duality of physus and logos there is the non-dual realm in which they are the same thing. That realm has its own nomos or order which is mirrored in the two horns of the duality. The worlds and its inhabitants are all non-dual in their perception, actions and thoughts as Loy tells us in Nonduality.²⁹⁵ Unless we can understand discontinuous processes such as that Goertzel posits with his ‘Magicians’ formalism then we cannot approach the nonduality which underlies phenomena. We glimpse the non-duality when we project chiasms such as those spoken of by John S. Hans in The Play of the World.²⁹⁶ This vision of Hans is a much more even handed exposition of the non-dualistic philosophy than that given by Deleuze and Guttari. Where they reduce humans to machines and claim that there is no difference at the level of desiring machines, Hans, on the other hand, shows that it is the Play of the world which allows those machines to become humanized. In the world there is an essential play --latitude -- within the existing constraints that can be explored and occasionally this exploration leads to emergent phenomena. That phenomenon allows us to, occasionally change our essence in spurts, and open up new vistas on the world. In this view the ghost is not “in the machine” but is in fact outside of the machine on the surface between system and meta-system. The ghost is the shadow of the meta-system that plays across the entire environment exploring all its possibilities for ordering, until an essentially new possibility is found and then it inhabits that niche by creating a new kind of ordering that extends our Being in radically new ways, and also transforms our environment into something completely different. This exploration can occur because we are heterodynamic -- thrown outside our selves together -- and because we actually organize on the form of the special systems with specific structures at the dissipative, autopoietic, and reflexive levels that interact in conjunction. They do not fuse into one, and they do not fall apart completely, because they are ultra-efficacious in conjunction. They have a reality, or an identity or a truth or a presence, on all three levels simultaneously. Psychologically consciousness as described by phenomenologists such as Gurwitsch²⁹⁷ is seen to be ultra-efficacious while the social ultra-efficiency seems to be love²⁹⁸. The desiring machines explore the possibilities of virtual organisms, the organisms explore the possibilities of virtual worlds, and the world continually collapses these worlds into a single socially

295. Loy, D. *Nonduality*. op.cit

296. Hans, J.S. [1981] *The Play of the World*. Amherst: University of Massachusetts Press.

297. See Aron Gurwitsch [1964] *The Field of Consciousness*. Pittsburgh, Duquesne University Press.

298. See Sadler *Existence and Love* op.cit.

constructed and embodied world through the annihilation of the possible worlds and the possible organisms of the nominated set to bridge the discontinuity into the next life-cycle of the swarm.

At this level one of the important algebraic properties is lost: associativeness. We lost the commutative property at the quaternion algebraic level and now we lose another fundamental algebraic property which in turn gives these reflexive systems their special characteristics. Loss of algebraic properties drives the manifestation of the characteristics of each emergent level of the special systems. When we lost the commutative property mutual action appeared as the special property of these systems. Now, when we lose the associative property, we see the social aspects of these systems emerge and become prominent in their manifestation. When you cannot easily reverse actions but must take circuitous routes back to a state prior to some simple action, then actions become prominent in the analysis of systems without the commutative property. Likewise, when you cannot reverse associations at will, then those associations become very important characteristics of the special systems under study. Different associations have different organizational properties that are unique, they do not vanish under symmetry operations in this algebraic system. So we realize that the highest possible alternating division algebra (the octonions, as there is no other alternating division algebra beyond it) emphasizes the social properties of systems. What is the social, but the relations of association between autopoietic systems? So we find that octonion systems have very special emergent characteristics due to the loss of a vital algebraic property. And those special characteristic are social. As G.H. Mead has shown us the social is defined by the presence of emergence and the ability of the social to cope with emergences. Once the ability to respond to and generate emergences has appeared, then there is the possibility for the generation of endless variety of emergent levels and phenomena. So our definition of the special systems end where the endless sea of variety due to the actualization of emergence begins. Note that the highest ontic level is the social which flows from the highest algebraic special system level. Thus, the ontic levels of physus unfolds directly from the field theory underlying the social construction of the world, not the other way around.

The meta-systemic operation at this level is pattern formation. Pattern formation appears in the association of elements within a gestalt or its dual the flow. But here the pattern is the pattern of the pattern-er. That is to say, the autopoietic system which organizes itself can take on many patterns which it actualizes as new patterns constantly emerge within it. At the reflexive level there is a meta-patterning organization that is the source of a myriad of patterns that are actualized. We have already mentioned the 'Magician' systems of Ben Goertzel. In those systems there are operators that correspond to each of the levels of special system organization. The first operator is the annihilation operator. It is the dual of the creation operator that emerges from the real algebra that produces systems on the background of

complete ordering. When the imaginary numbers arise it is a dual numbering system that can annihilate with the real numbers if the conjunction that holds them together yet apart is broken. Then the mutual action operator of ‘Magician’ Self-Generating Systems arises when the commutative property is lost and actions cannot be merely reversed to get back to the original state. This is a symmetry breaking at the level of behavior of the system. This symmetry breaking occurs based on the prior symmetry breaking that gives annihilation and creation as opposite fundamental operations upon the field of illusory continuity (the real number timestream). A further symmetry breaking occurs as we move from the level of quaternion to the level of octonion algebras and their associated special systems. At that level associations are no longer symmetrical and so social relations become important. At that level too we can create unique patterns within the same gestalt or flow formation. What we quickly realize is that what has mutual actions form together a single pattern as well. So by the mutual actions we are creating the organization of the patterning. This is the very definition of the autopoietic system, but raised to another level at which the system is patterning itself ever anew through cooperative action. At the reflexive level it is the cooperation and communication between the nodes of the autopoietic network that is emphasized. The network is no longer seen just in the context of a single organism but is seen in the context of the systems of related organisms that together inform each other’s organization. For that to occur each organism must go beyond itself and project the organization of it’s other. The self and the other then mirror each other. This mutual mirroring based on mutual action is Reflexion. In a reflex something reacts back on itself. In this case it reacts back on itself via the mirroring of the other in it and it in the other at the level of Self-Thou rather than ego-it as Buber tells us. Autopoietic networks whether in organisms, or between organisms, must be social in nature. The inward and outward reflexive nodes mirror each other so the social and psychological become chiasmic duals at this level of organization. John O’Malley talks about the nature of reflexivity in The Sociology of Meaning. Barry Sandywell also talks about reflexivity in relation to reflection²⁹⁹ and prereflective memesis³⁰⁰ in his series of Logological Inverstigations³⁰¹.

299. It should be noted that the way Barry Sandywell uses the term reflection and the way it is used in this paper are not the same. His use of reflection is similar to my use of autopoiesis. My use of reflection means the stopping of thought at its limits which gives access to the supra-rational.

300. We can see a parallet between the terminology of Barry Sandywell and the terminology developed here:

non-reflective = normal open or closed system

pre-reflective = dissipative special system

reflective = autopoietic special system

reflexive = reflexive special system

[no term] = meta-system

301. Barry Sandywell [1996] Reflexivity and the Crisis of Western Reason : Logological Investigations (Logological Investigations, Vol 1), Routledge UK See also The Beginnings of European Theorizing : Reflexivity in the Archaic Age : Logological Investigations (Logical Investigations, Vol 2); Presocratic Reflexivity : The Construction of Philosophical Discourse C. 600-450 Bc (Logological Investigations, Vol 3)

The reflexive system is a chiasm of social/psychic properties. The social ~~is~~ the psychological and vice versa. Here the strike out of the ~~is~~ indicates DifferAnce in the sense of Derrida which means the reflection in the mirror is distorted by differing and deferring. The mirroring at the reflexive level is distorted and that distortion is what allows social entities to be the same yet different. This distortion appears as the effects of the loss of the associative property within the octonion algebra. It produces similitude as multiple associations can be very similar yet still be different as one attempts to reverse, via chains of associations, another association that has no symmetrical opposite. This produces endless variety in the mirroring similar to the endless variety at the level of actions produced by the loss of the commutative property. This is also what gives the social and the psychological sciences their uniqueness. In both sciences context is everything. The sets of associations between elements determines their unique characteristics and produces emergent effects that cannot be simply mapped from one individual or social situation to the next. The social and the psychological are two sides of the same coin. Social relations produce differing psychological responses and the chemistry of particular people will produce a particular unique quality to social relations. The uniqueness of one generates the uniqueness of the other and vice versa in an indefinite mirroring that just does not appear at the simply autopoietic level of the organism considered alone. The distortion in the mirroring relates to Hyper Being or DifferAnce or what Heidegger calls “appropriation” which “IT gives”. But the mirroring itself exemplifies Wild Being which Heidegger calls the Fourfold of Heaven/Earth//Mortal/Immortal following Socrates or Physis/Logos//Apeiron/Peiron. The mirroring between the elements of the fourfold gives us an image of the inwardly mirroring tetrahedron which produces octonion like relations between images. What lies at the center of the fourfold is the point of existence or emptiness which is represented by the hollow space between the distant mirrors of the inwardly mirroring tetrahedron. Thus Hyper Being and Wild Being are related to each other as the distortions in the mirroring are related to the mirroring itself. They are duals that belong together and are ultimately the same.

It needs to be mentioned that just as the octonion appears from the conjunction of two quaternions, so too we can see how the hyper-kleinian bottle may form from the conjunction of two kleinian bottles. Constructively we get a mobius strip by taking a figure eight (8) cross sectioned double tube and twist it 360 degrees and then join the ends. Similarly we get a kleinian bottle by taking the same tube and only twisting it 180 degrees before joining the ends. If we want to conjunct two kleinian bottles we cannot do that by daisy chaining them because odd numbers of them are merely kleinian bottles and even numbers are two sided. To conjunct two kleinian bottles the obvious way to do so is to intersect them at the circle of their self intersection. This can be done if we take a four leaf clover shaped tube and twist it 180 degrees. If we twist it 360 degrees we get instead a pair of conjuncted mobius strips which appears as the pentahedron in four dimensional space. The conjuncted

pair of kleinian bottles is defined as a hyper-kleinian bottle. It is ambiguous when one passes through the circle of ambiguity whether one has entered the other kleinian surface or is still within the same kleinian surface. Thus it is unclear whether the hyper-kleinian bottle is one or two bottles. At the level of the hyper-kleinian bottle we achieve complete ambiguity or paradoxicality. This same figure can be seen to exist in four dimensional space. Each kleinian bottle would exist in a four dimensional subspace separated by a three dimensional hyper-plane. In the hyper-plane there would be a *sphere of ambiguity* that occurs when the two circles of self-intersection are allowed to rotate with respect to each other as they would do in a hyper-sphere. A hyper-sphere is composed of two orthogonal circles (x,y) (z,w) that move independently. This is why the hyper-sphere has the same volume as the torus which also melds two circles but in three dimensional space. The hyper-sphere is made up of an infinite number of spheres. We can see this when we think of the infinite number of spheres in the torus where each planar cross-section defines the circle of a sphere. Hyper-space has *ana* and *kata* directions according to Rudy Rucker. Each point in three dimensional space can be a point of departure into the *ana* or *kata* four dimensional directions in which case the solid object disappears from our three dimensional space. We can see the *ana* and *kata* sides of our hyper-plane as mirrors. The two kleinian bottles are mirror images of each other in the two hyper-spatial mirrors. They are reflecting around the sphere of ambiguity that seems to have horns that are mirror images of each other. This constitutes the mirror rotation of the solid in hyper-space that is the sine quo non of the hyper-kleinian bottle. Where the kleinian bottle turns inside out in three space the hyper-kleinian bottle does the equivalent in four space which is entantiomorphic mirroring where the left image becomes the right image. The *sphere of ambiguity* is a local non-coherent place in spacetime. Normally non-coherence is global but the anomaly of the sphere of ambiguity created by the four dimensional hyper-kleinian bottle is that it produces local non-coherence which is the same as paradoxicality. This utter paradoxicality is the other end of the series from the distinction which gives clarity. We descend from the distinction into the non-dual duality of the mobius strip, and then into the non-dual duality of the kleinian bottle which also contains a ring of ambiguity. That ambiguity is emphasized in the hyper-kleinian bottle where the equivalent of siamese twins are produced so that one does not know whether one is remaining in the same surface or has moved to the twin surface. This complete paradoxicality is the image of the mirroring of the mirrorhouse where all the reflections are considered real. The reflexive special system is utterly paradoxical if we take all the appearances as real. Therefore, this series of topological anomalies describes the process by which the autopoietic system differentiates itself. In the process of self-production the autopoietic system must redefine its boundary *vis a vis* the boundary of the other autopoietic system in the reflexive environment. When we see that the autopoietic system boundary is a kleinian bottle, then the extreme situation is where the two autopoietic systems are siamese. The other extreme is where they are clearly distinct. This is no mean task because when there are four

dissipative systems in a reflexive field then there are six possible virtual autopoietic systems in the field. The two true, real, identical, present autopoietic systems must continually define themselves against that virtual background of four other virtual autopoietic systems. In that process there is the realization of the non-dual duality that makes all the apparently different autopoietic systems globally the same since they are part of the same reflexive field and each of them are merely seeing reflections of themselves that they are calling other. The social system as G.H. Mead says in his symbolic interactionism produces the individuals that make up the society. They get their minds and their selves from the society of which they are a part like fish are immersed in water or birds are encompassed by the air.

Steve Rosen³⁰² has developed the idea of the series of topological anomalies by linking them to the Plank's constant³⁰³ as being what lies at the origin of the series. In other words Plank's constant gives us the first quantal value and that from this quantal value unfolds the further quanta of action which we associate with the series of topological anomalies. Something that follows from this is that each of the emergent quantal levels is composed of a set of plank quanta.

Figure 44:

Numbers of Plank's Quanta	Emergent Levels of Topological Anomalies
-1	Source
0	Dimensionless Point
1	Plank's Quanta
2	Lemniscate
4	Mobius Strip
8	Kleinian Bottle
16	Hyper-Kleinian Bottle
32	Hyper ² -Kleinian Bottle

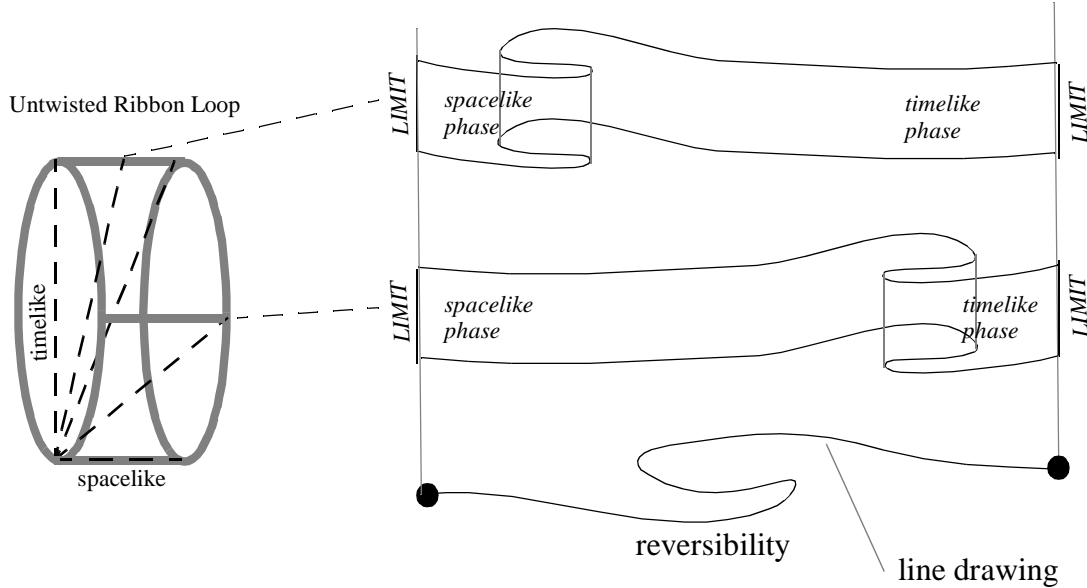
Plank's quanta is the smallest differentiable grain of spacetime. As we know from Relativity Theory even this smallest grain has a reversibility in it with respect to its phase structure in relation to inertial frames. In other words the timelike and spacelike components shift in relation to each other. This reversibility of the smallest

302. Correspondence on the Octonion Appreciation Society elist.

303. Atkins, P.W.[1974] *Quanta: A Handbook of Concepts*. Oxford, Clarendon U.P.

differentiable grain of spacetime is doubled in the lemniscate, doubled again in the mobius strip, doubled again in the kleinian bottle etc. It is actually possible to understand this strange holonomic math.

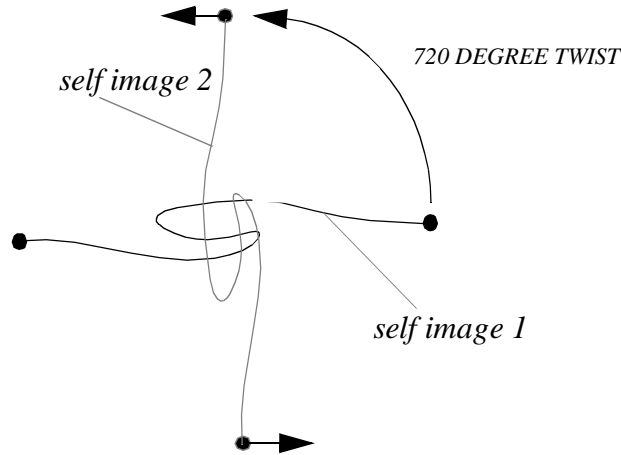
Figure 45: Plank's spacetime grain



We transform the plank spacetime interval grain into the lemniscate by recognizing the single untwisted circular ribbon has both width and circumference. The relation of width to circumference is the relation of the two spacetime interval phases to each other. In spacetime the ratio of these two phases to each other can change based on the inertial frame in which they are viewed. This dynamic relation is solidified in the band of ribbon that is the basis for building the lemniscate. To get the lemniscate we cut the band and twist it 720 degrees and then glue it back together. To represent that surgery we need to have two images of the band which we represent as orthogonal to each other. But actually the orthogonal images are glued back together after the twisting operation. In the untwisted ribbon there are two limits to the interval. After twisting and regluing there are still two limits but a spinor³⁰⁴ has been introduced into our image of the interval. The plank interval is the image of the meta-meta-system and is related to the 32nions.

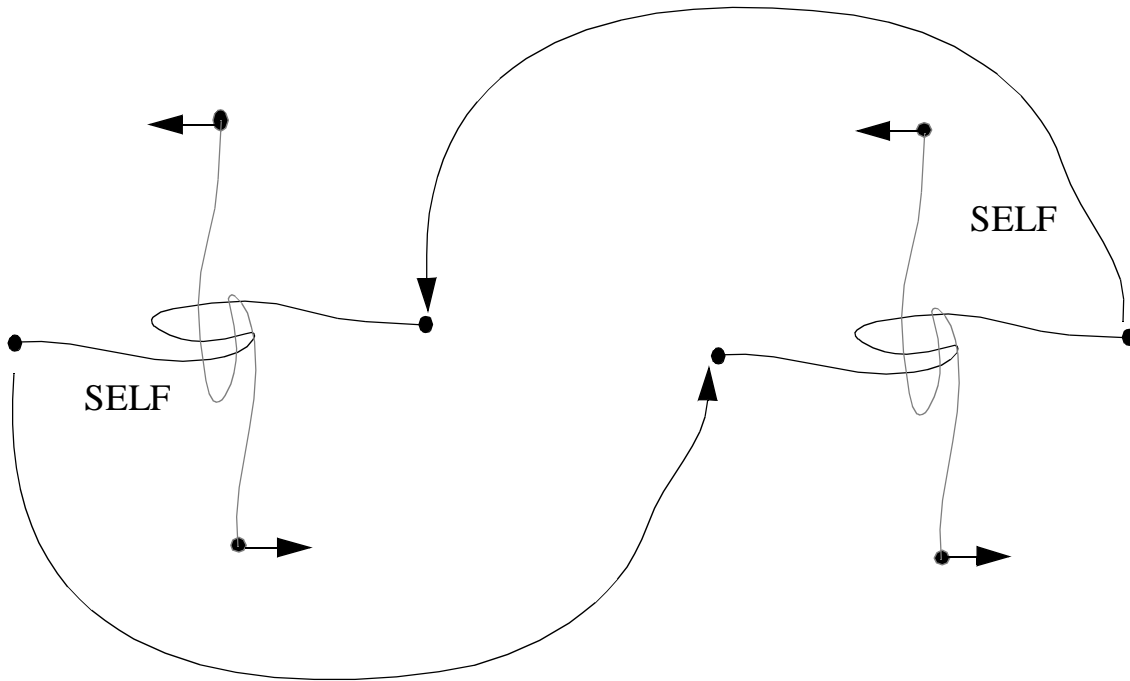
304. Hermann, R. [1974] *Spinors, Clifford and Cayley Algebras*. Interdisciplinary Math. Volume VII Dept. of Math. New Brunswick NJ, Rutgers University.

Figure 46: Lemniscate



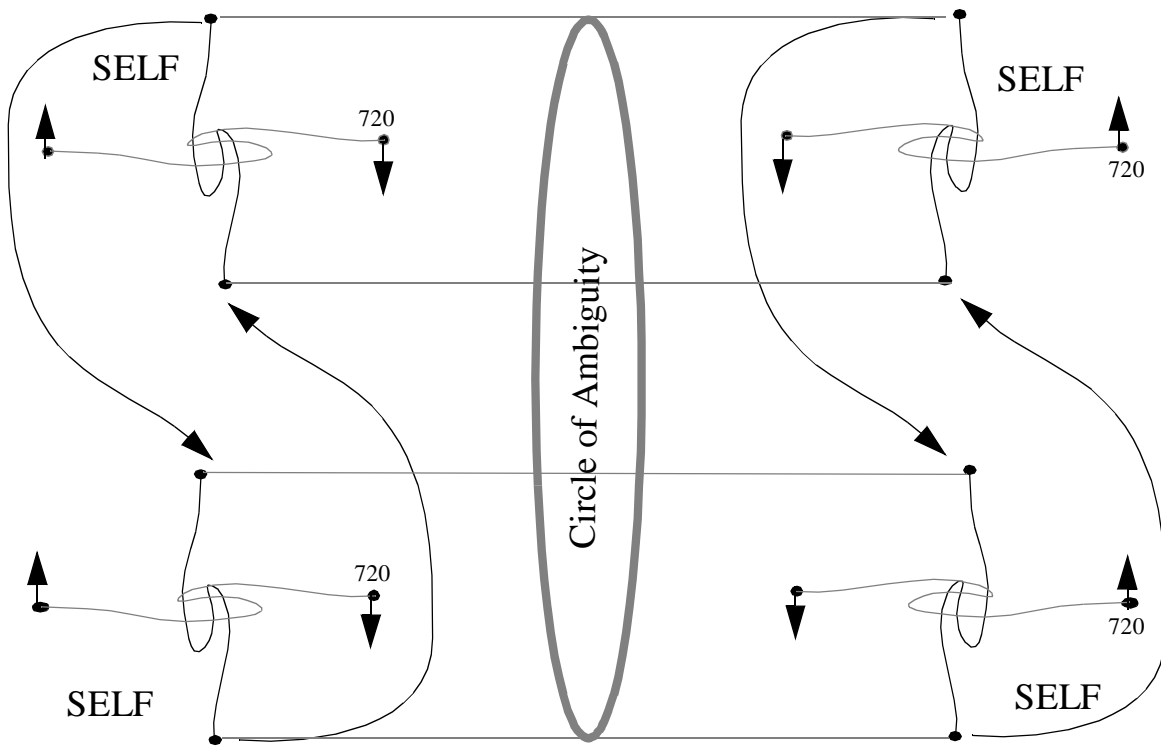
The Lemniscate places a 720 degree twist in the reversible sheet separating the phase spaces of the plank spacetime interval. Thus, the lemniscate is an image of the spinor in that interval. A spinor is the amount of movement necessary in the four dimensions of spacetime to stand still, i.e. fixed points must spin. Non-spinning points actually are rotating. In that it ranks with the tetrahedron, knot, torus and mobius strip. In the lemniscate the entire ribbon is twisted 720 degrees while in the mobius strip it is the bounding line that goes through that range of angular change. The gluing of the sides of the lemniscate together transfers the angular change to the line that bounds it making that line a singularity. This singularity is transferred to the self-intersection circle of the kleinian bottle and the sphere of ambiguity in the Hyper-Kleinian bottle. We move from anomalous figure to anomalous figure through the twisting motions combined with gluing operations. Each reversible line drawing is another image of the same figure. We need multiple images of the same figure because it is self-embedding. To show how this self-embedding works it is necessary to multiply the images of the self. What we are seeing here is that the spinor has a special topological possibility of self-mapping which produces a series of topological singularities. By twisting the figure experiences its freedom in the higher encompassing realm within which it is embedded. By self-binding the figure becomes more and more entangled with itself and in that produces anomalous self-relations. The lemniscate is the image of the meta-system and is related to the sedenions.

Figure 47: Mobius Strip



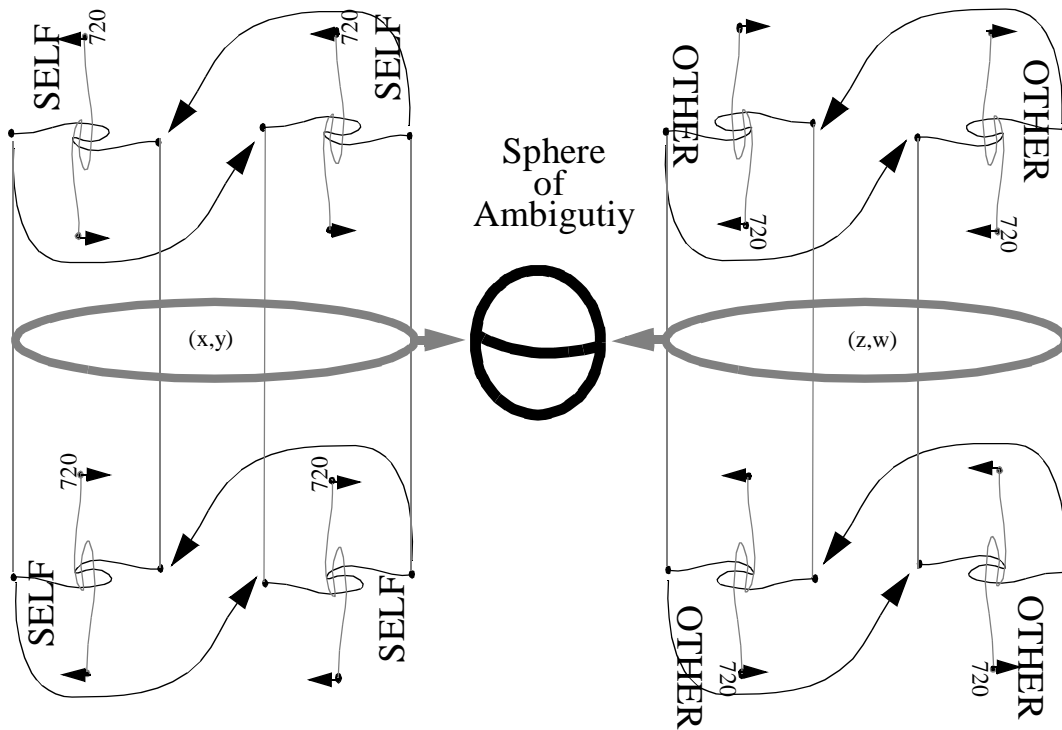
The mobius strip is composed by gluing the edges of the lemniscate together. That gluing operation necessitates the twisting of the already twisted lemniscate in relation to itself. So to represent that we need two images of the lemniscate which we twist in opposite directions. Thus the figures represent the multiple copies that we need of the form itself in order to represent the twisting and turning of that form as we move up through the dimensions. In the self-binding operation all the angular change of the lemniscate is transferred to the single boundary line. That single boundary line is the anomaly which results from the self-intrajection of a spinor into itself. Self-intrajection means that one copy of the self is taken out and twisted and then reconnected to the self such that the self becomes dually/non-dual. It is dual locally and non-dual globally. The mobius strip is the image of the reflexive system and is related to the octonions.

Figure 48: Kleinian Bottle



At the level of Kleinian bottle we finally have a minimal system of images of the spinor Self embedded in the plank interval which has been twisted opposite ways. This produces the circle of ambiguity which is where self-intersection occurs. The Kleinian bottle is the image of the autopoietic special system and is related to the quaternions.

Figure 49: Hyper-Kleinian Bottle



Finally we encounter the other at the level of the Hyper-Kleinian Bottle. So we see that the series comes from an intensification of mirroring of self to self starting with the plank quanta's reversibility and moving upward through the replication of that quanta and then applying twisting and gluing operations so as to explore higher and higher levels of dimensional encompassing. It is the image of the dissipative system and is related to the complexions. We can move beyond this to the hyper2-kleinian bottle which is related to the reals and is the image of the system. The inversion of these two series in relation to each other is made necessary by the fact that the lemniscate models the non-nihilistic distinction in the meta-system and from there the series of bindings devolve toward greater and greater paradoxicality as we move away from the supra-rational.

Figure 50:

Numbers of Plank's Quanta	Emergent Levels of Topological Anomalies	Characteristics	Algebras	Ontological Levels
-3	Further Fragmented Sources	pre ³ -geometrical	512nion	facet
-2	Fragmented Sources	pre ² -geometrical	256nion	pluriverse
-1	Source	pre-geometrical	128nion	kosmos

Reflexive Autopoietic Dissipative Special Systems Theory

Numbers of Plank's Quanta	Emergent Levels of Topological Anomalies	Characteristics	Algebras	Ontological Levels
0	Dimensionless Point	ideal unity -- origin	64nion	world
1	Plank's Quanta	reversibility of phases	32nion	domain
2	Lemniscate	twist in self	sedenion	meta-system
4	Mobius Strip	self intrajected twist	octonion	reflexive
8	Kleinian Bottle figure 8 tube circle of ambiguity	self ² intrajected opposite twists	quaternion	autopoietic
16	Hyper-Kleinian Bottle clover-leaf tube two klienian bottles sphere of ambiguity	enantiomorphic mir- roring of self/other	complexnion	dissipative
32	Hyper ² -Kleinian Bottle eight lobe tube four kleinian bottles hyper-sphere of ambiguity	meta-mirroring inward/outward	real	system
64	Hyper ³ -Kleinian Bottle sixteen lobe tube 8 kleinian bottles	meta ² -mirroring of non-dual nomos among different mathematical categories between physus and logos	rational	form
128	Hyper ⁴ -Kleinian Bottle 32 lobe tube 16 kleinian bottles	meta ³ -mirroring of non-dual rta (right) between limited and unlim- ited.	integer	pattern
256	Hyper ⁵ -Kleinian Bottle 64 lobe tube 32 kleinian bottles	meta ⁴ -mirroring of non-dual good or source of variety between having and non-having	naturals	monad
512	Hyper ⁶ -Kleinian Bottle 128 lobe tube 64 kleinian bottles	meta ⁵ -mirroring of non-dual fate (wyrd) between existence and non- existence	binary	facet

What is interesting about this is that it paints a picture which is the dual of the Algebraic series of anomalies. Each of the Topological anomalies can be decomposed freely into its plank quanta components that can be recombined freely to produce higher or lower emergent levels. This is due to the holonic nature of the fundamental unity of the plank quanta of the granular reversible interval. This has

implications for time as well as space if we consider that spacetime or timespace is merely a network of plank quanta. Higher level structures may exist in overlapping fashion re-using the same plank quanta modules. With respect to time we can see how each instant the universe is created and destroyed by the twisting of the current universe and then gluing it to the next image of the plank quanta. Thus the whole universe can be seen as existing at some very high level of the infinite series of hyper-kleinian bottles. It is differentiated down to the individual plank quanta of time by a series of holonic stages. If both space and time are made up of a network of holonic quanta then we can see how the intensification of mirroring occurs at deeper and deeper levels as we move up the anomalous Topological Hierarchy. Each level of mirroring is an emergent phenomena built holonomically out of the lower level stages.

The picture that we get through this inversion of the Algebraic and Topological anomalous series is that greater and greater intensification of mirroring occurs as we gain algebraic properties. Another way of saying this is to say that self-binding and twisting intrajection increases as we move toward the system level or the level of form. We unravel self-binding as we move toward the meta-system and lose algebraic properties. This means that from the viewpoint of the meta-system the possibility for paradoxicality increases as we move further and further toward the system. The system is a social gestalt which is dependent on self-other and inward/outward mirroring to be sustained. This intensification of self-binding however takes us further and further away from the ground state of the meta-system which embodied super-rational non-duality and interpenetration. That ground state is not self-binding but other binding in interdependent arising. In the ground state self and other are not yet differentiated. In the highly self intrajected state of the hyper-kleinian bottle and above self and other are differentiated and then paradoxically fused in spite of that differentiation producing ambiguity, paradoxicality and absurdity. We can see that the hyper-kleinian bottle and other higher bottles in their self-other ambiguity give us one image of the social field similar to that of Jung with the collective unconscious. As we go within into dreams we find archetypal images are socially shared. Thus on the inside we cannot distinguish between self and other. This is precisely the kind of paradoxical ambiguity that appears at the level of the hyper²-kleinian bottle. It is very different from the kind of image we see in the octonion reflexivity which is another more supra-rational image of the social realm which comes from the hyper-complex algebras. In this way we see how these topological and algebraic excursions lead us to different models of the social which are duals of each other. One sees the social as something that comes from a paradoxicality while the other sees the social as more closely akin to supra-rationality.

The social is our natural medium. This is why there is a collective unconscious that Jung found in his psychoanalytical work. The archetypes are given form by the

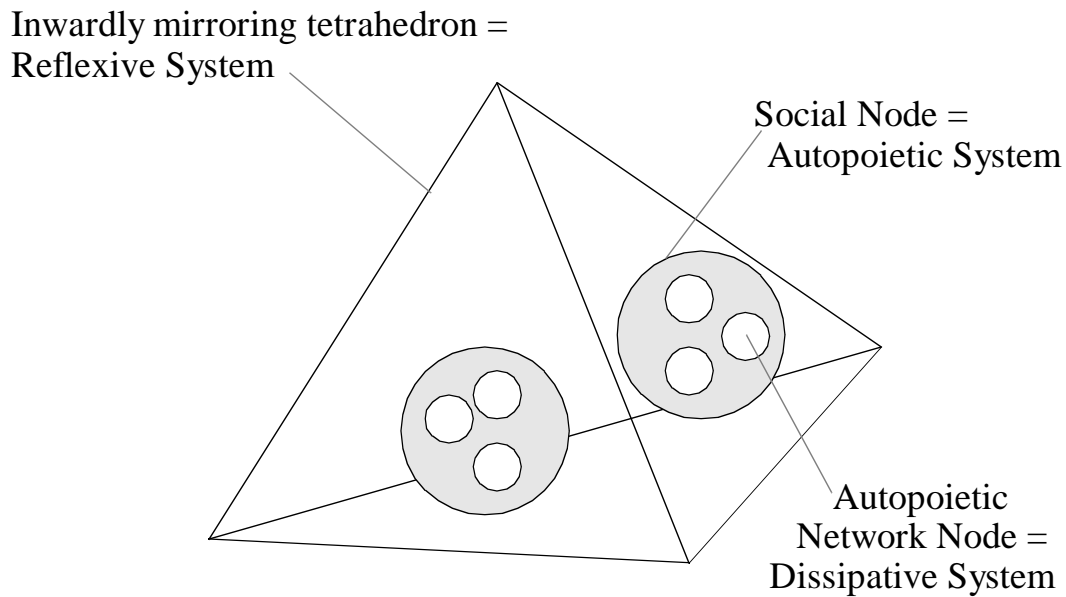
reflexive structure of the social field. The collective unconscious comes from the fact that all organisms that exist in a social nexus merely reflect each other. Sexual reproduction is an entry into the sphere of ambiguity by two mirroring organisms. Out of that comes the fertilized egg which is ambiguously fe/male until development takes place. The archetypes are the non-dual structures that appear in the social interspace. Jung says that these make up a Fourfold structure within the self. This fourfold structure is composed of the Ego, Shadow, Animus (Anima), Cathonic Mother (Wise Man) which together make up the field of the Self. Now we can interpret this structure in terms of the non-dual special systems. The ego is clearly the restricted systemic economy. We enter the unconscious by a series of steps first encountering the Shadow which only needs a partner to manifest and which can be related to the dissipative special system. Next we move deeper into the unconscious and the Anima/Animus formation appears when we enter into relations with the opposite sex. This duality places the quintessence³⁰⁵ of the other sex within the unconscious of each of the sexes. Within the Male is a female subconscious archetype and within the female is a male subconscious archetype. These archetypes are more independent than the shadow and also more difficult to recognize their effects. They are those invisible constraints which we recognize only with difficulty through a glass darkly. This is the level which is related to the autopoietic special system. Each autopoietic special system is an enantiomorphic image of the other within the reflexive field. As a mirroring each contains the other. This containing may either be merely formal from their reflection in the mirroring field or it may be in the form of a paradoxicality of mutual self intersection beyond mere symbiosis so that they actually become siamese twins. So the anima/animus is a necessity due to autopoietic mirroring. Since the autopoietic system is reflexive both on the inside and the outside, i.e. it is composed of quaternionic autopoietic nodes in its autopoietic network inwardly and it is a social being of quaternionic constitution outwardly, so what it sees outside is immediately internalized. Quaternions are like outwardly mirrored spheres. We can visualize the inward autopoietic network as a net made up of these outwardly mirrored spheres. We can think of the nodes in the social field as another sort of outwardly mirrored spheres. The individual is one of these outwardly mirrored spheres. They are all contained in the environment of inwardly mirrored fourfold tetrahedron. The social field is made up of all the reflections between all these mirrors. Thus, when it sees the opposite sex externally it internalizes that image within itself. Now the third stage is where the Wise Old Man and the Cathonic Mother appear. Notice that this has to do with the again of the animus/anima but now mediated by time. Time is exactly what appears in the reflexive level as the ecstasy of heterodynamics. Through time the internal animus/anima in one autopoietic system learns how to understand the anima/animus in the

305. We define quintessence as what is both Identical and Different, both True and False, both Present and Absent, both Real and Unreal which is the opposite of Existence which is neither any aspect nor its opposite. Quintessence is the fifth aspect of Being which is the combination of all the others and their opposites. It is the embodiment of the paradoxicality of Being.

other autopoietic system that is mirroring. With experience comes wisdom which is feminine celestial for the male and masculine terrestrial for the female. Thus we can say that the fourth element of the self in Jung's description is due to the appearance of the reflexive level. We look into the mirror seeing our ego, our shadow, our animus/anima and by experiencing that mirroring in the social environment we gain wisdom concerning our immersion in that mirroring. So we appear as the archetype of the Wise Old Man (Tiresias) or the Cathonic Mother (Demeter). The self contains all of these elements. Jung describes it as a whole³⁰⁶, but we would prefer to call it a meta-system. The unconscious is the shadow of the restricted systemic economy of the ego. It is specifically not a whole. It is inherently complementary and it is a landscape that contains blackholes, miracles and singularities. It is best described as a meta-system, as an environment, milieu, context, situation that surrounds the system as it participates in the social field of which it is intrinsically a part. It is unconscious because it lies beyond the confines of the system. It is the ego system that is the whole. When we say that the self is whole we are merely seeing the projection of the ego in the mirror of the social field. It is a collective unconscious because it arises directly from the mirroring structure of the social field. The archetypes are the internal constraints we feel within the structure of social mirroring. They are invisible because we do not see the mirrors but the images that reflect in the mirrors.

306. Lowen, W. [1982] *Dichotomies of the Mind*. N.Y. John Wiley and Sons.

Figure 51:



There is a fundamental duality between the Autopoietic Network Node and the Social Node. The Social Node is seen to contain the reflexive field both inwardly and outwardly.

Similarly we can say that there is another image of this level of social organization which is a conjunction of the soliton breathers into instantaton formations called Super-Breathers. If soliton breathers are the images of the autopoietic nodes in the autopoietic network, then the super-breathers allow these nodes to become one with each other by exchanging solitons across spacetime. The super-breather instantaton formation is what allows the nodes of the autopoietic network within the autopoietic system to be the same across the gulfs of spacetime. It is how the action at a distance necessary for the autopoietic system to self-produce is achieved. The whole network resonates by the exchange of instantatons. They are the image of the ecstasy of the autopoietic network. That network is like the Acupuncture meridians³⁰⁷. Each point in the network is a locus of energy called Chi³⁰⁸ which is transmitted by instantatons that pop around within the network. Chi does not flow through the meridians between the points, but instead scatters around within the network by instantly transitioning across spacetime via the fields that connect the nodes with each other. Each node is independent of the others utterly. There are no lines of exchange between them. Ultimately they are all the same because they are exchanging quantum like particles with each other through the fields that connect them. This is, of course, an image of the kosmic monad where the totality and the monadic parts have the same constitution. Those fields are the

307. Mann, F. [1964] *The Meridians of Acupuncture*. London, Heinemann.

308. Yoke, H.P [1985]. *Li, Qi, and Shu: an Introduction to Science and Civilization in China*. Hong Kong University Press.

reflexive substrate within the autopoietic system and it is the social field outside the autopoietic system. In the autopoietic system the psychological inside mirrors the social outside in a warped mirroring that causes inversions and strange images to appear that must be filtered out. That filtering process we call Being. We filter out the pre-entities at the pattern level and continuously construct not just reality but truth, identity, and presence as we attempt to clarify who we are in the myriad reflections in the specified other prior to the abstraction of the “generalized other” that G.H. Mead talks about in Symbolic Interactionism. Who we are is determined by the structure of the special systems and the Self-Thou relations that arise out of the flux of Ego-It relations. But the various images of the special systems mean different things. The mobius-klein series shows us the quantum transitions between supra-rational distinctions and paradoxicality. The soliton-breather series shows us how ultra-efficient motion is achieved in the reflexive autopoietic dissipative milieu.

6. Autogenesis

There is another series that is significant for the definition of reflexive autopoietic dissipative special systems. This is the series of XOR groups. We are familiar with the *exclusive or* operation from Boolean logic. The XOR gives only one of a pair of values “ored” together rather than both. XOR singles something out from a set of possibilities³⁰⁹. Ben Goertzel and Onar Aam have shown that XOR can be the basis for the arising of the hyper-complex algebras out of the Void. This concept has been embodied in Ben Goertzel’s concept of ON³¹⁰ which are pre-geometrical entities that pop out of the void in a way similar to the marks in Laws of Form. This is possible because the void can be construed to be vacancies which have pre-geometrical relations to each other, and these relations between vacancies can be construed to produce something by their combinatoric permutation. This can produce the imaginaries because they naturally arise at XOR level four. Thus, by taking an XOR of permuted vacancies we get the imaginary numbers. Once we have the imaginaries then quaternions and octonions arise by symmetry breaking, and the reals are merely a degenerative case. The point is that via the differentiation of XORs at various levels the complex numbers may arise spontaneously out of the void. Once they arise then we can derive the other hyper-complex numbers. In effect the XOR

309. Holland, John [1998] *Emergence: from chaos to order*. Addison-Wesley, Reading MA. Mention on pages 98-101 is made that the cyclical neural net can produce an XOR gate and that because of this neural nets can reproduce a general purpose computing machine.

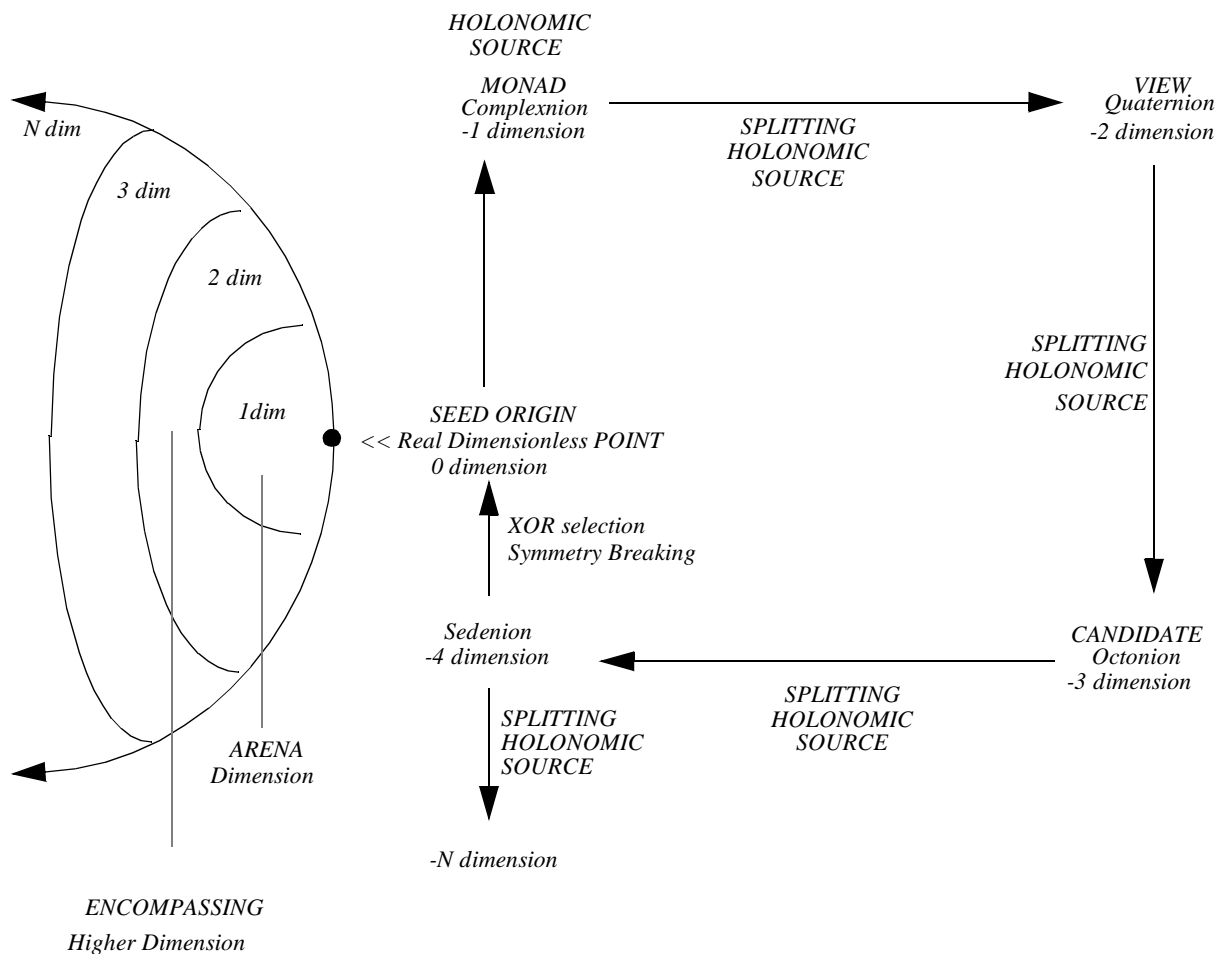
310. Goertzel, Ben [1996] *Ons a theory of truly elementary particles, explaining the emergence of structure from void in physics and psychology*. at URL <http://www.goertzel.org/ben/ons.html>. See also Goertzel, Ben [1997] *Ons: An Algebraic Foundation for Being and Time, Explaining the Emergence of Clifford Algebra Structure* at URL <http://www.goertzel.org/ben/OnsAlgebra.html>. See also Ben Goertzel, Onar Aam, Tony Smith, Kent Palmer [1997] *Ons Algebra The Emergence of Quaternionic, Octonionic and Clifford Algebra Structure From Laws of Multiboundary Form* at <http://www.goertzel.org/ben/Multi.html>. See also Ben Goertzel, Onar Aam, Tony Smith, Kent Palmer [1997] *Universe as Network: Deriving the Standard Model Plus Gravity from Simple Transformation Rules on Discrete Event Networks* at URL <http://www.goertzel.org/ben/eventnet.html>.

operation, or isolated vacancies within the void that are permuted, give us the elements on which our hyper-complex algebras operate. Thus, the XOR not only gives us the imaginaries out of the void, but also gives us the primitive elements that our algebras operate upon, and which assume the kinds of relations that appear in the Laws of Form. So, when we conjunct the hyper-complex algebras with the XOR series, we get a systems theory rather than merely an algebra, and the systems theory's elements pop out of the void producing the fundamental pre-geometrical elements. So this is a self-boot-strapping systems theory -- an autopoietic systems theory which we would expect if it is to describe autopoietic systems. We call this autopoietic meta-theory *autogenesis*.

Ons and Monads are pre-geometrical in some sense. Let's explore this idea a little deeper with the concept of negative dimension. We consider a point to have zero dimension. However we do not talk about negative dimension normally. All the N dimensions start from the point and unfold. However if we are considering pre-geometry then it makes sense to begin to consider negative dimension. What we notice is that the first negative dimension is negative one. But this is also the singularity on the number line that leads us into the hyper-complex algebras. So we can think of negative dimension one as giving us a single source beyond the origin point. If we push beyond this to negative dimension two then we find the quaternion imaginaries as fragmented sources. However all the fragmented sources at the quaternion level amount to one. If we push on beyond this to negative dimension three we find the octonion imaginaries as further fragmented sources. However all the fragmented sources at the octonion level amount to one. Next we discover the sources at the sedenion level and so on. Negative Geometry has to do with these sources that unfold infinitely deep as we follow the Cayley-Dickson process down the Pascal Triangle of the infinite non-division algebras. In other words there is a subspace to all the geometrical spaces on N dimensions which are made up of the hyper-complex imaginaries seen as sources of the origin point. We can think of this as forming an Emergent Meta-system in which the point returns to its source in negative dimension one and that this source fragments into the strange pieces of the various imaginaries at each level. As this fragmentation occurs into holonomic parts that mutually mirror each other properties are lost. But at each level and especially the sedenion level we can use XOR or symmetry breaking to generate a seed for a real point again. Thus there is a dialectic between the sea of infinitely deep algebras and the production of "real" points that are zero dimensional. This gives a specific meaning to our concept of pre-geometry. Pre-geometry exists in the negative dimensions that underlay all the positive dimensions. A source is no-where in relation to a point which is somewhere. The origin point is where the grid or coordinates projected on space intersect with the landscape of space itself. Opening out from the origin point is the arena of space which the next higher dimension encompasses. So from this we can see that the generation of dimensions is a model of the meta-system as proto-gestalt/proto-flow comprised of source, origin, arena,

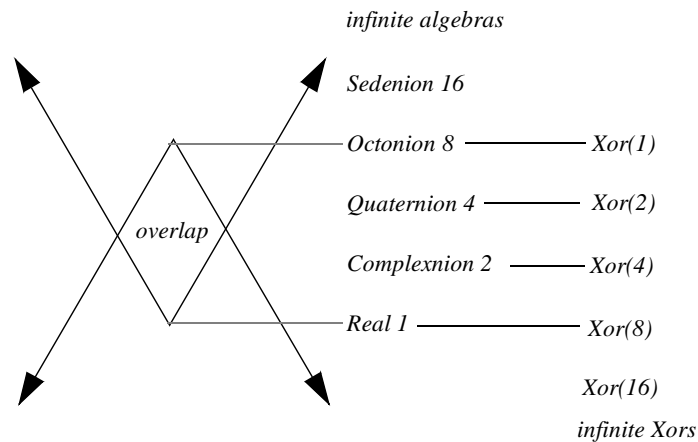
and encompassing. Normal positive dimensional theory can account for the origin, arena and encompassing of each dimension by the next higher dimension. But what it cannot account for is the sources. When we note that the very first negative dimension is also the singularity that produces the hyper-complex algebras then we can see that beneath the N dimensional spaces there is a subspace or negative-space of sources that fragment as we produce the various levels of hyper-complex algebras. Taking this viewpoint the *On* or monad is really one of these sources in the negative subspace of positive space. The negative subspace is another name for the void. However, with this analogy we can see precisely where the void occurs in relation to positive dimensions, i.e. it occurs as negative dimensions beyond the dimensionless point and this is a pre-geometry because it is prior to the unfolding of an arena of places, and prior to the arising of the encompassing dimensions beyond dimensionlessness.

Figure 52: Generating Dimensionless points out of the Holonomic negative dimensional subspace



If we look carefully at the relation between the XOR levels and the hyper-complex levels we see that they are, in fact, inverted in relation to each other.

Figure 53:



This inversion of the two series was the idea of Tony Smith. My contribution to this line of thought was the idea that the combination of hyper-complex algebra and the pre-geometrical *ONs* gives a Systems Theory. Notice that they only overlap between the 1-2-4-8 levels for each. When reals are emphasized XOR is eight. When XOR is one, or unique identity, then we have octonions. Thus, the inversion of the two progressive bisections give us a reciprocity between the algebras and the elements manipulated by the algebras. Out of the element's relations come the algebras. Out of the algebraic relations come the selected elements. The more differentiated the algebra the less differentiated the elements and vice versa. The algebras describe the lengthwise slicing of the number timestream. So, when the timestream is unified into a single illusory continuity, then the pre-geometrical elements are multiplied. These pre-geometrical elements can be thought of as the seven plus or minus two places in short term memory. They are pre-geometrical because the actual geometrical things have not yet arisen. Rather we merely have places for them to exist. Those places have some inherent relations to each other based on the combination of the algebras that describe timesplitting and the XOR operations that describe the selection of places from among the available places. We have also called these places monads. So the *Ons* are the same as monads except the monads are seen to exist rather than participating in Being. *Ons* are considered particles of Being. They are ontic. Thus we also differ in terms of how we conceive the level of manifestation to which the *Ons* refers. Here that level will be Existence, rather than Being, and we will use the term "monad" instead of *On* unless we specifically mean what we have previously called a pre-entity. Here we will consider that the *monad* or *On* to be like the place in short term memory where something might be stored for instant recall.

So we can have eight monads and one timestream element in our short term memory. Or at the other extreme we can have eight differentiated timestreams braided together and one monadic pre-entity. Here the pre-entity, or monadic *On*, is thought of as a place for something to be stored for instant recall -- that is a hole for

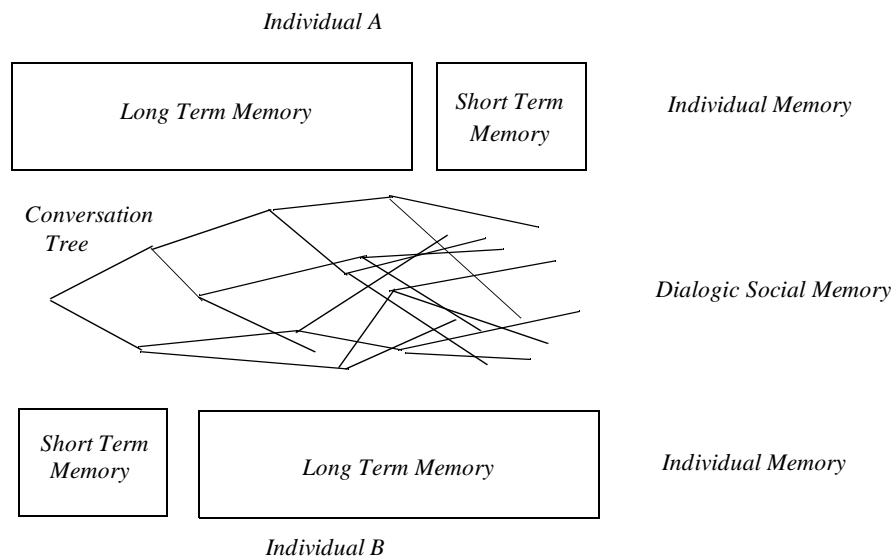
a possible chunk³¹¹ placed in short term memory. Between these two extremes there is the level of quaternion and XOR(2) or the level of complexnion and XOR(4). These show a less extreme trade-off which uses less short term memory, i.e. only six places. Seven plus or minus two occurs as the range of extension of short term memory between the inner and outer complementarities of the timestream splittings and the XOR differentiation levels. The only other level is the long term memory which is the encompassing meta-system within which short term memory as a system is embedded. Long term memory is made up of sedenion and above hyper-complex algebras and XOR(16) and above places which form a rhizome in which all memories held long term exist. So we see from this that our systems theory naturally gives us the relation between short term and long term memory and shows us that the places of short term memory, i.e. the monads or *Ons*, are just enough to allow the spacetime relations of the timestreams to pre-entities to be held together. Manifestation is the movement of pre-entities and timestreams through the short term memory as a result of presencing within existence. How we experience presencing depends on how we distribute the relations between time and pre-entity within the grasp of our short term memory. Between the short term and long term memory there is conversational memory that only can be accessed socially within dialogue. Mnemonic devices are a simulation of this social memory within the individual. Notice that in mnemonic devices we place things in places building up a larger network of places than our short term memory would normally allow. In effect each place is a set of short term memory locations within the landscape of long term memory and thus simulates the conversation tree that we naturally build together in dialogue and which we can revisit together, just as in the mnemonic device the one remembering can walk from palace to place. This conversational memory is accessed when we remember something from a previous conversation within the conversation together so that we can jump to that point and continue talking about that conversational subtree. It is difficult to do that when we are alone. We simulate it imperfectly with mnemonic devices created by Simonides. This social memory is normally ignored because we tend to study the memory of isolated individuals. But what we notice is that two individuals together produce a chunked conversational history in their resonant dialogue. The pre-entities and timestreams dance together and intertwine between them as they experience mutual self-manifestation to each other and together. In that they belong together and are thus the Same as Heidegger tells us in Identity and Difference³¹². Each of them has the ability to move into one of the five modes based on the combination of timestreams to pre-entities they choose. We will identify those modes with the Five Hsing. If one is talking the other is receptive. The receptive one is in the mode of the meta-system while the other is in one of the special system modes or in the mode of the system. So together there are five times four or twenty modes. This is the number of possible interactions

311. Simon, H.A. [1974] "How Big is a Chunk" in *Science*, Volume 183, February, pages 482-488.

312. Heidegger, M. [1969] *Identity and difference*. Translated by Joan Stambaugh. [1st ed.] New York, Harper & Row.

between the five Hsing and the four receptivities of the earth, i.e. earth, air, fire and water. The one who is talking is celestial and the one who is silent is terrestrial. When there is active mutual listening and resonance then this role naturally oscillates between them producing the traces in conversational social memory of the diachronic moment of their timestreams and the synchronic slices with pre-entities both held in short term memory of each as they manifest to each other by the mutual presencing of their dialogue.

Figure 54:



When we bring together two individuals in long term conversation they build together a rhizomatic conversation tree between them that they share when together. The conversation tree is difficult to access when they are not engaged in conversation. The conversation tree is like a channeling of the dialogue which is chunked and accessed by both together one reminding the other as the dialogue elaborates the tree of conversation topics built up over many conversations. This grows out of the Yin/Yang cycling of the celestial and terrestrial roles across many conversations. Where the long term memory is rhizomatic, the social memory is arborescent. The interacting short term memories play across this landscape of individual and social memory endlessly constructing revisited diachronic chunked patterns that is the core of the mutually shared lifeworld. The movement of each person through this mutual lifeworld is an emergent meta-system (EMS) formation and the pair together represent the meta-EMS formation. The EMS for each is merely the symmetry breaking of the restricted system of intentional consciousness into non-intentional awarenesses of each for the other. Each has its set of monads held in a compact dual system. This slowly breaks down as each fragments inwardly into separate timestreams. These timestreams are flowing backwards as Igvar Johansson suggests in Ontological Investigations because that is what it takes to produce

resonance. This means each individual is backing into the future seeing time flow back into the past given what appears in short term memory. This, at least, is the view from the mind which faces forward in space but backward in time. The heart on the other hand faces backward in space oriented toward the advent of the Yang celestial cause but forward in time. The heart is what encompasses the supra-rational vision which the mind cannot comprehend. Seeing the trail of events in short term memory as time flows backward allows resonance between individuals that cannot be understood otherwise. This resonance is the basis of social phenomenology. As events flow past the number of monads that can be held decreases and the subjectivity of the observers splits until the monads finally vanish and the timestreams enter into the fusion of the non-division meta-system of sedenions and above. Since this trailing off occurs for both people in resonant conversation then they play off of each other assuming various levels of restrictedness and laxity of complexity and simplicity in their grasp of the diachronic movement across the mutually held conversation tree. The dual EMS formations within each individual that fades into the trance of the meta-system and then refocuses on the dualistic experience of the restricted system produces a meta-EMS cycle in which the timestreams of one become the monads of the other and vice versa. This meta-EMS allows the mutual dance of the two to model the dynamics of existence. One fades and the other makes a new distinction which then fades while the first makes another distinction. These mutually held distinctions fade into the mutually held meta-system by a mutually held resonant structure which is the social compact of the meta-EMS shared by the symbiotic couple.

Here we see the trade-off between the duals: gestalt and flow. The XOR produces the gestalt, one monad over against the background of the rest of the monads. The hyper-complex algebra produces a similar structure in the timestreams where one time is held as real over against the imaginary others. One timestream acts as the global clock for the coordination of the others. Flow emphasizes hyper-complex algebra while gestalt emphasizes XOR. Both share the singling out of one over the rest. XOR does so by logical selection while the hyper-complex algebras do so by symmetry breaking.

Figure 55:

TIME		MONADS	
Sedenion one real and fifteen imaginaries			
Octonion one real and seven imaginaries	plus	XOR(1) unique one	FLOW timestreams plus reference
Quaternion one real and three imaginaries	plus	XOR(2) one selected out of two	social gestalt/flow
Complexnion one real and one imaginary	plus	XOR(4) one selected out of four	psychological gestalt/flow
Real	plus	XOR(8) one selected out of eight	GESTALT figure on ground in time
		XOR(16) one selected out of 16	

Flows and Gestalts can be synchronic or diachronic.

Figure 56:

	Synchronic	Diachronic
Flow	Add reference element XOR(1) = monad [emotion] frozen timelapse photo	7+1 Octonion only [feeling] river running
Gestalt	7+1 Xor only [concept] perceptual gestalt	Add real time variable [idea] temporal gestalt

The synchronic gestalt is the perceptual gestalt which we continuously use to make sense of things in our world. When this grasping includes meaning (noesis), then we call that gestalt a concept, a grasping of something's significance. This is normally done on the background of feelings running through the body which always rushes past ungraspable like a river through us. We are mindbody in bodymind composed of grasped thought-feelings immersed in the flow of feeling-thoughts. Men normally identify more with the concepts and women with the feelings in our dualistic gender training. Outwardly we project synchronic flows as emotional

reifications of feeling complexes. We also project outwardly diachronic gestalts as ideational reifications of conceptual complexes. Ideas are conceptual patterns with illusory continuity. Emotions are feeling patterns collapsed into an overlapped timelapse snapshot. Emotions only relate to feelings and ideas only relate to concepts, so outwardly the cultural artifacts are reified along dualistic lines. These outward artifacts are triggers of either emotional or ideational cascades of feelings or conceptual streams. Most cultural artifacts are complex combinations of ideas and emotions. The outward dualistic reifications have the use of relating inward concepts and feelings to outward behavior. Ideas allow concepts to attain illusory continuity so that theory can influence behavior and produce praxis. Emotions give us patterns of feeling complexes, so we can know when things feel right or wrong in the midst of behavior and thus furnish inward cues to change behavior in midstream. Ideas allow behavior to follow a projected plan. Emotions set the feeling envelope that behavior should be constrained by. With a combination of emotional templates and ideational plans external behavior can be guided by internal concepts and feelings. In the social sphere internal concepts and feelings are externalized, they become objectified as a social gestalt, and then are re-internalized by the participating individuals. This is the way Berger and Luckmann describe the social dialectic in The Social Construction of Reality.

Social Phenomenology posits that introjection is the first moment in this dialectic, followed by an internalization, which then leads to a re-externalization and objectification of social realities. Normal individualistic phenomenologies believe that externalization and objectification come first followed by introjection and internalization. But really these two descriptions are complementary. It is just because of the individualistic bent of our culture caught in the nets of dualism that the social becomes ignored and underplayed. It is merely another example of blindness to the meta-system and obsession with the system. Social phenomenology emphasizes the meta-systemic field, rather than the restricted economy of individuals that stand out from the field, in compensation for the over emphasis on the individual in traditional phenomenology. In that emphasis we follow Merleau-Ponty, Levinas, and Sadler over against Sartre, Heidegger, Schutz, Berger and Luckmann. Schutz, Berger and Luckman are sociologists who founded social phenomenology but still had an individualistic bent to their analysis. We prefer an analysis more like the schizoanalysis of Deleuze and Guattari, or the description of the field of “play” by John Hans in the Play of the World, where the individual becomes fragmented and sinks at least partially into the “Magma” of the social field as Carlos Castoriadis describes it. We can approach social phenomenology in a radical way by positing Wild Being as the basis for the constitution of the other more consolidated kinds of Being. Our social phenomenology emphasizes the primordial nature of Wild Being, and how the consolidation of the other kinds of Being occur out of that rhizomatic field of the social magma at play in which disseminating and desiring machines roam freely in search of each other in a Dionysian dance³¹⁵. Out

of this daemonic dance we ascend the levels of reification step by emergent step until we produce Pure Being of emotional templates and Illusory continuity of ideas. This occurs through the cycle that Berger and Luckmann posit of introjection, internalization, externalization, and objectification, but starting as Sartre and Canetti have done from the Fused Group or the Pack. From there partial individualization proceeds inwardly as institutionalization occurs outwardly, These are the two kinds of ossification of the primal social field. But in spite of this ossification we can still see these as reifications embedded in the social field which is primary.

Social phenomenology which takes the social as primary uses reflexive autopoietic dissipative special systems theory as a means of understanding the interaction of the various emergent levels that appear out of the social field in the meta-systemic environment. It allows us to isolate these levels and progressively reify them until the restricted economy of individuals appears. It is by this conjunction of juxtaposed elements that we construct the truth which emerges out of the reality through presence and identity. We socially construct all the aspects of Being as we move from Wild to Pure Being. The meta-system is the reality filter on the truth of the restricted system. Not everything that becomes present is accepted by that filter, and not everything in the meta-system is granted identity by the system attempting to hold itself and others to its own truth. The system and the meta-system are reciprocal and complementary duals of each other. In order to understand them both we need both a General Systems Theory and a Specific Meta-systems Theory, i.e. a meta-systems theory built on the understanding of the Emergent Meta-systems formation. Between these two the theories of rare and anomalous Special Systems takes form. In that we appreciate the relations between gestalts and flows as we combine a process view with the formal structural systems view of socially embedded phenomena. From there we begin to formulate the underpinnings of special systems theory in terms of the relations between monadic pre-entities (*Ons*), and hyper-complex algebras. This gives us a logomathematical basis for our special systems theory that recognizes the emergent levels by the trade-off between monadic differentiation and timestream differentiation. These compensatory differentiations cycle around each other producing the emergent meta-system formation which is the model of the meta-system because it generates the octonion Clifford lattice that dominates all higher N-dimensional spaces embedded in non-division algebras.

We note that between the two extreme compensations of eight monads and one real timeline or eight timestreams and one monad which fill short term memory slots, there are two lesser compensations between two monads and quaternionic timestreams OR four monads and complexnion timestreams. These lesser compensations between protospaces and fragmented time both fit into the pattern of

313. Maffesoli, M. [1993] *The Shadow of Dionysus: A Contribution to the Sociology of the Orgy*. SUNY.

the perfect number six which is holonomic, i.e. the sum of the factors equals exactly the whole with no excess or deficiency. These are the formations related to social flow and psychological flow, i.e. the state of timeless time in which we experience synchronicity. In these states flow and gestalt become one chiasmic non-dual configuration. This is an expression of the rare phenomena of ultra-efficaciousness, i.e. ultra efficiency or ultra-effectiveness, in the world. The quaternion plus two monads is ultra-efficient and the complexnion and four monads is ultra-effective. Ultra-efficacy is when it is possible to switch back and forth freely between these two modes of psychological and social flow. Social flow is when the octonion plus monad field congeals into a mode of quaternion plus two monads conjuncted. Psychological flow is when the real plus eight monad field congeals into complexnion plus four monads. The psychological flow allows a minimal system of monads to interrelate in complex time. Time is split into real and imaginary time so the minimal system can be rotated such that one monad out of the four is within an imaginary timestream. The social flow allows two monads to operate in a field of quaternionic timestreams. Thus, two different people can operate in the same temporal field fragmentation. Together they form an octonion with all eight timestreams (4+4) which congeals into just four shared timestreams as they resonate. Then each has two monads which can occupy each of the four timestreams. So there is a perfect correspondence between the four timestreams and four monads with two each contributed by each person experiencing the symbiosis of social flow. To say it another way each person contributes six elements to give twelve in all which is the number of close-packings of spheres in three dimensional space called the kissing number. This is the fundamental interaction of two perfect systems. These systems each contribute two monads and four timestreams. By resonance the timestreams become entrained. Then each contributes two monads to occupy two of the four entrained timestreams. This gives a completely fused minimal system of four monads within four resonating timestreams shared between the two individuals embedded in an octonion field. This represents perfect logomathematical harmony as the two perfect systems based on the number six enfold each other.

Special systems theory uses this logomathematical accounting to explain how we move from the duality of gestalt verses flow to social and psychological flows which are chiasmic duals. Also we can go on to represent the proto-gestalt and proto-flows of the meta-system in terms of the sixteen timestreams of the sedenion non-division algebra and the XOR(16) generated monads that is its dual. The meta-system is inherently complementary. So we can see it either as sixteen timestreams or sixteen monads, but without any overlap such as that provided by the special systems. This non-overlapping quality is what characterizes the meta-system at the sedenion and all higher non-division algebraic levels. In the sixteen monads one is selected by the XOR. In the sixteen timestreams one is designated as real by symmetry breaking. The designated as real time stream and the selected monad together provide the seed for the renewal of the symmetry breaking sequence that

leads to the EMS by the spontaneous arising of the special systems one after the other in a cascade of symmetry breakings which generates the EMS cycle again and again. The sixteen monads represent the meta-system as arena while the sixteen timestreams represent the meta-system as origin. If we take another view that emphasizes flow then we would say instead source and encompassing flow. The difference is whether the emphasis is on the designated as real or selected elements or on the imaginary timestreams or the unselected elements. Each monad can have its assigned timestream if we push past the sedenion level to the 32nion level. In that case there are two selected monads and two designated timelines when the symmetry breaking occurs. One of these two becomes imaginary and the cascade of symmetry breaking starts all over again. At this level we can have both proto-flow and proto-gestalt views at the same time. So the duality of the meta-system actually comes from the embedding of two sedenion formations in a 32nion field. However, if we want to see all four manifestations of the proto-flow/gestalt, i.e. origin, arena, encompassing stream, and source we must go on to the 64nion level instead. But these embeddings are actually infinite because the pascal triangle is infinitely deep, and so any set of things no matter how large, like every quark in the universe, or every particle in the pluriverse, can be encompassed by this infinitely deep fused non-distributive field which we identify with Indra's net of interpenetration spoken of by the Mahayana Buddhists. It interpenetrates because the division property has been lost and the elements are no longer distributive. But ultimately it produces a $CL(N)$ Clifford Algebraic³¹⁴ lattice that decomposes into a lattice of octonions, i.e. a lattice of social fields or worlds. Myriad worlds spontaneously arise out of the pre-geometrical level as it appears as a meta-systemic environment for the advent of the spontaneous arising of the special systems which together produce the dynamic of the emergent meta-system.

Now that it is clear how the logomathematical basis of special systems and meta-systems theory work, we can go on to consider the strange and unique relations between all four anomalous series we have mentioned thus far. We believe that the logophysical realm has a special anomalous infra-structure which is made clear when we bring all these series together and consider their inner coherence.

314. Snugg, J. [1997] *Clifford algebra : a computational tool for physicists*. New York : Oxford University Press.

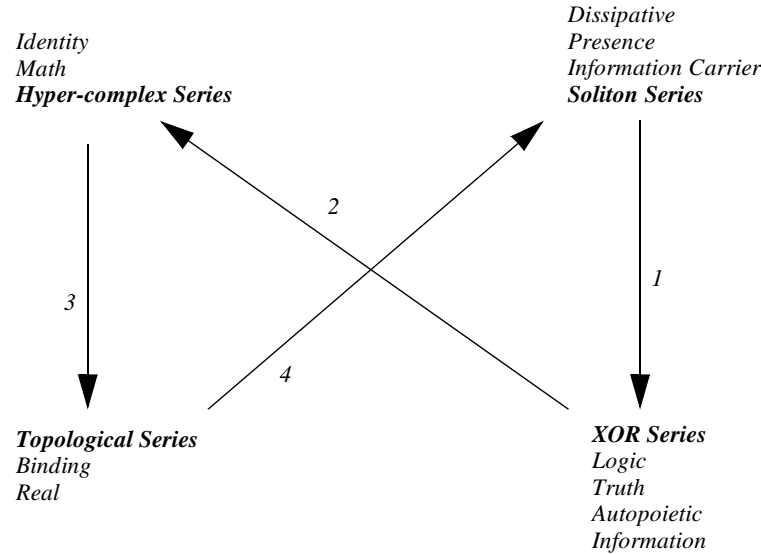
Figure 57: Four Anomalous Series³¹⁵

<u>Hyper-complex Algebras Series</u> sedenion *octonion *quaternion *complexnion real	<u>Soliton Series</u> sea *super-breather instantaton *breather *soliton waves
<u>Topological Series</u> sphere of ambiguity *hyper-kleinian bottle *kleinian bottle *mobius strip lemniscate	<u>Exclusive OR Series</u> XOR(16) xoooooooooooooooooooo *XOR(8) xoooooooooooo *XOR(4) xoooo *XOR(2) xo XOR(1) x

These four series have a complex and interesting set of mutual relations. Of course from a purely mathematical point of view they have no relation. It is only when we begin to line them up as analogous series of emergent thresholds that they begin to have relations based on meanings rather than purely based on their form. We have already seen that the XOR and Algebraic series are flipped and overlap to give us the logomathematical basis of special systems theory. We also saw that the topological series is also inverted due to the modeling of supra-rationality verses paradoxicality. So that they allow us to understand the devolutions of distinctions from non-nihilistic to nihilistic by the self-defining autopoietic systems that form symbiotic relations. We noted also how the paradoxicality appears in the series of penrose triangle, nekker cube and tesseract. Finally, the soliton series gives us a model of how non-dual particle/waves appear as ultra-efficient in physics and show how action at a distance in the autopoietic network can be achieved. Once we recognize that each of these four anomalous series play a role in defining the dissipative autopoietic reflexive special systems we can go on to wonder how they relate to each other.

315. Special System analogs marked with asterisk.

Figure 58:



We see this as a cycle of self-founding or autogenesis where solitons and anti-solitons in channels represent non-dual information carriers that are quantal and discrete rising above background wave patterns. The soliton and anti-soliton bits carry information which is manipulated by Boolean logic which can select individual bits based on the XOR operation. But it can use all sixteen logical operations specified by Matrix Logic. Bits are seen to move in Cooper pairs so that we get truth vectors instead of scalars and this is an autopoietic formation which is ultra-efficient like super-conductivity³¹⁶. Where solitons allow us to present data, when we add logic we are able to sift it to create information content whose truth can be determined. The XOR also allows us to select one and thus by changing the selected one from the set allow us to count. From this counting comes mathematics based as it is on the number one and addition. When we reverse addition to get subtraction and by that we create identity (no difference with self) and zero which mediates all differences within the whole matrix of possible differences between elements. Thus math produces identity and as a by-product the concept of zero which comes from the cancellation of differences. Simple math leads to algebra with variables and that leads eventually to the understanding of hyper-complex algebras which give rise to the concept of special systems which can be defined rigorously by the combination of logic and math together. Hyper-complex algebras ultimately define the reflexive level, and it is at that level that the meta-levels of learning arise and knowledge appears along with the identity aspect of Being. Math has no binding to what exists. When we add that binding we get topology which is the ultimate underlying coherence and constraint on shape transformations. At this level wisdom appears out of knowledge because it is the combination of knowledge and experience. Topology

316. Kresin, V.Z. and Wolf, S.A. [1990] *Fundamentals of Super-conductivity*. N.Y., Plenum Press.

is the interface between mathematical possibilities and dimensional realities. This is where the sedenion appears and spontaneously gives rise to the real either as real number line against fifteen imaginaries or selected ontic monad over against fifteen unselected monads. Topology gives us the possible surfaces and solids and higher dimensional manifolds in each dimension of space, but it also gives us the means of producing channels within which solitons might flow as data streams. Think of channels as negative knots embedded in a surface. These data streams can encode the wisdom we have taken from the combination of knowledge and experience and as such it might represent realizations. Those higher level data streams can again be selected based on XOR and treated numerically within an algebraic milieu, then reapplied to topological constraints which again are encoded in soliton bit streams flowing through channels with high efficiency. This is a definition of self-founding or boot-strapping or autogenesis which is based on self-reference. But conceived in the context of holonomics it can be seen as the holonomic root of the EMS cycle.

Figure 59:

CANDIDATE math = nomos octonion reflexive HYPER-COMPLEX SERIES identity	MONAD physus complexnion dissipative SOLITON SERIES presence
SEED binding sedenion -> real meta-system -> system TOPOLOGICAL SERIES reality	VIEW logos = logic quaternion autopoietic XOR SERIES truth

Autogenesis or self-founding is at the root of the emergent meta-system and special systems theory. Self-founding or boot-strapping has the same form as the EMS and the special systems themselves, as we might expect in a world where operator and operand are the Same, i.e. belong together. In self-founding the information carrier is based on topological constraints which is based on algebraic relations of conjunction and juxtaposition which in turn is based on the arising of numbers from the XOR of logic which is applied to the information in the carrier which is in turn based on the topological definition of the information channels. And so we go around and around, at each level founding a new emergent ontological level out of ontic bits. Self-founding is seen as the underlying dynamic indicated by the conjunction and juxtaposition of the four anomalous sequences. Together they specify the mechanism for founding successive emergent layers in a spiral in which each layer uses the last as its basis. The first pops spontaneously out of the void.

There is no ultimate substratum. It is as if each emergent layer popped out of the void as each layer is equivalent to the void. This gives us the form of the kosmic monad when we realize that the spiral's top reconnects with its bottom so the spiraling is endless self generation and so we get a definition of interdependent co-arising as self-founding spirals around to give rise to itself again and again. Always we must ask about the empty center that the spiral moves around, in other words this cycle of self-founding defines its own groundlessness because it rests on the void. The self-connected spiral defines emptiness and like the skeptics endless dialectic gives an intimation of the threshold of formlessness. That which defines the void is no different from the void. The EMS cycle defines the edge of form and formlessness by the cancellation of form and anti-form which is like the cancellation of soliton and anti-soliton in the model of self-grounding. But soliton and anti-soliton when equal form breathers and super-breather instantatons which are anomalous holonomic formations. These anomalous holonomic formations give us an intimation of the intrinsic structure of the void itself. It is on account of this inherent structure that monads (*Ons*) can pop spontaneously out of the void via the XOR formation which gives us imaginaries. Once imaginaries appear then the cascade of symmetry breakings occur to give us quaternions, octonions, sedenions, 32nions, etc. All these formations have perfect balance with no deficiency or excess and thus they are holonomic models of interpenetration of forms which allows all forms to be seen as embedded in the void. They are like perfect numbers in this respect. But every distinction made in the void is groundless and thus must be non-nihilistic. Yet we devolve from those perfect distinctions producing surplus and lack and move from lemniscate through the series of topological anomalous dual/non-dual surfaces until the solid of the sphere of ambiguous paradoxicality is produced at the hyper-kleinian bottle level. Higher and Higher dimensional hyper-kleinians are produced by increasing the lobes of the self-crossing tube twisted 180 degrees from four to eight to sixteen to thirty-two, etc. Each level produces the intensification of paradox into absurd, hyper-absurd, etc. The binding of self-interference is the stuff out of which things take shape at the various heuristic levels and this creates the medium which allows the information carriers of soliton and anti-soliton to flow in flawless and not-so flawless channels. Perpetual information machines are possible when information enters a system from a phase space containing a strange attractor. When these particle/wave non-duals called solitons operate in Cooper pairs then we move from dissipative to autopoietic special systems and the phenomena of super-conductivity arises which is as close as we come to perpetual motion -- perpetual flows of electricity due to zero resistance and thus zero entropy within the circuit is made up for by the entropy of producing the proper temperature. At the reflexive level defined as the limit of the hyper-complex algebraic sequence the physical analogue is the macro-quantum mechanical Bose-Einstein Condensate in which all the various atoms reduce to a single form fused together becoming a single field. This transformation of individual atoms into a condensate field and back again calls into question the rules of mutual constraints of forms and their transformative

possibilities which is addressed by topology. Topology lays the groundwork for understanding surfaces such as the surface of the sphere of ambiguity. In that surface are the channels produced by hyper-kleinian bottles multiple self-intersections which provide channels for soliton and anti-soliton information carriers. Notice that the tube which is figure eight or cloverleaf or has eight, sixteen, thirty-two or higher number of lobes forms a single channel with 720 degrees of curvature like a spinor. A spinor is the definition of a point that stands still in four dimensional spacetime. To stand still in four dimensional spacetime it is necessary to rotate 720 degrees. This is what the solitons traveling through the hyper-kleinian tubes do. A spinor with its 720 degrees has four representations:

Figure 60: Embodiments of 720 degrees of angular change

Math = algebras = juxtaposition of dimensions	torus	hyper-sphere same volume
Waves = solitons	knot	no knots in hyperspace
XOR = something selected	tetrahedron	pentahedron = two mobius strips intertwined
Topology	mobius strip	local duality and global non-duality

These four representations are related to the four moments of self-founding. The mobius strip shows us a topological picture of the 720 degree rotation. The tetrahedron is the simplest form and thus an idealization of “something” as a minimal system as B. Fuller noted in *Synergetics*. Knots denote interference and thus are a symbolization of waves of which solitons are a unique and anomalous kind. The torus takes a simple circle and builds a figure out of circles juxtaposed which gives the synthesis of the toroidal figure. This figure is of the same kind as the juxtaposition of numbers that in conjunction gives hyper-complex algebras. The proof of that is the fact that the torus and hypersphere have the same volume. A hypersphere is a torus through the fourth dimension where a sphere is rotated around the fourth dimensional axis. That rotation is governed by the algebraic form of the quaternion. When the Yang celestial cause hits the *Ard* (Yin Earth) it has four receptivities which is equivalent to saying that their interaction is a dance of self-founding or autogenesis which defines the void, and thus shows that the forms within the *Ard* are no different from the void. The interactions of heaven and earth take the form of interpenetration of forms which shows us that forms are not different from the void, and their self-founding merely defines emptiness which is the formation of emptiness itself. Forms are formless and formlessness has form. The self-founding at the heart of special systems holonomic theory has the form that arises out of the void, defines the void, falls back into the void and indeed exists as the void itself whose production of myriad forms is the same as non-production and whose

destruction of forms is the same as non-destruction. Holonomic special systems and meta-systems theory is the theory of the inherent and intrinsic order within the empty void which *does and does not* give rise to the myriad forms and *does and does not* swallow them back up again. It intimates that production, non-production, destruction and non-destruction, maintenance in continuity and non-maintenance due to discontinuity are all the same. Void is empty and emptiness is void, yet between them arise and fade the ten thousand things based on the nomos embedded intrinsically in the void of the various anomalous series which by their meaning operate together to generate self-founding of autogenesis in groundlessness and groundless self-founding dancing around the empty center of a cyclone raging in the void. Self-founding is, of course, another image of the fourfold of the empty world.

What is strange here is that the four series together actually produce “something” when they are brought into complementary focus with respect to each other. We will call that “something” a *figure*. This is because we can imagine solitons moving through the tubes of the hyper-kleinian bottle. We can image those solitons carrying information and that information giving rise to the hyper-complex algebras. It is possible to think of the hyper-kleinian bottle as siamese computers. They can be construed to be Turing machines in which the information flowing in one direction through the tubes via solitons is the tape while the information flowing in the other direction through the tubes is the state machine. Siamese computers share not just their tapes but their state machines as well. They do so via the instantaton breathers that use the sphere of ambiguity as their potential trough. These instantatons allow them to communicate with each other concerning their computations. But either of them can change the state machine or tape of the other. Siamese computers are the computational equivalent of the hyper-kleinian bottle. In previous papers I have shown that mobius strips can be used as tapes in Turing machines. In a kleinian bottle the tape and the state machine become one thing. In a hyper-kleinian bottle they can write to each other’s tapes or state machines via the ambiguity of self-intersection. Such a siamese computer could be imagined to function via solitons and anti-soliton bits moving through the tubes of the hyper-kleinian bottle. Logic arises spontaneously and then algebra as soon as the XOR produces number. Such a machine could be imagined to use Matrix Logic if the solitons were to move in Cooper pairs, i.e. if they move ultra-efficiently. But this strange formation of auto-genesis in the figure of Hyper-kleinian bottles with solitons running through them must be remembered to be a devolution from the supra-rational which appears right on the brink of paradoxicality of the sphere of ambiguity. The supra-rational is when the four series are kept apart and held to be utterly unrelated. The auto-genesis figure is the congealing of the devolution away from supra-rationality. However, it is extremely interesting and unexpected that such a concrete figure can be formed by combining the four series into a single representation. We will call this figure the kernel of auto-genesis. It is the proto-seed of the EMS cycle. That is the seed that gives rise to the whole cycle itself rather than

merely the monads of a specific cycle. Yet still every seed, every monad, every viewpoint, every candidate can be seen as a facet of this proto-seed of autogenesis. It can be seen as what lays beyond the faceting of the EMS into cycles and as what produces the various facets of the EMS phases.

7. Duality and the Kinds of Being

The reflexive appears to us in terms of a series of levels of learning when we see it in terms of logos and a series of levels of change when we see it in terms of physus. We can see these levels of learning or change as Bateson did as being truncated at four levels. So we see that a fifth level is unthinkable if we follow his analysis in Steps to the Ecology to the Mind. But what this reveals is that knowledge appears at the reflexive level. And the strange thing about knowledge is its persistence. Knowledge is the most persistent thing in existence. We build our world out of its persistence. In the autopoietic system cognition and living are mixed. Thus there is no separation of knowledge out from the tacit understanding of the organism of its environs. But at the reflexive level knowledge appears as what persists among the changing patterns of experience. Once knowledge appears we can rise to meta-level after meta-level in our ability to deal effectively with knowledge. We learn, then learn to learn, then learn to learn to learn, and finally learn to learn to learn to learn in the face of change, change of change, change of change of change, and change of change of change of change. But we hit a blank wall if we try to comprehend learning or changing at the fifth meta-level. This lack of comprehension beyond the fourth meta-level of learning/change brings us right up against the ultimate groundlessness of all our knowledge that was pointed out by Hume. We interpret that groundlessness to be identical with the Buddhist concept of Emptiness (Sunyata).

Figure 61: Levels of Emptiness

Emptiness =

- hole = system
- nothing = dissipative
- interpenetration = autopoietic
- emptiness of emptiness = reflexive
- Indra's net of interpenetration = meta-system

And we see in the meta-levels of learning the premonition of the phenomena of the fragmentation of Being. Being appears in four kinds and when we cease to split physus from logos we are faced with the fact that there are different ways that any entity that essences forth a world can relate to that world. The combination of the ways of essencing forth the world are equivalent to the projection of ideation within a world. So we see that ideation that arises in the production of persistent knowledge

has a substrate that produces the illusory continuity. That substrate breaks up into four kinds of Being or ways in which being-in-the-world can be actualized.

At the reflexive level then we find that the chiasm between learning and change appears as the difference between the most persistent thing (knowledge) and the most fleeting of things (the flux of experience). But this appearance of the epistemic goes hand in hand with the arising of ideation that reveals the substrate of the illusory continuity that supports the ideas. Ideation appears on the basis of the four kinds of Being as ways of relating to the world.

Figure 62: Meta-levels of Being

The levels of Being are these:

- Pure Presence -- present-at-hand -- pointing -- transcendence
- Process Being -- ready-to-hand -- grasping -- immanence
- Hyper Being -- in-hand -- bearing -- immanence in transcendence
- Wild Being -- out-of-hand -- encompassing -- transcendence in immanence

Pure presence is the traditional kind of Being described by Aristotle, Descartes, Kant and most of the philosophical tradition. Process Being was discovered by Husserl and first made the basis of a philosophy by Heidegger in Being and Time. Once different modes of being-in-the-world were discovered to exist then the question was how many were there. Merleau-Ponty first discovered Hyper Being in Phenomenology of Perception. He called it the Hyper-dialectic between Process Being and Nothingness. It was also discovered by Heidegger and called ~~Being~~ (crossed out) which was subsequently made a center of a philosophy by Derrida who called it DifferAnce. Heidegger also talks about it in terms of “appropriation” which he names by “IT gives.” Wild Being was discovered by Merleau-Ponty in his The Visible and the Invisible. However, we can see in retrospect that Heidegger was talking about Wild Being when he delineated the “fourfold” of the world in ‘The Origin of the Work of Art’ following Socrates. It was first made the center of a philosophy by Deleuze and Guattari in their Anti-Oedipus and A Thousand Plateaus. It was explored by Loy in Non-Duality under the rubric of Asian Philosophies relation to Western philosophy and by John S. Hans in The Play of the World. Recently Arkady Plotnitsky has made headway deepening our understanding of this philosophical meta-level in his works Complementarity, Reconfigurations and In the Shadow of Hegel. All of these meta-levels of Being have been explored to various degrees during this century in which the fragmentation of Being has occurred. But what is not generally realized is that these different kinds of Being work together to form the substrate of ideation and that they are revealed beyond the veil of our projection of the dualism of physus and logos when we consider the ontological groundings of our knowledge and its connection to the world through our very being-in-that-world. We can separate out the kinds of Being from the tradition by realizing the meta-levels of Being in the following series:

Figure 63:

beings ^a	entities	things
Pure Being	Being	Static Plenum of Illusory Continuity
Process Being	Being of Being	Monolith of Process and Static Being (Parmenides + Heraclitus)
Hyper Being	Being of 'Being of Being'	IT Gives . . .
Wild Being	Being of "Being of 'Being of Being'"	Fourfold of the World

a. cf. Vail, L.M. [1972] *Heidegger and Ontological Difference*. University Park, Penn. State University Press.

Parmenides describes the fourfold in his fateful statement interpreted by Heidegger as:

Figure 64:

It is necessary: Saying and also Thinking: beings : Being

It Gives Fourfold |>>monolith<<|

Appropriation Worlding IS is

Hyper Being Wild Being Process & Pure Being

Figure 65: Sameness and Dynamism

SYSTEM

- Pure Presence -- homeostatic
dissipative special system
- Process Being -- homeodynamic
autopoietic special system
- Hyper Being -- heterostatic
reflexive special system
- Wild Being -- heterodynamic

META-SYSTEM

A genuine emergent event must traverse all four of the meta-levels of Being in the process of its manifestation within the world. This is because an emergent event is a particular integral synthesis of these four different kinds of Being. The emergent event embodies its own stages of coming into Being in its very structure. These stages relate to the different modalities of our being-in-the-world. Only the emergent event can decenter the whole world and cause a transition to a new world complete with a new future and a new past. The emergent event relates to our whole

being because through it our human essence is transformed. The appearance of genuinely new things in the world changes who we are as well as the world and our relationship to it. It is our essence as 'dasein' to ecstatically project the world. We can relate to every thing within the world through the four kinds of Being. Emergent events integrate all our ways of relating to the world and decenter our world changing both the projector and what is projected. Emergent events can either arise from within us as our creativity or outside us as brand new phenomena that are seen for the first time. The direction of the emergent event is not relevant. What is relevant is that it not only transmutes our world by displacing all the diacritical relations between things but also it transmutes us because it changes who we are fundamentally. We 'are' the ones who have projected the new world that contains the new emergent event. We are the ones that have released one world and grabbed onto another one and in the process took an unexpected tack that changed both the future and the past in one fell swoop. This leap is the unfolding of the implicate order talked about by David Bohm in the proto-gestalt.

At the reflexive octononic special system level this possibility of emergence appears as the confluence of the possibility of both creation and annihilation established at the level of the real and complex numbers and the systems that can be expressed via analogies with their algebras. But also in the confluence between the loss of associative and commutative properties. The 'Magician' Self-Generating Systems described by Goertzel have the property of synthesizing the different kinds of Being in a single model. From that we learn that the loss of commutative property produces the emergent characteristic of mutual action in 'Magician' Self-Generating Systems. And the loss of the associative properties produces the emergent characteristic of gestalt patterns which is essentially the production of social patterns. In an emergent events there is the creation of one world and the destruction of another world. Each of these worlds are characterized by the mutual actions of things and the gestalt formation of patterns. There is an inner transmutation of the patterns and behavioral complexes in the jump from one world to another. The jump from the old world with its past and future to the new world with a different past and future is a process that ends up shifting from one Purely Present regime of manifestation to another. This jump is a discontinuity and thus has the essential nature of Hyper Being. We can only see the jump on the background of the continuous that exemplify Process Being. But in the jump itself there is a wild and chaotic point of departure into an unexpected turn of events and a counter intuitive state of affairs. Thus the different kinds of Being do not just describe ideation but the transformational effects of ideation which adapt to the utterly new and completely unheard of and totally surprising aspects of existence. All this appears under the rubric of the reflexive that upwells as the social substrata (what Deleuze and Guattari call the *socius*). The reflexive brings the social into existence and this last key element makes it possible for emergence to appear which reveals the inner coherence of ideation and makes the kinds of Being visible beyond the hierarchy of the meta-

levels of change/learning.

8. Recursive Sedenion³¹⁷ Meta-Systems

Each of the special systems can be seen as a partial meta-system. When the series of alternating division algebras end then we graduate into the pure meta-system where linearity gives way to circularity by the loss of the division property. That loss of the division property causes the emergent properties of interpenetration to arise within the meta-system. The meta-system is a field of complementarities of complementarities ad infinitum and is represented by the various non-division algebras that may be created by applying the Cayley-Dickson process iteratively ad infinitum. This results in the embodiment of Pascal's triangle by algebraic objects like the imaginary numbers in successive progressive bisections or projections. These higher structures lack the properties we consider interesting in algebra. But that very lack makes them perfect for modeling interpenetration. The obverse of a lack of division is 'fusion'³¹⁸, and that is what interpenetration signifies. The Sedenion may be seen as a conjunction of octonions. These octonions are non-associative³¹⁹ but continue to support the possibility of division and the distributive property within themselves. But this property is subsumed³²⁰ within the overall structure of the Sedenion. The Sedenion contains fifteen virtual octonions that are the shadows of the two conjuncted octonions that gives rise to the Sedenion. Of these fifteen octonions three are special. Those three represent ultra-efficacious worlds where showing and hiding (i.e. Manifestation of Being) vanishes. Those worlds merely exist. Existence is the absence of showing or hiding relations. The twelve other worlds, and each octonion may be seen as a possible world, all have showing and hiding structures in which when you show some aspect of the world then another aspect vanishes. Thus the twelve other worlds represent the shadow of the ultra-efficacious worlds. And those ultra-efficacious worlds represent the inside of the quaternion structure. In other words, the closed quaternion formation which shows us how every part can contain the whole still remains closed. But at the Sedenion level we discover three special worlds that have a special relation to each other that allows us to "see inside" the quaternion and see that each quaternion formation contains three parts that are themselves whole worlds³²¹. Thus at the Sedenion level arises the crucial difference between enlightenment and non-enlightenment. Here we think of enlightenment as the embodiment of social 'flow' within a society. Social flow being the analog to psychological flow within consciousness. That experience

317. Or higher non-division algebra.

318. This 'fusion' of interpenetration does not produce a unity.

319. Schafer, R.D. [1966] *An Introduction to Non-associative Algebras*. New York, Academic Press.

320. Islands of distribution and division remain immersed in the non-distributive non-divisible, i.e. fused soup of the sedenion or higher level non-division algebras.

321. By virtue of the fact that from the outside they look like a quaternion imaginary but from the inside they can be seen as octonions. This means that autopoietic special systems have reflexive fields both outside them and inside them. They are utterly immersed in reflexivity.

of psychological flow is how we experience ultra-efficacy within consciousness. So too, it is experienced in society by the embodiment of social flow that we see whenever a team ‘clicks’ on a project. Social flow takes us into the ultra-efficacious worlds. These are the worlds of existence (non-showing and non-hiding) and away from the showing and hiding of the twelve worlds of normal efficiency. These worlds show up in myth as the time of Kronos and in many other forms³²² throughout world mythology where the world takes on an ultra-efficacious modality. The time of Kronos was the golden age when toil was not necessary. That age is actually a possibility for every world. It is possible for us to snap into a world of social flow in which there are ultra-efficiencies and ultra-effectivenesses that do not just effect special systems within the world but in which the whole world is a special system.³²³ In that world Being in all its kinds vanishes because neither showing nor hiding any longer occur in the same way and instead all that exists is that which is neither shown nor hidden which the Buddhists called ‘Thusness’ or ‘Suchness’. So Leibniz was right there is a best of all possible worlds, but it has no Being. Thus, the world we live in that has Being is not it. What he was wrong about was that there was only one best of all possible worlds. There are in fact at the Sedenion level only fifteen possible worlds and three of them are ‘best’ in the sense of ultra-efficiency/ ultra-effectiveness and lack of showing and hiding or unadulterated existence.

Social Phenomenology starts from the premise that the social comes before all other experiences. And within the social it is the experience of social flow that is the sine quo non of all social experience. In resonance the external and internal unconscious become unified while alienation and anomie vanish. This is the experience of pure resonance and synchronicity between the members of the socius. This experience was called the ‘fused group’ by Sartre in The Critique of Dialectical Reason and the ‘pack’ by Elias Canetti in Crowds and Power. This fundamental experience of communal consciousness in perfect rapport is supported by the mathematics of the Sedenion which singles out three octonions as different from the other twelve. Those octonions correspond to reflexive worlds among the special systems. Those particular reflexive worlds can be fully engulfed by synchronicity in which the showing and hiding of Being vanishes. This can happen to whole groups as Sartre and Canetti describe. We may describe the Sedenion as a mirrorhouse of mirrorhouses. The three special worlds within that mirrorhouse have no distortion in their mirrors while the others have distortions that generate showing and hiding

322. For instance we could interpret the “Kingdom of the Heaven” referred to by Jesus as indicating these three quaternionic ultra-efficacious worlds. See Marvin Meyer [1992] *The Gospel of Thomas : the hidden sayings of Jesus*. Translation, with introduction, critical edition of the Coptic text & notes by Marvin Meyer ; with an interpretation by Harold Bloom. 1st ed. San Francisco, Calif.: HarperSanFrancisco.

323. An example of this was Medina during the life of the Prophet Muhammad, peace and blessings of Allah be upon him, during which arose the most perfect of communities which surrounded him. See Lings, M. [1983] *Muhammad: his life based on the earliest sources*. N.Y. Inner Traditions International, Ltd. Another example is the community founded in Sub-Saharan Africa by Uthman Dunfolio.

relations between things that we call Being. Within the meta-mirrorhouse there are subtle breaks between the octonions where the division property breaks down so that there is a fusion of the plural worlds with each other. As we go on from the sedenion which has sixteen imaginaries to the 32-nion, 64-nion, 128-nion we see worlds within worlds that we would expect in the pluriverse. These worlds are fused and at the same time separate as they exist in Indra's net of interpenetration. Interpenetration hides behind the complementarity of dualities within the meta-system. Duality points toward the inexpressible non-dual state beyond the complementarity that cannot be known cognitively and ultimately does not have any Being due to its intrinsic emptiness. Emptiness is the flip side of interpenetration. Because each thing is empty, it can thus interpenetrate with all other things that interdependently arose with it. Emptiness is the true nature of existence. What is not shown or hidden is the emptiness of the things. What cannot be shown nor hidden is the interpenetration of all things. Enlightenment in the Buddhist sense is the realization that there is no difference between enlightenment and non-enlightenment, just as there is no difference between ultra-efficacious worlds and normal worlds at the octonion level but this distinction arises only within the context of the Sedenion. There are worlds within worlds within worlds as we follow Pascal's triangle in the iteration of the Cayley-Dickson process of unfolding of each new level of imaginary complexity. Indra's net is vast. But within it is the possibility of local continuities and those appear as the special systems within worlds and at the level of the world there are the three special worlds that are ultra-efficacious. We call these worlds within worlds within worlds and take this as the key emergent at the level of the Sedenion. Reflexive systems form the mirror house by reflecting distorted multiple mirrors. At the recursive level there is the opening to discontinuity that is given by the break in the linearity of the imaginary timestreams. This gives us cyclical time. These cycles are called in Buddhism the wheel of Samsara or Birth and Death. As discontinuities open up across time instead of between time streams we look through them directly at the emptiness beyond the imaginary continuities that we project on existence that gives the illusion of persistence or Being.

Notes on Sedenions:

This is the multiplication table for sedenions in lijkEIJKSTUVWXYZ notation:

	1	i	j	k	E	I	J	K	S	T	U	V	W	X	Y	Z
1	1	i	j	k	E	I	J	K	S	T	U	V	W	X	Y	Z
i	i	-1	k	-j	I	-E	-K	J	T	-S	-V	U	-X	W	Z	-Y
j	j	-k	-1	i	J	K	-E	-I	U	V	-S	-T	-Y	-Z	W	X
k	k	j	-i	-1	K	-J	I	-E	V	-U	T	-S	-Z	Y	-X	W
E	E	-I	-J	-K	-1	i	j	k	W	X	Y	Z	-S	-T	-U	-V
I	I	E	-K	J	-i	-1	-k	j	X	-W	Z	-Y	T	-S	V	-U
J	J	K	E	-I	-j	k	-1	-i	Y	-Z	-W	X	U	-V	-S	T
K	K	-J	I	E	-k	-j	i	-1	Z	Y	-X	-W	V	U	-T	-S
S	S	-T	-U	-V	-W	-X	-Y	-Z	-1	i	j	k	E	I	J	K
T	T	S	-V	U	-X	W	Z	-Y	-i	-1	-k	j	-I	E	K	-J
U	U	V	S	-T	-Y	-Z	W	X	-j	k	-1	-i	-J	-K	E	I
V	V	-U	T	S	-Z	Y	-X	W	-k	-j	i	-1	-K	J	-I	E
W	W	X	Y	Z	S	-T	-U	-V	-E	I	J	K	-1	-i	-j	-k
X	X	-W	Z	-Y	T	S	V	-U	-I	-E	K	-J	i	-1	k	-j
Y	Y	-Z	-W	X	U	-V	S	T	-J	-K	-E	I	j	-k	-1	i
Z	Z	Y	-X	-W	V	U	-T	S	-K	J	-I	-E	k	j	-i	-1

In the 16x16 table,

the upper left 1x1 gives a table for R, (real)

the upper left 2x2 gives a table for C, (complexnion)

the upper left 4x4 gives a table for Q, (quaternion)

and the upper left 8x8 gives a table for O. (octonion)

Lohmus, Paal, and Sorgsepp (op.cit.) note that if you use the Cayley-Dickson procedure to double the octonions to get the sedenions, you retain the properties common to all Cayley-Dickson algebras:

centrality if $xy = yx$ for all y in the algebra A ,
 then x is in the base field of A ,
 which is the real numbers R ;

simplicity no ideal K other than $\{0\}$ and the algebra A ,
 or, equivalently,
 if for all x in K and for all y in A
 xy and yx are in K ,
 then $K = \{0\}$ or A ;

flexibility $(x,y,z) = (xy)z - x(yz) = -(z,y,x)$
 or, equivalently, $(xy)x = x(yx) = yxx$;

power-associativity $(xx)x = x(xx)$ and $((xx)x)x = (xx)(xx)$
 or, equivalently, $x^m x^n = x^{(m+n)}$;

Jordan-admissibility
 $xoy = (1/2)(xy + yx)$ makes a Jordan algebra;

degree two

$xx - t(x)x + n(x) = 0$
for some real numbers $t(x)$ and $n(x)$;

derivation algebra G2 for octonions and beyond;

and squares of basic units = -1 .

For sedenions, you lose the following properties:

the division algebra (over R) property

$xy = 0$ only if $x \neq 0$ and $y \neq 0$;

(A concrete example of zero divisors in terms of that basis
is given by Guillermo Moreno in q-alg/9710013:

$(e1 + e10)(e15 - e4) = -e14 - e5 + e5 + e14 = 0.)$

linear alternativity

$(x,y,z) = (xy)z - x(yz) = (-1)^P(Px,Py,Pz)$

where P is a permutation of sign $(-1)^P$;

and the Moufang identities

$(xy)(zx) = x(yz)x$

$(xyx)z = x(y(xz))$

$z(xyx) = ((zx)y)x$.

For sedenions, you retain the following properties:

anticommutativity of basic units $xy = -yx$;

and nonlinear alternativity of basic units

$(xx)y = x(xy)$ and $(xy)y = x(yy)$.

Taken from Tony Smith's homepage at

URL <http://galaxy.cau.edu/tsmith/sedenion.html>

9. General Meta-Systems Theory and the Theory of Emergent Worlds

The sedenion is only one of a myriad non-division algebras produced by the Cayley-Dickson process. We define the algebraic models for meta-systems to be any non-division algebra from the sedenion on down through the whole of Pascal's triangle which is of infinite extent. We call the production of this infinite structure of non-division algebras 'recursion' and refer to the meta-system images produced as *recursive meta-systems*. This leads us to propose a General Meta-systems Theory (GMT) which is the opposite of General Systems Theory an example of which is that constructed by George Klir in his Architecture of Systems Problem Solving. We must carefully distinguish this General Meta-systems Theory from what we have called Emergent Meta-systems. The EMS is image of the interaction between the static balance of autopoietic special systems and the dynamic balance of the combination of the reflexive and dissipative special systems. This interaction appears as the cycle we have described which by symmetry breaking moves from the

real up through the hyper-complex algebras but returns to the real by XOR when it reaches the sedenion level. If instead of cycling within the hyper-complex division algebra domain we break free into the infinite production of even lower non-division algebras then we enter the realm of General Meta-systems Theory. In the Pascal triangle produced by the Cayley-Dickson process there are infinite images of meta-systems of any complexity you desire. All of these images exemplify interpenetration through the 'fusion' gained by the loss of division. The whole set of these images is seen as a representation of the jeweled net of Indra which is the symbol of the ultimate state of interpenetration of all things developed in Hua Yen Buddhism. Ultimately, no matter how many things we consider to exist in the universe, for instance all the fundamental particles or all the quarks, there is a non-division algebra at some level of the Pascal triangle which corresponds to that complexity of meta-systemic environment. At whatever complexity we want to focus there is a meta-systemic representation close at hand defining the threshold of complexity that we should use in considering the multiplicity of the phenomena on which we have focused. Thus, General Meta-Systems Theory is truly general because it gives us a model for any level of phenomena we want to consider as an interpenetrating field. General Systems Theory deals with the figure on this ground which we call the social gestalt of the system. Special Systems Theory tells us the quantal steps by which we move from the figure of the System to the background of the Meta-system. Special Systems Theory describes very peculiar ultra-efficacious and anomalous kinds of Systems, that may arise when we are in the halfway houses between the System and the Meta-system views of phenomena. As we have seen we can take this way of looking at things and blow it up, or shrink it down, to produce various emergent ontological levels such as domains, worlds, kosmos, pluriverse or form, pattern, monad and facet. These ontological levels form an autopoietic ring that we can think of as a torus. They encapsulate the ontic emergent levels that are discovered after utter reductionism fails. We can think of these as nested tori within the torus. Each level corresponds to a certain speed of clock at which it operates in nature. When we take this tori and expand it into the fourth dimension then we find the kind of mirroring we have described as occurring between the social and individual psychological emergent levels between suchness and the absolute. The hyper-torus unifies the various sets of emergent levels we have described as making up our model of the world. There is a surgical operation by which it is possible to make a torus into a kleinian bottle. One cuts the torus and then infolds one end of the cut torus, then one moves the other end through the side of the torus until it can be glued back to the envaginated other end of the cut torus. So there is a surgical operation by which we can move from any level of hyper-torus to any level of hyper-kleinian bottle. Thus, there is an operation by which we may turn our model of the world as hyper-torus into a model of the social relations because we recognize the relation between the kleinian bottle and the autopoietic systems as models of individuals. The hyper-kleinian is a model of social relations at the boundary or event horizon of the paradoxical. It is the dual of the model of the social taken in

terms of interpenetration that occurs at the reflexive level represented by the octonion hyper-complex algebra. As we move out from the equation between the autopoietic system as octonion or as kleinian bottle, we find that it is possible to construct images that either tend toward the paradoxical, i.e. in terms of hyper-kleinian bottles, or those that tend toward the supra-rational, i.e. in terms of octonion hyper-complex algebras. But both of these series of models may be seen as relating to the picture of the world as hyper-torus containing a central three dimensional torus made up of nested sub-tori. By a surgical operation we can convert between hyper-kleinian bottle and hyper-torus. It is also well known that a fundamental model of the dynamics of chaotic systems is the torus which might represent the dynamics of a pendulum within a pendulum, for instance. The dynamic field of the torus can break up into chaos easily. That chaos can exemplify the operations of the strange attractor. A strange attractor has infinite information within it and exemplifies the dual of the continuum. We know that the Emergent Meta-system is a model of chaotic systems of infinite complexity. The Emergent meta-system is composed of the interrelations of the various special systems. These special systems are described by the hyper-complex algebras. So in this way we see that there is via the collapse of the tori into chaos, a route to understanding how the tori is related to the hyper-complex algebras. The illusory continuity of the tori itself must break up in order to make this connection possible. The shattering of illusory continuity by the breaking up of time into various timestreams with imaginary inter-transformations produces a completely different view of the social in which resonance rather than reified structure is emphasized. In this way we see how our model of the hyper-complex algebras, the hyper-tori of the world model and the hyper-kleinian bottles all inter-relate to give us a view of the complex and fascinating interrelations between the social and the world. The social has two images, one is the event horizon of the sphere of ambiguity while the other is the reflexivity of the octonion. Both of these images of the social can be related by appropriate transformations to our model of the world as hyper-tori. In this way we can see that the social and the world are interrelated by complex and interesting transformations which are not obvious. We talk about that complex and interesting transformational interaction in terms of the projection or construction of the world. However it might well be that we should change our image and begin to understand the world as constructed out of the same fabric as the social. That rare and numinous fabric can be inter-transformed from hyper-tori to hyper-kleinian or inter-transformed through immersion in chaotic discontinuity with the reflexive supra-rational properties of the special systems and meta-systems. General Meta-systems theory encompasses all of these inter-transformations and provides us with a general framework for understanding all projections of worlds of any complexity.

It is necessary to distinguish between General Meta-Systems theory and the theory of worlds proper. The theory of worlds is described by Nelson Goodman in Ways of Worldmaking.³²⁴ He speaks about several ways of worldmaking:

- Composition and Decomposition
- Weighting
- Ordering
- Deletion and Supplementation
- Deformation

We note that Husserl's phenomenology is based on expansion and contraction of objects in the imagination in order to explore the constraints on essences. Igvar Johansson suggests that we can use slicing of objects instead in order to explore their internal coherences. Goodman says that he has described several ways of worldmaking but does not claim that this is a complete list. But what we note is that all the ways of worldmaking involve kinds of transformation of objects at the meta-essence level, i.e. at the level of Hyper Being. We have described two of these in order to understand how the fabric of the world can turn into the two views of the social, either from the supra-rational side, i.e. reflexive special systems, or the paradoxical side, as the event horizon for the sphere of ambiguity at the center of the hyper-kleinian bottle. The transformations we needed were topological surgery and dynamical collapse into chaos. Self-binding surgery is what produces the series of topological anomalous structures of lemniscate, mobius strip, kleinian bottle, etc in the first place. The dynamics of chaos is what lies behind our model of the Emergent Meta-system which eschews continuity for discontinuity. Notice surgery assumes the existence of continuity before it introduces its disruptions and re-glues to create strange and anomalous forms. Emergent Meta-systems assume discontinuity from the very beginning and attempt to explain continuity rather than vice versa. So when we move back and forward between our various mathematical analogies we are employing various ways of worldmaking in order to talk about the worlds arising through the surface of the chaos of Wild Being from the sea of meta-systems. This leads us to posit a Theory of Worlds based on the General Meta-systems Theory. Meta-systems give us the basic empty substrata of interpenetration upon which our worldmaking transformations operate. The Theory of Worlds produces myriad worlds from this empty "stuff" of interpenetration by various types of transformations that operate at the level of meta-essences. In order for this to occur the "stuff" must come through the interspace from Existence into Being, i.e. arise in Wild Being to be operated on in Hyper Being. All the various levels of meta-systems are a model of existence. It is not until one gets to the level of hyper-complex algebras that we simultaneously enter into the realm of the kinds of Being and the different sorts of ultra-efficacious special systems. The kinds of Being are the differentiation of the paradox of Being. The special systems are the images of the supra-rational that segment the kinds of Being. They mutually define each other. The Theory of Worlds speaks about how this process by which worlds arise occurs. No matter how many worlds you imagine there is some level of the Pascal Triangle that

324. Goodman, N. [1978] *Ways of Worldmaking*. Indianapolis, Indiana: Hackett Pub.Co. See pages 7-17

embodies the relations between all of their most fundamental existents. But we bring these worlds into existence via the meta-essence level transformations we apply to these existents. This simultaneously brings them into Being and allows them to be ultra-efficacious until they are reified into the social gestalts of systems in which they enter the restricted economy of entropy. We may produce myriad worlds in this fashion or understand the transformations of our own designated as real, true, identical or present world. All transformations occur at the level of meta-essence, i.e. at the level of Hyper Being, on materials that at least have Wild Being, i.e. chaotic infrastructure. Our world is transformed when an emergent event occurs. Such an event is when an existent appears within our world and moves through all the levels of Being until it reaches Pure Being. The existent first takes on the veil of Wild Being and becomes an enigma with propensities. Then, it takes on the veil of Hyper Being and becomes a meta-essence which has fuzziness which we query. Then, it takes on the veil of Process Being and becomes an essence with probabilities when it actualizes which we project as Dasein. Then, it takes on the veil of illusory continuity in Pure Being which has determinate characteristics that we see as an object by our subjectivity. These stages of the realization of the emergent event by which some level of our tradition is transformed utterly by the genuinely novel and new, are the same stages by which the myriad worlds can be produced. Instead of an object coming into the world from existence we have a whole world arising through the various stages of ascent out of existence. The meta-systems have levels within the Pascal triangle to support a world of any complexity in arising. Worlds arise in the same way that individual emergent objects arise. At first there is some level of complexity in the Pascal triangle that is designated as the level needed for a particular world. Then the existents of the world take on the veil of Wild Being and are seen as a chaotic mass. But immediately they achieve the ultra-efficacious qualities of the reflexive special system and thus form a basic supra-rational social fabric. In that fabric the existents exhibit propensities that are enigmatic. We note that there are Mandelbrot like sets at the levels of quaternion and octonion. Onar Aam was first to create images of Octonion Mandelbrot sets which we might call “Aambrot” sets³²⁵. Such images are calculated by the speed at which individual points escape to infinity, which is a mathematical representation of what Deleuze and Guattari call a “line of flight”. Thus at the Wild Being level the world is made up of various *lines of flight* which exhibit a propensity. Existents are trapped in the *magma* of their fundamental indeterminacy as Castorialis calls it. They form a heterarchical *rhizome* which is “heterogeniously interactive and interactively heterogenous” as Arkady Plotnitsky would have it. John S. Hans speaks of the *play of the world* and its aesthetic dimension. The social ultra-efficacious field operates on the reflexive field of enigmas which exhibit what Coutu calls *tendencies in situations* at the level of Wild Being. The social field itself is like Cannetti’s *pack* or Sartre’s *fused group*. At this level it is impossible to separate the existents from the members of the social

325. These can be seen on his web page. op. cit.

field itself. Everything arises from the social and thus we found a social phenomenology to study what arises from that fundamental infrastructure of our world. All worlds are social worlds. Only social beings propose worlds and project them and designate them as real, present, true and identical. But worldmaking occurs fundamentally when we take this chaotic substrata of the world from Wild Being and attempt to transform it by some ways of worldmaking by producing meta-essences. At this point we move from Wild Being into Hyper Being. The world stops being Chaotic and becomes Fuzzy. The fuzzy meta-essences yield an autopoietic ultra-efficaciousness. Autopoietic systems are formed as the balance point for the world out of the reflexive field. As we imagine it all individual organisms that project worlds appear from a social milieu. Those social organisms are the centers of the vortex of the world or the pivot upon which the ecstasy of the projection of the world occurs. This can also be seen in terms of the collapse into nothingness which is the dual of Process Being that Sartre imagined in Being and Nothingness. There is a hyper-dialectic between Process Being and Nothingness which Merleau-Ponty described in The Visible and the Invisible. The cancellation of Process Being and Nothingness yields Wild Being. But prior to cancellation there is the indecidability of Hyper Being, and it is within that realm that autopoietic unities arise. These unities attempt to distinguish supra-rationally and maintain their boundaries in relation to all the other images that appear in the reflexive mirroring environment of the social. If they get lost in the false and distorted multiplicity of images then they fall into nihilism. At the level of Hyper Being the differences between the meta-essence differentiations into individual essences is undecidable. The anomalies at this level are the Godelian statements whose truth cannot be known within the system that is being projected. All autopoietic systems have Godelian statements, i.e. non-nihilistic distinctions by which they maintain their boundaries in relation to all the images of themselves and others in the reflexive social environment. The Godelian statement is the kernel of a meta-essence with reference to truth. Similar *things*³²⁶ exist in relation to identity, presence and reality. They are *things* that cannot be discriminated whether they are inside or outside the boundary of the system. Such determinations must be made either by nihilistic *fait* or by producing a non-nihilistic distinction. If we make a decision concerning the fuzzy meta-essence and their inter-transformations then we fall into Process Being and the embodiment as a dissipative system. Such a special system can either be a desiring machine or a disseminating machine. At this level there are probabilistic essences of ontic eventities within the world projected by dasein immersed in a particular mitsein³²⁷. Now we enter a stage of worldbuilding that we can relate to because we are surrounded by eventities that essence forth. At this level of worldbuilding we can recognize the excrescences

326. A “*Thing*” is an Old English term for a social gathering. It is at a social gathering that the social gestalt is created that determines whether something is inside or outside the boundary of a particular autopoietic system. This is normally concerned with the distribution of rights and responsibilities within a social milieu. This leads us down the path of exploring the various levels of non-duality called law & order, right & responsibility, the good, and the fated.

327. being-with others.

produced by nihilism and contrast those with the ideal holoidal state of perfect operator-operand (noun-verb) coincidence. We can recognize the epochs in which the world remains the same and the novum of the emergent events that transform the meta-essence infrastructure of the world. We can also recognize the holonomic character of the world, and the integrity of things that occur due to the synergies that appear because the world comes out of the meta-system. All the trigrams of Being are recognizable at the level where the world takes on particular essences.

Figure 66: Trigrams of the aspects of Being³²⁸

		<u>Holoid</u> Noun/Verb Unity <i>true</i> <i>identical</i> <i>real</i> {Epidoclus' love} totality as unity		
	<u>Holon</u> <i>true</i> <i>identical</i> <i>illusory</i>		<u>Integra</u> <i>true</i> <i>different</i> <i>illusory</i>	
<u>Novum</u> <i>true</i> <i>different</i> <i>real</i>		the non-nihilistic distinction is the center point of the trigrams of Being.		<u>Epoch</u> <i>false</i> <i>identical</i> <i>illusory</i>
	<u>Essencing</u> <i>false</i> <i>identical</i> <i>real</i>		<u>Eventy</u> <i>false</i> <i>different</i> <i>real</i>	
		<u>Ephemeron</u> <i>false</i> <i>illusory</i> <i>different</i> {Epidoclus' strife} excessences		

Eventually our arising world falls into Pure Being where everything within it becomes determinate. In that world we become subjects who apprehend objects. In such a world we build formal structural systems theories concerning the objects we find there as we produce various social gestalts in our social phenomenology. This world has become concrete and may be apprehended to have various ontic levels of emergent properties after we have applied reductionism. All these ontic levels and the phenomena that appear at each of them may be seen using any of our emergent

328. See *The Fragmentation of Being and the Path Beyond the Void*: Fragment 12 “Unfolding Imaginary Being”.

ontological templates of comprehension. As we use those templates we are individuals who process various emergent levels of information and find ourselves embedded in a tradition with various emergent levels on which emergent events might appear. As we think about our ontological templates of comprehension of our world we imagine various combinations of those levels such as the formal structural system and the meta-systemic world domains. The meta-systems are the basis for our production of myriad worlds and their various synergetically related domains and disciplines. This is the dual of the formal structural system such as that described by Klir within the emergent ontological hierarchy. In order to situate any given formal structural system it is necessary to provide the context of meta-systemic world domains. Out of environmental meta-systems we socially construct or project worlds which contain domains by which we segment the phenomena that we find within the worlds. Without a General Meta-systems Theory and a Theory of Emergent Worlds it is not possible to situate the phenomena we describe by our Formal Structural Systems Theory. Thus, both the General Meta-systems Theory and the Emergent Worlds Theory become crucial for our full realization of the social phenomenology by which we describe what appears within our worlds. It is also the basis for the founding of virtual worlds such as may appear within the medium of cyberspace.

10. Ultra-Efficacious Special Systems

The key feature of the special systems is their ultra-efficiency. This is to say that they unexpectedly bring four dimensional rotations into the three dimensional realm and violate our expectations by giving us the apparent equivalent to perpetual motion machines that we normally think of as impossible, but which are indeed actualized either physically or logically. Within four dimensional or higher dimensional space it is well known that perpetual motion is a possibility because rotations blocked in three dimensional mechanical devices are possible in that realm. And, of course, we know that we live in a four dimensional spacetime realm but we normally relate to it via our concepts of three dimensional space segregated from time. But what the special systems make clear is that nested within our three dimensional projections, we can on a rare occasion access the implicit four dimensionality of the underlying spacetime substrate. When this occurs then we get phenomena that violate our general rules as to how things work. But these violations that appear as anomalies are just as real as the entropic norms we project upon existence. It is in the deep nesting of phenomena that the four dimensional rotations appear that give rise to unexpected ultra-efficiencies. The discovery of these ultra-efficiencies is always an emergent event within the realm of normal science that leads to revolutionary paradigm changes.

Two examples of such ultra-efficiencies that violate our expectations are solitons and super-conductivity. One of these is a macro-phenomena of unique waves propagating in channels while the other is a micro-phenomena of electrical

conductivity in a lattice of particular types of molecules that only appears close to absolute zero but recently has been found also at or about the freezing point of nitrogen. In both cases there is a special circumstance that produces the unexpected ultra-efficiency in a limited region of space-time and the study of these special circumstances lead to a major refinement of our understanding of the forces of nature. Soliton solutions have been found in many basic physical equations, like the Schroninger Equation, and many different kinds of chemical compounds are found to have super-conductive properties. Both of these phenomena are ultra-efficient, but this ultra-efficiency has not been related to any general theory. The theory of the special systems now claims to be the underlying general theory of ultra-efficiency. It describes how four dimensional rotations enter into systems and introduce a nesting that allows an access to the underlying four dimensional substrate beneath our projection of three dimensional spatial constructs on existence. This access to the underlying four dimensionality is gained by the bifurcation of the timestreams within the system so that the conjunction of the different timestreams produces the ultra-efficient effects that we see in our experiments. In each case the underlying mechanism will be different. For super-conductivity it is the arising of Cooper pairs that communicate via phonons, which are the vibrations of the lattice of atoms they are traveling through. In the case of solitons it is the reflections of the solitary wave off the bottom of the channel through which they are traveling. But in each case the ultra-efficiency arises from a synthesis of the different kinds of Being as represented in a particular configuration of the logos/physus dichotomy as it is applied to particular phenomena. This means that in every case of ultra-efficiency there is a mapping between the phenomena one of the ultra-efficient special systems that have analogies with the hyper-complex algebras. The mapping of super-conductivity is to the autopoietic special system where the Cooper pairs act like a closed pair of dissipative systems. In the case of the soliton the mapping is to the dissipative system where the reflection of the wave form off the channel gives an Escher waterfall-like effect in which the reflected energy of the wave out is used to keep the wave going beyond what we might expect.

The discovery of a general theory of ultra-efficient systems is a major advance in General Systems Theory which now covers the special cases of formation/patterning, living/cognitive and social/psychological effects. Now sociology and psychology can be grounded in a particular form of mathematical analogy which will allow them to be systematized in a way analogous to the systematization of the other sciences. Other sciences take great advantage of mathematical analogies to advance their understanding of phenomena. Now both sociology and psychology can follow this same royal road of science but applying analogies to parts of mathematics that physicists have not been able to apply very well. It is of interest that quaternions and octonions have found little use in describing physical phenomena. But now we can see that they have their use in describing the articulation of the Logos into its social and psychological aspects.

Also until now autopoietic theory has been a backwater of the theory of living and cognitive systems. It describes well the anomalies of these kinds of systems, but as a theory has not been well accepted because the theory did not seem to have any mathematical grounding. The realization that quaternions are the mathematical grounding of autopoietic theory will go a long ways toward the production of grounded representations that will allow us to build better models of autopoietic systems. And we will no longer apply this theory haphazardly to social systems because we know that we need to advance to the next emergent level in order to describe social and psychological phenomena which unfold from, and are based on the constraints of the living and cognitive autopoietic systems. Finally we realize that the autopoietic systems are built out of dissipative systems and so there is a bridge to normal non-dissipative physical phenomena. So it is now easy to understand the steps by which the emergent living system must go through to evolve by a series of discontinuous mutations or quantal jumps out of non-dissipative phenomena.

The theory of ultra-efficient phenomena unifies the field of studies that have been so long dualistically separated. The physical phenomena have been described quantitatively with great rigor until it hit the wall of quantum mechanics that set the limits to application determinateness. The logos has been described mostly in qualitative terms through the humanistic disciplines³²⁹ such as hermeneutics, phenomenology, dialectics and structuralism. But now we realize that the realm of logos has its own special systems and these have a direct connection to all other systems through a certain series of emergent levels. The special systems and their emergent levels in connection with the general theory of systems ties logos and physis into a single mathematically described structure which then allows us to see beyond that structure to the levels of Being that unify our projection of the world and all the ramifications of the logos/physis dichotomy within our world.

We speak of ultra-efficiency but we actually mean the combination of ultra-efficiency and ultra-effectiveness which we call ultra-efficacy following Plotnitsky. Dissipative systems are highly efficient and effective because they produce order from nowhere spontaneously and for free. Autopoietic systems are ultra-efficient and ultra-effective because they trap the order production and allow it to go on indefinitely. It is as if the ordering principle were reflecting around the closed container of the autopoietic system. This is efficient because ordering and the maintenance of order occurs spontaneously. It is effective because it maintains the boundary in equilibrium and continual expansion is no longer necessary. Reflexive systems are ultra-efficient and ultra-effective. This is because these systems self-transform continuously spontaneously. This means that it is not just maintaining

329. The dual of these humanistic disciplines that project distance is 'Heuristic Research' which attempts to live within its topic rather than approaching it from the outside. See Moustakas, Clark [1990] *Heuristic Research*. Newbury Park CA, Sage Publications.

order but continually renewing itself with a different emergent order. Here emergence is for free. This is effective because it allows flexibility and adaptability to radically and quickly changing environments. Thus, the dissipative system is highly efficacious, the autopoietic system is ultra efficacious and the reflexive system is ultra-efficacious. The efficaciousness at each level is the non-dual reversible chiasmic point between efficiency and effectiveness. In Buddhism this is called skillful means. For instance, the concept of enlightenment is a skillful means in that it uses a meta-illusion to cure the soul which is sick with myriad illusions. The concept of enlightenment is efficacious because it is an illusion at the same meta-level as that of the self that can be used to annihilate the self. First the self as a system cancels with the illusion of enlightenment, then we fall into the sea of meanings, and then we realize the truth of the statement of Shaykh Ibn al-Arabi al-Akbar that “man is the little universe and the universe is the big man” at the reflexive level. Until finally we glimpse the jeweled net of Indra which is all the levels of emptiness combined in an anti-construction like the emergent meta-system formation.

11. Holonomics

But the access to the key characteristic of ultra-efficaciousness is not the only thing that the theory of the special systems give us. It also gives us a clear view of what Holonomics should really mean. That is Holonomics applies to the conjunction of different timestreams and the splitting of the real number lines that are fully ordered and represent illusory continuity in our description and measurement of systems. When the single timestream bifurcates it goes through a series of symmetry breakings that each has profound consequences for the intertransformation of descriptions of systems. With each emergent algebraic level certain key characteristics change and new ones are introduced so that there is a transmutation of the basic constraints that our attempts of intertransformation must operate under. This means that unexpected four dimensional effects enter into the nesting of our systems as they split into multiple timestreams that are described by hyper-complex algebras. So nested within our general systems described by Klir’s general systems theory are special systems descriptions that are radically different and non-intuitive but which manifest as physical or logically discriminated phenomena. Through these phenomena we discover the synthesis of the kinds of Being and have access to the structure and unfolding of the emergent event.

Holons are the special meso-systems that arise between systems (as gestalts and flows) and meta-systems (origins and arenas) which have parts that are held in conjunction and which exist in relation to separate timestreams that are also in conjunction. These strange quasi-wholes are exactly equal to the sum of their parts, neither more (like the system) nor less (like the meta-system). Holons are neither part nor whole but are at the same time both part and whole in a strangely beautiful perfect balance. Their analogy are the perfect numbers³³⁰ whose parts add up to the

whole without remainder nor deficiency. Holons act like wholes from one point of view and parts from another point of view so they fulfill the original Janus faced characteristics of things that can be seen as wholes or parts depending on the viewpoint on them. We note that the analogy of perfect numbers to holons can be extended by the concept of amicable numbers and sociable numbers³³¹. Amicable numbers³³² have sets of divisors that add up to each other. Sociable numbers are a group of numbers that form a cycle in which progressively the sum of divisors adds up to the next number in the series. Amicable numbers are an image of the autopoietic special system which is two holons symbiotically related to each other. Sociable numbers are an image of the reflexive special system which is a set of holons that form a series. The most abundant of these are sets of four holons that are mutually generating from their divisors in series. However the first such set of sociable numbers has 5 elements and the second has 28 elements. After that there are fifteen sets of four before we hit a set of nine and a set of eight. There are also sets of six. The sequence is 5, 28, 15x4, 9, 8, 4, 8, 10x4, 6, 5x4, 6, 15x4 ... Sociable numbers³³³ are an analogy for the reflexive special system made up of more than two symbiotically related holons.

Having mathematical analogies for these strange special systems is a very important advance because it gives us an access to the nomos that lies behind both the physus and logos. It gives some grounding to our understanding of the counter intuitive properties of dissipative, autopoietic, and reflexive special systems based on derivations from the mathematical properties of the algebras. And extensive explorations of these implications show that the counter intuitive analogies with the algebras are very revealing as to the nature and logic underlying the special systems at all three emergent levels. This gives a mathematical grounding to the general theory of holons, so we can now speak of a science directed at discovering ultra-efficacious special systems based on a general theory of such systems which explores the nomos that underlies conjunctive holons. So finally after many false starts a new mathematically grounded science of holonomics is born which is directly connected to general systems theory and explicitly defines a series of emergent levels that define strange special systems that defy our expectations based on the norm of thermodynamic entropy. This norm is rarely, but still definitely

330. Such as 6, 28, 496, 8128, 130816, etc. Such numbers are the relations between elements at specific 2^n heuristic levels such as $2^2, 2^3, 2^5, 2^7, 2^9$. See <http://www.utm.edu/research/primes/glossary/PerfectNumber.html>

331. "An amicable pair is a cycle of length 2 of s , i.e., a pair of numbers each of which equals the sum of the other's aliquot parts; the members of amicable pairs are also called amicable. The smallest such pair is (220,284)." David Moews (dmoews@xraysgi.ims.uconn.edu) See <http://xraysgi.ims.uconn.edu:8080/amicable.html> See also <http://www.utm.edu/research/primes/glossary/AmicableNumber.html> See also <http://www.vejlehs.dk/staff/jmp/aliquot/kwnnap.htm>

332. <http://xraysgi.ims.uconn.edu:8080/amicable2.txt> David Moews (dmoews@xraysgi.ims.uconn.edu)

333. "The members of aliquot cycles of length greater than 2 are often called sociable numbers. The smallest two such cycles have length 5 and 28, and were found early in this century by Poulet [POU]. Borho [BOR1969] constructed one of length 4 in 1969. Everything since has been found via computer search." David Moews (dmoews@xraysgi.ims.uconn.edu) See <http://xraysgi.ims.uconn.edu:8080/sociable.txt> See also <http://www.utm.edu/research/primes/glossary/SociableNumbers.html>

broken by specific phenomena in nature. Now we have a basis for tying these phenomenal anomalies together and a hypothetical pattern to assist us in discovering new ones.

Holonomics applies the Special Systems and Emergent Meta-systems theory to phenomena. It goes beyond the dialectic between the Novum and the Epoch that appear within the trigrams of Being. In other words it goes beyond the comprehension of how the world transforms utterly as in the transformation between the mythopoetic and metaphysical eras. Rather it focuses on the structure of the emergent event itself and attempts to understand its holonic form as well as its integrity. The question has been raised³³⁴ in the philosophy of consciousness concerning the relation between qualia and the functional psychological capabilities exhibited by consciousness. This becomes a question in all dualistic philosophies. However, for non-dual philosophies such as our social phenomenology this is not a difficult question. We recognize the dual of the holon as the integra. The integra is what was called in Chinese philosophy, Li, i.e. principle/pattern. It is what lies beyond kindness that appears in Wild Being. Li and Chi go together in the Chinese view of the constitution of the world. Chi is the energy of unfolding transformation and Li is the underlying principle of patterning which becomes exhibited in the unfolding process. The Li of each individual existent is different as it essences forth into existence expressing its Chi. This relation between the holon and its intertransformation with other holons is encapsulated at this level of the trigrams of Being. Quality and Quantity are related by means of the N^2 to 2^N intertransformation symbolized by the Ho and Lo river maps related to the Trigrams in the I Ching. So there is a specific intertransformation between quantity and quality that we spoke of with respect to the emergent meta-system image that arises from the laws of form/pattern via engagement and entanglement. Quality and Quantity refer back to a non-dual integral holon exhibiting Li and Chi fused. So Qualia and the Functional aspects of our psychology arise together from this non-dual holonomic source that provides the bedrock of consciousness. Consciousness is a restricted economy of intentionality. It is opposite the non-intentional Unconscious. Their relation is like the relation between Pure Being and Hyper Being. Hyper Being is seen as the unconscious of manifestation which is a more general way of looking at phenomena. Between these two exist Process Being or we might say Awareness which is non-intentional and in fact probabilistic. Awareness in this sense is neither conscious nor non-conscious but is the field in which intentionality arises. But the antipode of awareness is Wild Being in which the integral holons that exemplify the fusion of Li and Chi appear. Normally our culture is blind to this level of phenomena where the qualia and the functional aspects of awareness interact. This blindness is exemplified best in gender relations which when considered from the point of view of the kinds

334. Chalmers, D.J. [1996] *The Conscious Mind: in search of a fundamental theory*. New York : Oxford University Press.

of Being leads to an “Archetypal Gender Ontology³³⁵”. But all aspects of our world can be seen in terms of the integral holons and their manifestation of Chi and Li. These integral holons are both quantitative, i.e. discriminatable, and qualia at the same time. From them arise our discriminations concerning invisible properties of existence and the visible discriminations concerning qualia. When we go into that inner unity of qualia and quanta we find the holoidal mirroring of the part in the whole that is found in holograms that is an image of interpenetration.

Holonomics deals with all socially projected phenomena in terms of its Integrity and Holoidal character. Thus holonomics is a discipline that understands the seeming mystery of the arising of qualia within the expression of quanta. We have described Plank’s quanta as the basis for the arising of the various levels of self-intra-embedding. Each of these levels of intra-embedding of the self into the self with various twists and gluings has its phenomenal character. The phenomenal character of these quantal levels is intrinsic to their expression in existence because existence is ultimately non-dual and encompassing all duals supra-rationally or devolving into paradoxicality. Supra-rationality and paradoxicality spring from each other in an unending dance that produces all the worlds. Holonomics studies the character of this dance and the phenomena that appear within it in terms of their inner integrity and their holoidal mirroring of the greater context of which they are a part. The integra tells us about the Chi/Li Fusion of the individual thing while the Holoidal Holographic quality of the individual shows how it mirrors the world. Social Phenomenology has this level of subtlety that goes beyond the level of meta-essences at which we tend to stop within the Western Indo-European tradition. But other cultures did not have our own blindness to the level of Wild Being with its articulation of Chi and Li. As specific examples we will describe the medical disciplines of Homeopathy and Acupuncture which are traditional scientific disciplines that deal with humans in terms of holoidal integral holons rather than stopping at the level of meta-essences, i.e. the transformations in our physiologos or logophysus due to imbalance and disease.

One way of understanding the position we are positing is to think of the radical break posited between micro-quantum relativistic mechanical processes and our common sensical Newtonian view of our mundane physical world. Also consider the radical break between a view of the world that accepts qualia and those who do not as an important consideration when looking at physical phenomena. Both of these radical breaks work to preserve our Indo-European worldview. Consider now a view that says that qualia and quantum phenomena are what is designated as real and that the laws of physics as they appear in the Newtonian physics is epiphenomena, i.e. reversing the normal position analytic materialists take on both ends of the spectrum. This view says that things are quantal and that these quanta are inherently qualitative.

335. Palmer, K. “Archetypal Gender Ontology” (manuscript)

This is the macro-quantum mechanical view immersed in a social phenomenology. It says that the normative Newtonian view is socially constructed in our worldview and we are resisting dropping it by erecting dualistic positions with respect to physus on the one hand and the logos of consciousness on the other hand. The non-dual view takes what is incomprehensible on each side and posits that it is more real than the normal Newtonian view. It posits that these boundaries are artificially constructed in order to preserve a worldview that is fundamentally warped because of its basis on Being rather than Existence. We posit that other worldviews did not have this warpage and cite the Chinese traditional sciences and those of the Islamic tradition. We give as examples of these Acupuncture and Homeopathy in what follows. The reason we should take these disciplines seriously is that other cultures may have had an inherently macro-quantum mechanical view of existence. In fact, we posit that all cultures that do not have Being in their languages start out with this macro-quantum mechanical and qualia centered non-dual view. It is Western culture because of its dependence on Being rather than Existence that projects fundamentally different and warped views on existence which cannot understand qualia and quanta despite those being two of our most fundamental philosophical categories. We dualistically separate them from each other and deny their intertransformability and fundamental non-dual status. The very fact that they are dual category for us is the fundamental source of the problem. We find the quanta in the physus when we go beyond the illusory continuity of the calculus. We find the qualia in the logos of consciousness after we have gone as far as we can in understanding the invisible cognitive features of consciousness. Both of them are fundamentally incomprehensible for us in different ways. You would think that the invisible aspects of consciousness would be incomprehensible. You would think that the illusory continuity would be hard to understand based as it is on transcendental numbers and various levels of Cantor infinities. But instead it is the most visible aspect of consciousness and the quanta we discover that evades the power of the calculus that we find incomprehensible. And this is because of the dualistic structure of the Western worldview which privileges transcendence which is at once invisible and projects illusory continuity and thus bolsters subjectivity. What is visible and quantal contain discontinuity and it is this discontinuity that we are attempting to avoid by our dualistic schemes. General Systems Theory shares these widespread dualistic transcendental prejudices. Emergent Meta-systems Theory and General Meta-systems theory confronts this issue directly by privileging discontinuity instead and so we are led to emphasize the visible (or generally sensible) which is full of discontinuity and the quantal at the micophysical level. If we bring together these two inferiors in the dualistic schema that first splits physus and logos and then draws copenhagen-like lines between us at the ultimate phenomena of nature or consciousness then we achieve a view that is on the face of it macro-quantum mechanical and qualitative at the same time. In this view it is easy to see how we could find Li and Chi to be a significant distinction as the Chinese did. The Chinese also had the concept of Shu or number or quanta. Each quanta had its own Li which it exhibited by the unfolding of its Chi. Chi is the

unfolding we find both in Logos and Physis. It is a characteristic they both share that is non-dual between them. The flow of Chi allows the individual to exemplify its own unique patterning beneath the level of essence or meta-essence, i.e. at the level of Wild Being. The source of that Pattern is Li and its exemplification in the individual is also Li. Li has two specific senses of patterning in things and the patterning principle which is the source of that patterning in things. Thus we specifically have a marriage of quanta and qualia in the Chinese Tradition. The qualia is thought of as the patterned Chi that is inseparable from the quanta in which it appears because each quanta has a unique Li both in principle and in terms of embodiment. We can understand that in our own worldview in terms of fractal patterning along the lines of the Mandelbrot set where the escape velocities of various points differ giving a unique patterning at any level of magnification. There are macro-patterns within this fractal landscape which are unique at each point if we only go to the next level of magnification. In other words each point has its own disposition or propensity toward a velocity in its line of flight given when it is iterated. Iteration is the quantal dimension. The qualitative dimension is given when we assign a color to each velocity. When we look at the gestalts that appear in this patterning we find swirling patterns that exemplify the Chi and Li. The swirling patterns only come when we project across the landscape of the Mandelbrot set a view which is not visible with respect to each point. But each point independently contributes to this overall view. It contributes its qualia, i.e. its color coding. But the color coding is randomly assigned based on the escape velocities that come from iterating each point. Thus we can clearly see how quality and quantity are intertwined. If we did not assign the colors we could not see the pattern. If we did not iterate the points we could not see the pattern. Both assigning the colors and iterating the points to find the velocity of escape differences are crucial to seeing the swirling patterns. Chi and Li appear when we combine quality and quantity in this way as a macro-phenomena which is unexpected and emergent. However on our view the situation is reversed. Chi and Li are non-dual concepts that are prior to the arising of the quality/quantity duality. The Mandelbrot set is there as an expression of Chi and Li prior to our combining quality and quantity to see it. In this view there is a Mandelbrot Li or principle of ordering unique to the Mandelbrot set which appears uniquely in every area throughout the set. That ordering appears because different points in the set have different propensities or dispositions. Those propensities or dispositions or tendencies that become visible at the level of Wild Being form a field which has Chi, or a dissipative patterning in accordance with the Li. We put that patterning together and see the swirls with our combination of quality and quantity that allows us to see it but it already exists in the Mandelbrot set or any of the sets associated with quaternions or octonions such as the 'Aambrot' set. This phenomena inherently combines the Chi, Li and Shu. Each point at whatever magnification is the exemplification of Shu. Each point is discontinuous from all the others. When we do self iteration on that point and assign colors we see the swirling patterns. Swirling refers to the Chi of the area and the Patterning refers to the Li of the area. Swirling

patterns are there prior to our seeing them as an intrinsic mathematical field phenomena that only exists in relation to the Complexnions, Quaternions and Octonions as far as we know. We can generate fractal patterns and see them in our world but we know of no other mathematical object that exemplifies these patterns in the way that these formations do that are associated with the hyper-complex algebras. So once again the hyper-complex algebras are our guide in understanding what we have called macro-quantum mechanical and qualitative experience as a form of immanence which is opposed to the transcendence of the invisible functions of cognition and the illusion of continuity exemplified by the calculus.

In our scheme of emergent ontological levels, which is, of course, provisional, it is the monad which serves as the representation of the fusion of quantity and quality. Monads, in our sense, are independent existing eventities, that occur at the limits of our perception, whatever those limits are. As with the Mandelbrot set, given a level of magnification, there is a field of points which are each treated independently. Iteration and color coding is applied to each independently, then we form a series of gestalts based on the patterning they reveal. So the monad is a moment of pure content or 'hyle' at what ever level we might be looking. It is quantitative to the extent each moment is treated independently within the perceptual field. It is qualitative because the monad has its color value, or general sensate value, as distinct from all those around it in the discontinuous field. When we treat the field as a proto-gestalt or meta-systemic environment then we project upon it coherences and implicate orders that cause us to have a series of gestalts of the field. Both the proto-gestalt and the gestalts within the proto-gestalt is something we project on the field of pure discontinuity, i.e. Existence. As projections the proto-gestalt and the gestalts are part of Being. Just as the forms are at the level of Pure Being and the patterns are at the level of Process Being, so the monads are at the level of traces in Hyper Being. Thus everything that Derrida says about the traces in his Grammatology appertain to the level of monads. In other words we can think of monads as the traces left by the writing of the projection of perception. We can think of monads as written into the palimpsest of existence. Myriad perceptions leave their traces on existence. This is the sense in which we find the qualia the same for each of us. We read off the traces of prior perception in our act of perception. That prior perception is social. A trace is like when writing on a pad of paper we pull up the sheet we have written on and shade in the next page down in the sheaf of papers. There we see the indentions left by our writing. If we write over the same sheet multiple times then we produce a palimpsest of traces. That palimpsest shows us fuzzy images of what we have written which are all interfering with each other to such a degree that it turns into a pure field of chaotic moments. When we reach that level of chaos we have entered Wild Being. Each of these moments in the field has its qualia and its quantity fused together. However, the fusion of quality and quantity in the monad is not enough. There is a further level of analysis which we have mentioned which is called the facet. One may think of the facet as the reversibility

between the chiasmic phases within the facet. In other words the same monad under various conditions appears differently. The qualia change subtly from moment to moment depending on the aspect under which we are looking at the monadic content. It is as if we changed the color coding of the Mandelbrot, Quaterbrot, or 'Aambrot' depending on the context and viewing angle. As we know the Mandelbrot is a two dimensional image. But the Quaterbrot is four dimensional and the 'Aambrot' is eight dimensional. So aspect does not really play a role in the Mandelbrot. But in the higher level fractal sets it can be seen to play a role as the viewpoints on the particular moments of content may be different. If this difference of aspect makes a difference, i.e. the coloring changes depending on the viewing angle, then we have a model of the facet. In other words the monad is not merely uniformly colored surface. If it were then that would lead to our inability to see its content. It's 'content' would be written on its surface rather than something inside it. But because we can think of the monad as having a chiasmic interior that can catch the light in any angle, then we will see various colorations depending on the relation of the observer to the monad itself. It is as if it were made of colored glasses and that glass was twisted and warped within the monad so that when the light went through the monad it varied in its hue. Of course, this is merely one example based on vision. The monad does not have merely one propensity, rather it has various propensities depending on context. Each facet is a different propensity. The propensities appear in the internal reversible phase structure of the monad. That phase structure corresponds to what has been called the chiasmic cube which we have developed out of the Greimas square. That cube has octonionic structure and allows for the interference of several different reversible phases within the interior of the monad. It is in Wild Being that we apprehend within the chaos an implicit ordering. That implicit ordering is what there is of the things themselves under all the layers of our projection upon them. We see that in the propensities, tendencies or dispositions of the monads in the given situation. Each monad has a tendency in a situation which we see when we view the monad under various aspects. We can simulate that by changing the coloration of the moment in the Quaterbrot or 'Aambrot' depending on the viewing angle within the complex space of the fractal. Each monad is like a jewel within Indra's net. From various aspects depending on the light and the point of view of the observer the jewel will look differently. We realize the intrinsic social nature of the monadic jewels when we realize that they are reflecting each other and that part of what we see of their difference is the mutual reflections of the jewels. Thus all monads appear within a swarm within a field of discontinuous multiplicity. However, from another aspect all monads are layered instead of multiple. The layering is the reflections they have of the other monads in the swarm. This shows reflections of reflections of reflections to an infinite depth. In other words reflections are not merely first order but participate in an infinite mirroring. That infinite mirroring can be seen as the layering of the monad. It is that layering that allows us to call the monad a viewpoint in a constellation of viewpoints, in as much as it can look upon that layering produced by mutual mirroring and see itself and others as the origins of the infinite regresses.

From another aspect all monads are candidates in a slate. In other words when we start looking at the possibilities of the monads we find that there are myriad possibilities for viewing each monad within the field of reflectivity. There are myriad positions for the lighting of the monad as well. When you realize that all these possibilities exist then it becomes clear how the faceted monad goes to the next level of infinity beyond the infinity of mirrored images. But the monad is also a seed in a pod from yet another aspect. From this aspect we find that in each discrete moment there is only one finite set of sources of light and one finite set of positions in spacetime for the monads in the swarm. So at each moment the sets of possibilities cancel out to give us the basis of one particular situation. In the seed the monad returns to its source. When it becomes a monad it comes out of that source to become an origin within spacetime. When it becomes a viewpoint then it becomes a boundary and explores what is inside it rather than outside. There it finds mirrored inside whatever is seen outside. When it becomes a candidate then it looks at its position in the encompassing stream of endless possibilities. In this way we can see that the monads with their facets have a direct connection to the aspects of the proto-gestalt. In other words Forms that appear as figures in a gestalt with their patterned contents are rooted in the proto-gestalt via the monads and facets that underlie them. Monads in their swarms exhibit the implicate order of the proto-gestalt. We can think of the various colored inkblobs that are stirred into a super solution that can be stirred and unstirred multidimensionally without interfering with itself. Each inkblob that is stirred into the solution in a different way can be unstirred from it. But think of the individual particles of ink as faceted monads. Then what we see is that each stirring are merely an implicit aspect of the solution and that the various colors of the inkblobs is merely revealing the various facets of the contents of the solution. What the concepts of monad and facet do is place the implicate order of the solution at every point in the solution like a hologram. In other words it makes it holoidal. As we know everything that is holoidal is made up of holons and their integra. This unfolds into the novum and the epoch which in turn unfolds into essencing forth of the eventity. And this series of devolution finally yields the ephemeron, i.e. what is false, illusory and different as opposed to the holoidal which is true, real, and identical. At the meta-system level there is this holoidal fusion of the hologram that we see in the jeweled net where every monad reflects every other monad in the swarm. When we come up to the level of propensities in Wild Being then we see the holon and integra as the two fundamental ways of looking at the faceted monad. When we come up to the level of traces in Hyper Being then we see that the two fundamental ways of looking at the faceted monad is in terms of the Novum and the Epoch, i.e. in terms of the utterly new emergent events and the periods of time when the proto-gestalt is stable. When the emergent event occurs then the proto-gestalt is repatterned. When we come up to the level of signs, values, processes, and structures at the level of Process Being then we see the various patterns which appear as we project on the monads as content of our field of consciousness. At the level of patterning the fundamental way of looking at the faceted monad is in terms of

Essencing and Eventity. Finally when we come up to the level of Form and find that this form is a figure on a ground then the fundamental way of looking at the faceted monad is in terms of the ephemeron. In other words to a formalism content is irrelevant. Each of the levels of the trigrams of Being are associated with what Chang calls the levels of harmony. If we start out from the level of the ephemeron then at that level there is no harmony but only Epedoclean Strife. The next level of harmony is logical consistency that appears at the Essencing and Eventity level with respect to the faceted monad. The next level of harmony is mutual action or interaction that appears as the level of Novum and Epoch with respect to the faceted monad. The next level of harmony is mutual dependence or mutual support that appears at the level Holon and Integra with respect to the faceted monad. The final level of harmony is the image of Interpenetration within the Holoidal Hologram with respect to the faceted monad.

Figure 67:

<u>Levels of Harmony</u>	<u>Trigrams of Being</u>	<u>Meta-Levels</u>
interpenetration	holoid	Existence of facet
mutual support	holon/integra	Wild Being of facet
mutual action	novum/epoch	Hyper Being of facet
logical consistency	essencing/eventity	Process Being of facet
strife	ephemeron	Pure Being of facet

Holonomics helps us to understand the interrelation of facets at the various levels of Being or Harmony or in terms of the trigrams of Being and thus gives us a language to talk about the holoidal nature of existence as a meta-hologram. We note that the negative subspace of dimensionality opens out on the horizon of hyper-complex algebras that go infinitely deep in terms of the division of the single source into myriad of fragments of the source which are all the same as it. This goes on to the depth that everything in existence can be seen to have its own unique source, or everything that has ever existed in the universe can be seen to have its own unique source deeper in the Pascal triangle, or even deeper all the things that have ever existed in all the worlds can be seen as having their own unique source which is merely a splinter of the single source in subdimension negative one. Hyper-complex algebra shows us how all those sources can be the same. The sources are not located in a particular place like the dimensionless origin points. The sources are everywhere/nowhere in relation to the dimensionless points in higher dimensional spaces. The negative dimensional subspace is active instead of static like normal geometrical space as we have seen when we hypothesized that the EMS cycle

operates to produce the dimensionless points of space within the negative subspace. Everything that appears in a dimensional space appears from and returns to the sources in the negative dimensional subspace. We call it a subspace because negative dimensions would be precisely the same as positive dimensions, merely the inverted dual if it were not for the imaginary numbers that unfold from the square root of negative one. This unfolding occurs at the negative one dimension as well to produce the subspace of infinite hypercomplex dimensionalities. In these subspaces are non-locatable sources that span all the dimensions of higher dimensional spaces and can produce the dimensionless points that inhabit these higher dimensions. This infinite series of subspaces produced by the hyper-complex algebras can be thought of as the meta-system to the dimensional systems. In the negative dimension there is an image of the dual of the positive dimensions which is augmented by the imaginary spaces that unfold from it. This is like the operating system that the applications of higher dimensional spaces emerge from and the arena in which they exist. Each dimension is an encompassing stream for all lower dimensions while in the subspace is the sources, or sources, from which the dimensionless points arise.

Facets are the intersection between the subspace definition at the level of 512nion and the 512 plank intervals. In other words facets exist as a kind of hinge between the description of things in terms of dimensionality, i.e. higher and higher kleinian bottle self-introjection and lower and lower subspace fragmentation of the sources. It is a convenient point at which the harmonics of the two differentiations of subspace and higher dimensional space coincide. It also happens to be the level where the perfect number 130816 appears as the number of relations between 512 things. This kind of perfect balancing between the facets in terms of plank interval differentiation and hyper-complex differentiation is precisely what holonomics is about. The relations between 130816 relations neither has excess nor lack. We can imagine these relations as occurring between a Plank interval at the 512 level and a source that is part of the 512nion. So the perfect numbers describe the holonic quality of the relation between the positive dimensional aspect and the negative subspace dimensional aspect of the pluriverse.

Facets mediate between monads and pluriverse. We can think of the pluriverse as an unfolding of a monadic swarm and the kosmos (universe) within a pluriverse as the unfolding of a monad within the swarm. There is continuous unfolding and infolding of the monad into the kosmos and vice versa. The meta-system related to this inverting transformation is the faceted pluriverse. All of this is contained in our analogy with higher dimensional spaces in relation to the subspace of negative imaginary dimensions. The pluriverse is n-dimensional. It is therefore the encompassing stream. Each monad is like an n-1dimensional space within the n-dimensional space. The monad is made up of myriad zero-dimensional points which are the origins from which it unfolds. Any one of these zero-dimensional point can be the origin from which the grid of the coordinate system unfolds. The zero-

dimensional points are the seeds from which dimensionality of any given dimension unfolds. The sources are the fragments of the imaginary source in subspace negative one that appear as we go deeper and deeper into the Pascal triangle via the Cayley-Dickson process. Each dimension is an arena within which the various zero-dimensionless points interact to form higher dimensional synergetic figures and forms. At whatever level we posit the kosmos operating there is the higher dimensional pluriverse that contains many kosmi. Each dimension is holonic with respect to that above and below it. So we can think of the relation of the kosmos to the monad as the relation of dimension $n-1$ to $n-2$. In other words the n dimensional pluriverse contains the komos of $n-1$ which is made up of the monads of dimension $n-2$ and the facets of dimension $n-3$. The negative dimensions $n-1$, $n-2$, $n-3$ can always be mapped on the negative dimensional subspace. By that mapping there is always a duality between n -dimensionality of the pluriverse and the $n-3$ dimensionality of the facet. This duality acts as bookends for the $n-1$ and $n-2$ dimensionality of the kosmic monad.

12. Special Systems Theory and Meta-Systems Theory Holonomic Duality

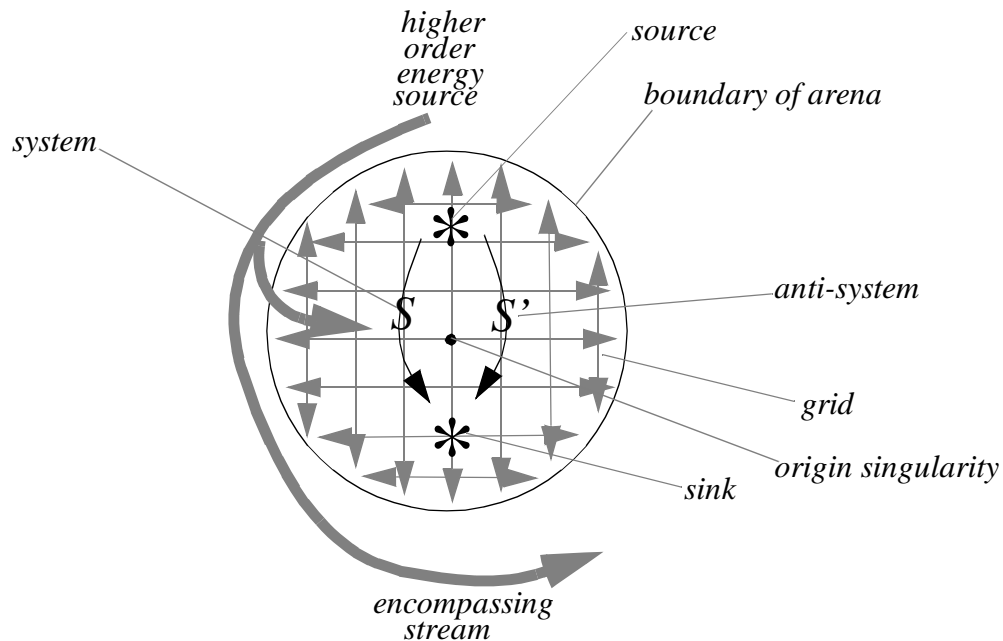
In this paper we have worked to define special systems theory as best we can as the bridge to understanding meta-systems. But in doing so we have defined meta-systems themselves because of the holonomic duality between meta-systems and special systems. We comprehend this duality in the following way. When we started the distinction between the gestalt and the flow was made. We said that a system is a social gestalt or conversely we can see it as a social flow. Then we noticed that the social gestalt can be pushed into time to produce a temporal gestalt, or the social flow can be pulled out of time into a synchronic moment as a timelapse. This gives us four states of the synchronic and diachronic gestalt or flow corresponding to idea, emotion, concept and feeling. Then we asked ourselves what the dual of these four are in the proto-gestalt or meta-system. The proto-gestalt is the implicate order that the gestalts arise out of in our experience as we move from gestalt to gestalt. The proto-gestalt is our pre-gestalt of the environment of the system. At that level there must also be the duality between gestalt and flow. We know now that the meta-system is intrinsically complementarity and in fact sports complementary complementarities. In this case the higher order complementarity is between proto-gestalt and proto-flow. We know that the proto-gestalt has the sub-complementarity of origin and arena. We posit that the proto-flow has the sub-complementarity of source and encompassing stream. This gives us four aspects at the meta-system level that correspond to the four aspects at the system level.

Now once we understand the set of complementary complementarities at the meta-system level we begin to wonder what their inter-relations might be. Eventually it becomes clear that when combined these aspects form the basis of a picture of the dissipative system. In other words the arena defines the boundary of

the dissipative system. Outside that boundary is the encompassing flow of energy and other resources that provide the dissipative system with the flows of energy that it lives off of as it produces order in itself. The origin is the same as the singularity from which the order flows out toward the boundary through the arena. The origin is the point where the grid or coordinate system imposed on the landscape intersects with the landscape itself. The grid is the order that propagates from the singularity out toward the boundary. The sources are of course out of timespace. They are in the negative dimensional subspace from which the systems arise in time. From the sources the systems travel through time to the sinks by which they return to their sources. The origin and end points of the system may be different within the space of the dissipative systems while the sources and sinks are the same outside of spacetime. In this way we realize that when we bring the four complementary complementarities of proto-gestalt and proto-flow together we have defined the dissipative system in a formal way. This tells us that the meta-system breaks up into dissipative systems. It shows us that a dissipative system is really merely a pocket of dissipation within a wider dissipative environment. Normally systems are not dissipative only the environment is dissipative. But in some rare cases the systems are dissipative as well in which case we really have a pocket of a sub-meta-system within a wider meta-system. It also means that we can construct more complex meta-systemic environments by looking at the relations between dissipative structures of the sub-environments and these may be called autopoietic when they have stable boundaries with respect to each other. We can also see that these meta-environments that are autopoietic can be conjuncted to produce reflexive meta²-environments. The ability to conjunct environmental niches is endless and leads to the picture of the meta-system as an endlessly complex conjunction of dissipative environments. When we have enantiomorphic relations between autopoietically conjuncted dissipative niches then we have reflexive environments that can cancel with each other. Cancellation really means in this case enantiomorphic mirroring because what ever is enantiomorphically mirrored is pushed back into the four dimensional space. What ever exists in three dimensional space is that which is not enantiomorphically mirrored. Enantiomorphic mirroring of reflexive environments such as we see in many animals on earth shows that there is four dimensional space cancellation happening at that point in three space. At those points there is a manifestation of formlessness as cancellation of mirroring images. As we go on up the higher and higher levels of embedding of dissipative niche environments in autopoietic meta-environments and reflexive meta²-environments we begin to understand the meaning of Gaia. Gaia is a hypothesis that the environment of the planet itself is alive and conscious. What we see is that environments as conjuncted dissipative systems can become autopoietic and thus by definition living cognitive, and at further levels of conjunction they can become reflexive and thus by definition social psychological. This then is the true meaning of the Gaia hypothesis. Just as the system in rare cases can be dissipative, and thus a pocket niche environment in a

wider environment, and in even rarer cases it can become autopoietic, and in even rarer cases it can become reflexive, so too the environments themselves can be seen as dissipative, autopoietic and reflexive. Special systems theory that describes the rare anomalous aspects of systems becomes general in meta-systems theory describing the relations between dissipative niches in terms of autopoietic and reflexive relations which give us the nature of Gaia which is embedded in higher order non-division algebraic structures of the encompassing metaⁿ-environment. Gaia is the reflection of our living-cognitive aspects in the meta-environment and the reflection of our social-psychological aspects in the meta²-environment. Or we are the reflection of those aspects of the environment. There is mutual mirroring between ourselves and our environment and that mutual mirroring is the Self-consciousness of Gaia and ourselves. Based on this analysis there is no doubt that Gaia exists. We cannot recognize it directly because it is the inverse of ourselves, it is our living-cognitive and social-psychological natures turned inside out. In destroying our environment with all of it's conjuncted meta-systems we are truly destroying ourselves because we are destroying the mirroring between ourselves and our living-cognitive and social-psychological environment. The fact that meta-systemic description can be done in terms of special systems in a holonomic way shows us the fundamental wisdom of the design of creation in the face of which we should find ourselves in awe and wonderment because it guarantees the mirroring between our living-cognitive and social-psychological characteristics and those of our encompassing environments.

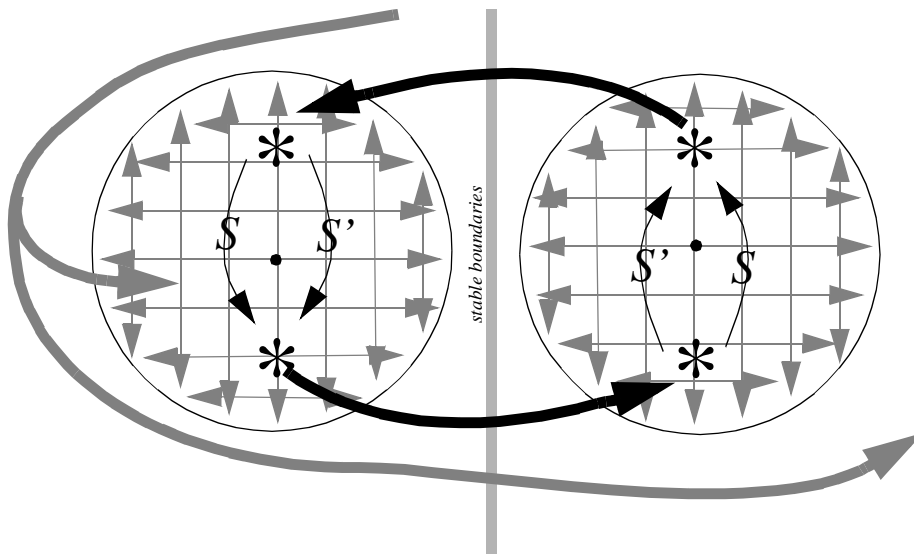
Figure 68: Dissipative Meta-System



Once it is clear that the dissipative system is the same as the environmental

meta-systemic niche from a formal point of view with respect to the patterning by the proto-gestalt and proto-flow complementarities, then it is possible to build up a picture of the wider meta-system in the same way we build up our pictures of the autopoietic and reflexive special systems. In the diagrams S and S' stand for the Systems within the environment. These may be dissipative, autopoietic or reflexive, and as such they would represent niches within a niche if they existed. Normally the system and meta-system are allopoietic instead. We can see that the paths of the system/anti-system pairs going from source to sink, traveling through the dissipative pocket, has the same form as the creation and annihilation of the virtual particles and anti-particles that make up the field of empty spacetime. This pattern exhibits the structure of the kinds of Being. Creation out of nothing appears out of Wild Being. The two particles traveling together are caught in Pure Presence. The traversal of the interval gives us Process Being. The cancellation at the end of the interval give us Hyper Being. Thus this model relates to the kinds of Being and the aspects of Being as well. The relation to the aspects of Being comes from the fact that the Meta-system's relation to the system is in terms of Reality while its relation to itself is in terms of Presence. On the other hand the relation of the system to the meta-system is in terms of truth while its relation to itself is through identity. So in this way both the aspects and the kinds of Being appear within the dissipative meta-systemic niche.

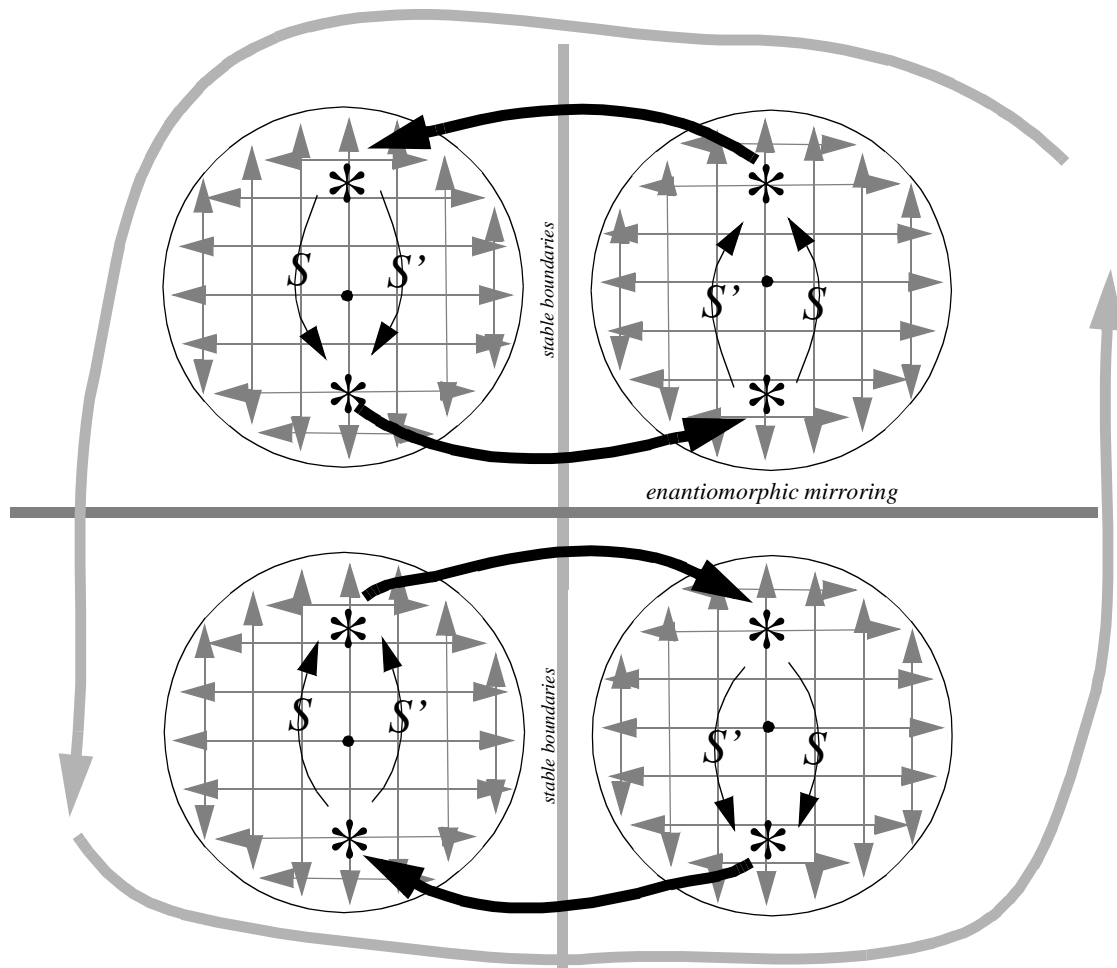
Figure 69: Autopoietic Meta²-system



Taking two niches and putting them together so that the source of one is connected to the sink of the other yields an autopoietic meta²-systemic ecology. When we take two autopoietic meta²-systemic ecologies and conjunct them such that they are seen as enantiomorphic then we get a reflexive meta³-systemic

environment. Such niches and conjuncted niches, etc. can happen in many different ways. The theory is that when it occurs the autopoietic and reflexive properties pop into existence until the conjunction is lost then they vanish just as quickly. Understanding exactly how this occurs is the goal of holonomics as applied to a particular field. What we are developing here is a General Meta-systems Theory that is based on a direct application of Special Systems Theory to the structure of the meta-systems based on our understanding of the proto-gestalt. It says that the tiered meta-system is a structure of complex conjunctions of dissipative super-systems. Precisely how this structure is realized in various instances will be different. Here we are concentrating on understanding the organization of the meta-system knowing that the structural level will be different in each case. The organizational level is the same because it is part of our projection of the meta-system onto the ontic realm. Meta-systems are incredibly complex conjunctions of niches. But what is of interest is that no matter how complex they are it is the first few levels that allows them to mirror back to us the living-cognitive and social-psychological characteristics that we find in our selves as embodiments of special systems.

Figure 70: Reflexive Meta³-system



When we consider the relation of the meta¹-systemic niches to the meta²-systemic ecologies we find later is a conjunction of the former that is composed of origin (destination) / arena (boundary) // source (sink) / stream (cause) :: singularity (anomaly) / ramified-subspaces // generator (destructor) / ramified-encompassment. When we put dissipative niches together it is necessary to have the equivalent of gage particle interactions because each niche is projecting its own ordering of its arena within its boundary. Thus we show arrows from sink to source and vice versa in order to demonstrate the symbiotic relations between the two niches that combine to create a meta²-systemic ecology. However, we can think of this interchange as an exchange of gage particles which renders the higher level meta²-systemic ecology coordinate system independent. As an example let us take a tree as an autopoietic system that is a conjunction of two dissipative niches. The leaves and trunk are in the niche of the air and the roots are in the niche of the earth. Each of these niches are made up of various of the machines that exist at the level of Wild Being: desiring, disseminating, absorbing, ejecting. The leaves and branches work together to absorb CO² and light while ejecting Oxygen. They disseminate sugars to the lower niche. Desiring is seen in relation to growth which is reaching for the sunlight. For the root system there is the absorbing of waters and minerals which are disseminated to the upper niche. Wastes are ejected and desire is again seen in growth for more water and food by the root system. Thus a tree which appears as a single thing is really living in two different niches simultaneously and operating as a symbiotic exchange between them. The conjunction of the two niches produces an autopoietic ecology. The cells of the tree are adapted to these two symbiotic niches. This occurs because each cell projects a coordinate system on the whole tree. Each cell interoperates with the others by exchanging gage information packets with the other cells around it. The gage information packets give the coordinate independent position of each cell and results in the growth and developmental unfolding of the meta-essence of the plant. The gage information packets (infons) only appear when two niches are conjoined. When we go up a level to the reflexive conjunction of the meta³-systemic environment then these become meta-gage infons. Meta-gage infons can be seen as signs of reference, values within an economic market, processes and structures. In other words the gage infons appear at the trace level and the meta-gage infons appear at the pattern level. meta²-gage infons are symbolic forms that appear at the level of forms as we break into the meta⁴ and higher conjunctions of niches. The relation of the infons (info packets) to energy can be seen in Stonier's equation of information to potential energy.

This brings us to ask what the niches are that animals inhabit if plants inhabit two niches that are so different since animals are walking around basically in the air. We posit that the two niches for animals including the human animal are the material world and the world of consciousness, social and individual. Thus for us

consciousness becomes a niche which we inhabit and that we exchange gage like infons between. Our meta-gage particles are signs that appear in reflexive social relations. Thus we see how the quantum-qualia role of consciousness in macro-quantum mechanics plays a role in understanding the world in which humans and other animals inhabit. This niche of shared consciousness includes animals and the human planetary cohort. We could posit other beings³³⁶ who have a similar relation between consciousness and supra-conscious states, i.e. they live in two dissipative niches one consisting of consciousness and the other consisting of some higher or supra-conscious realm. In all cases what we think of as organisms are really exchange systems between these two realms. Thus we can think of milieus not only as natural in the sense of niches, ecologies and environments but also in terms of the layering and segmentation of consciousness. When we think of organisms as straddling niches rather than within a niche we find ourselves applying the dictum of Bateson that the information from two completely different sources is better quality information than from one source. We can posit that all organisms that are autopoietic exist as exchangers between niches rather than as living in the niches themselves. In this way we find that an ecology is a shared niche and an environment is a reflexive conjunction of shared niches. This leads to a new kind of biology that considers not just the macro-quantum/qualia mechanics of consciousness but also that concentrates on the circulation of gage infons and meta-gage infons of reference, i.e. signs, value, process and structure at the level of pattern that culminates in the forms we see and the exchange of symbols between those forms, i.e. a symbolic interactionism of the Gaia environment.

In order to make the concepts clear in this section let us look at the Highway Transportation meta-system. We can consider the automobile as a system. It exists when on the highway in the dissipative niche of the Highway single direction roadway on which we find it. In this case the on and off ramps are sources and sinks for the flow of traffic made up of the car systems. The arena is the roadway with its several lanes between median and the shoulder of the road. The origin is the place where the roadway starts and the destination is its opposite. The encompassing stream is the other roads outside the highway niche. Also that includes the generators and destructors of dealers and junk yards as well as the petroleum industry and other subsidiary automotive industries. The grid is the road markers and other signs that are alongside the road. The singularity includes the lane markings, debris in the roadway and accidents.

This niche becomes autopoietic when we add to that the roadway lanes that go in the opposite direction. At that level there is a reinterpretation of the elements of the meta-system and the meta2-system. The autopoietic roadway is what we mostly

336. In Islam these are called Jinn, who the Greeks called gods using a word that means invisible man. Angels may represent an even higher conjunction of realms.

have because people want to be able to go and come and we do not build one-way roads very often. This creates the whole ecology of the road city with its motels, restaurants, fast food joints, filling stations etc. that cater to the traffic that is going in both directions. And we move to the reflexive level we can see it in the cloverleaf highway intersection. We see the reflection in the fact that we can go around the clover leaf in such a way as to go back in the opposite direction from which we came. The ability to transition from one two way roadway to another allows us to have a transportation network which has enhanced properties. Higher level meta-systemic reflexivity occurs when we bring together different modes of transportation such as air travel and rail travel and shipping. All modes of human travel is the highest level meta-system which blends into the ultimate meta-system which is everything happening on our globe or everything happening in the universe. Travel is just one aspect of our world but it provides a comprehensive set of nested environments, in those we can see how the conjunction of dissipative niches produces autopoietic ecologies which in turn produce reflexive and meta-systemic environments. When we say that the special systems attributes exist in the nested environments we do not mean that autopoietic ecologies are living/cognitive in the way humans are but only that these kinds of environments have emergent properties that are consonant with those in autopoietic systems in general. Similarly when we say that reflexive environments are social/psychological we merely mean that they display emergent properties that are consonant with those of social and psychological beings such as ourselves. We do not mean they have the same properties as social organisms only that they give rise to new emergent properties that are beyond what an autopoietic ecology might have which in turn goes beyond what a dissipative niche might have. The Highway system gives an excellent example of this kind of nesting which is fairly obvious because it is artificially constructed. Other natural environments may be more intertwined and embedded to produce more complex emergent levels as we move up through the emergent levels of the meta-system which is organized along the lines of the conjunctions of the special systems.

13. Homeopathy, Acupuncture and Reflexive Healing

Now it is time to engage in the production of an example taken from traditional disciplines of healing. In this example we select Homeopathy³³⁷ which has its roots in Islamic and Greek medicine but which became an alternative Western medicine from the 1700s till about the 1920s when it lost ground to the dominant medical paradigm of Allopathy. Acupuncture on the other hand was a traditional

337. Resch, G. and Gutmann, V. [1987] *Scientific Foundations of Homeopathy*. Barthel Barthel Publishers. See also Hahnemann, S. *Organon of Medicine*. New Delhi, Homeopathic Publishers. See also Coulter, Harris L. [1982] *Divided legacy : the conflict between homoeopathy and the American Medical Association*. Volume 3. Richmond, Calif. : North Atlantic Books, 1982. Coulter shows in volume one the roots of Homeopathy in the Greek Medical Tradition which was taken up and passed to the West through Islam. Coulter, Harris L. [1973] *Divided legacy : a history of the schism in medical thought*. Volume 1. Washington, Wehawken Book Co., 1973-94. Coulter, Harris L. [1982] *Science and ethics in American medicine, 1800-1914* Volume 2. Richmond, CA, North Atlantic Books, 1982.

form of medicine practiced almost exclusively in China until recently. We posit that these two forms of medicine³³⁸ are good examples of the kinds of systems we are proposing to study here. Thus there are already sciences that treat human health from the Holonic point of view. Homeopathy is purely dissipative while Acupuncture is purely autopoietic. These two forms of medicine are duals of each other as we will show.

In Chinese cosmology there are four celestial lights. These are Major Yang and Major Yin as well as Minor Yang and Minor Yin. These four permutations of Yin and Yang roll over as opposites in a continual cycle as shown by the circle with the two waves where one opposite is embedded in the other called the Yin/Yang symbol. These celestial lights have the following correspondences:

Figure 71:

Major Yang = Sun = Heart in Homeopathy
Major Yin = Moon = Mind in Homeopathy
Minor Yang = Stars = Points in Acupuncture
Minor Yin = planets = Five Hsing in Acupuncture

As you can see Homeopathy treats the Major Yin and Yang components related to the celestial body. Acupuncture treats the Minor Yin and Yang components related to celestial body. So these two forms of medicine are complimentarities of each other.

Homeopathy is purely dissipative. If we take Kent's Philosophy³³⁹ as our guide then we see that disease is thought of as order moving from the center to the periphery. Disease only effects the body that is susceptible to it. Disease must move to the center and dissipate instead of order from there. It is impossible for disease to effect the body from the periphery. In homeopathy one takes substances and gives them to healthy people to be proven. By a succession of provings all the possible symptoms produced in healthy people by a substance can be discovered. Then one looks for a patient with as nearly as possible the same totality of symptoms. When such a patient is found then the homeopath produces a tincture of the healing substance through a series of secussion steps which attenuate the concentration of the substance until nothing of the original substance is present. This absence has a particular structure prepared through the successive fractal embedding of the pattern of the substance in the medium of the secussion which is either alcohol or water. This process produces a negative of the coherence of the substance at the molecular level imprinted as a trace within the chaotically agitated medium. This trace is frozen in a sugar pill and then eventually given to the patient. The coherence of the disease in the patient cancels with the coherence of the inverse trace of the substance to effect the annihilation of the disease. This cure is also dissipative as it moves through the liquid medium of the body as a celestial organizational waveform cancelling the wave form of the disease from inside to outside and from top to bottom. Thus order

dissipates from will (heart) to mind to body in the healthy person. Disease likewise dissipates from the center in the sick person. The reaction of the healthy person to a substance is the basis for the cure of the sick. The opposite trace to the coherence of the substance, that makes sick, is given to the sick and that annihilates the disease giving back health. This cure also is placed at the center of the body in the mouth and that radiates throughout the body dissipatively. The totality of symptoms in the prover and the patient that match are the system. The meta-system is indicated by the lack patterned as the inverse of the healing substance by the homeopathic pharmacist. This lack is given to the patient and that destroys the disease. The relation between the system and the meta-system is produced by miasmas that create susceptibility in the patient. If it were not for the miasmas there would be no susceptibility and the patient would never get sick.

Acupuncture is quite different. In acupuncture the body is seen as an autopoietic whole. That whole is dissipative in terms of the flow of Chi, or vital energy in a way similar to Homeopathy. But in Acupuncture there is a special celestial kind of Chi called Jing which is given by nature to an individual at birth and which causes immediate death when it runs out. The whole purpose of medicine is to restore the Jing. This gets out of balance when Yang Splendor and Closed Yin appear as extremely unbalanced states. These states arise when someone holds on to one of the opposites as they roll over and attempts to stop the natural process of one opposite turning into the other. Yang Splendor appears when we attempt to freeze Yin and Closed Yin appears when we attempt to freeze Yang. These two

338. The link between China and Islam is the fact that there are said to have been 124000 prophets to mankind in the Islamic tradition. Fu Hsi is a good candidate to have been the Prophet to the Chinese people, in fact as he is portrayed with horns it could be that Fu Hsi may be associated with Dhul Quarnin, the master of the two horns mentioned in Quran. The claim is that when a prophet arrives to a tribe or people one may ask questions about either Allah (God) or creation. If one asks about God then the answer will concern the nature of *Tawhid*, i.e. radical unity. If one asks about creation then the answer will be a heuristic device such as those listed in Figure 68 concerning the rolling over of natural, but supra-rational, opposites in creation. Thus, there is in human history as influenced by the many prophets to specific tribes and peoples the possibility of a Prophetic Science based on the understanding of heuristic devices by which they explained the operation of creation. Prophetic Science encompasses and surpasses what we know of Western Science because in fact Western Science is a degenerating of Prophetic Science taken from the Greeks and Arabs. We, therefore, call Prophetic Science: "Mainstream Science" and consider modern Western Science to be an eddy off of that great stream of Prophetically-based Science beginning with Adam and continuing through the Prophet Muhammad down to today. Muhammad is the last prophet who brought revelation from God to all peoples rather than to a specific tribe. The Sunnah (practices) and Sharia (Way of Life) of Islam based on the teachings of the Prophet Muhammad is the highest and best known embodiment of Prophetic Science. We can see this very clearly when we consider the relations between the five pillars of Islam and the Special Systems hierarchy:

Meta-system	= Hajj	(Pilgrimage)
Reflexive Special System	= Zakat	(Charity)
Autopoietic Special System	= Nimaz	(Prayer)
Dissipative Special System	= Saum	(Fasting)
System	= Shahada	(Witnessing of Radical Unity)

This study may be considered as an exercise in an *Archeology of Knowledge* that looks for the traces of Prophetic Science in the artifacts of many cultures but especially the roots of the Greek, Chinese and Islamic cultures.

characteristics are extreme nihilistic opposites such as those endemic in Western Culture as seen in the opposition between Ahura Mazda and Ahriman in Zoroastrianism or closer to home between Athena/Apollo and Artemis/Dionysus in Greek culture. Our Western culture revels in the production of extreme nihilistic opposites. This is seen as the epitome of sickness in Chinese medicine. However, Chinese medicine has lost track of the underpinnings of its own science. In order to restore these underpinnings it is necessary to reformulate the relations between the five Hsing (transformations) and the acupuncture points. We can do this based on Ibn al-Arabi's discussion of Celestial Causation in Chapter Eleven of the Mekkan Revelations. Yang is an unseen cause. Yin is the appearance of movement in the seen, heard, felt, etc. earth (*ard* in Arabic) flowing from the action of an unseen cause. In Homeopathy the unseen cause appears in the heart as the determination of the will (i.e. intention) and then appears in the intellect as a decision or a set of reasons and finally the order that appears from nowhere appears in the configuration of the body. In acupuncture what we have to realize is that we are dealing with Minor Yang that appears on the surface of the body as the flowing celestial energies moving between the acupuncture points. These points are independent of each other and the *Chi* jumps around from point to point like an instantaton. The pattern of the activation of acupuncture points happens like the different patterns of electrons in the Schroninger equation. A disease is set up by a blockage of the movement of Chi to all possible points. This is like a particular standing wave on the surface of a watery planet. The Schroninger equation represents all possible patterns of standing waves. When we introduce needles there is a pattern interrupt through perturbation of a set of acupuncture points. This causes the standing wave pattern to break up and either change to another pattern or to sink into the probability wave of all possible patterns. In acupuncture the meta-system is on the inside and the system is the shell of the autopoietic system. The inverse of this is that the sickness is a restricted economy within the meta-systemic interior. When we cause a pattern interrupt within the autopoietic system then that restricted economy breaks down and is replaced by the global economy of the whole body which is equivalent to the state of health wherein the Chi flows freely to all of the acupuncture points from all the acupuncture points in a rhythmic and cyclical fashion. The acupuncture points are equivalent to the nodes in the autopoietic network. These are organized by the five Hsing that are imaginary nodes of a hyper-cycle which controls the flow of Chi around the body by a series of transformations from one form of Chi to another. The Jing is the catalyst in this transformative process. The acupuncture point nodes each give a particular kind of Chi energy that is taken together and transformed by the Hsing using the Jing. The production of useful Chi from the raw Chi appearing at the acupuncture points is given in an analogy to a pot boiling on a fire. Upon the earth there is wood that is on fire which heats a metal pot filled with water. The escaping steam is by this analogy like the Chi. If we recognize the Hsing as a hypercycle of transformations

339. Kent, J.T. [1980] *Lectures on Hoemopathic Philosophy*. New Delhi, B. Jain Pub.

in imaginary hyperspace that control the acupuncture point nodes of the autopoietic system then we get an accurate picture of the isomorphism between the acupuncture theory and autopoietic theory. The Chi is the structure and the Jing is the organization which is imposed by the five Hsing transforming the Chi from the acupuncture points and channeling its distribution throughout the entire organism. The view of the acupuncture points as being on meridians is from the viewpoint of this interpretation only a heuristic device. It should also be remarked that the opposite of Chi is ‘Li’ which means both patterning and principle. The Li³⁴⁰ is the ordering principle behind the actual manifestation of the Chi. Chi is the energy of growth, such as the growth of the physis and the logos. Thus, Chi is non-dual energy prior to the distinction of the physis from the logos. Thus it is not purely physical energy. But the Chi is directed by Li so that it lays down a pattern that is specific to its each individual manifestation beyond the level of essence or meta-essence, i.e. at the level of Wild Being.

The Five Hsing interact with the four receptivities of the earth to produce the twenty interactions between Heaven and Earth by which their interpenetration occurs. A given Hsing as a “flavor” of unseen cause gives four different lines of causation moving out from its point of interaction with the earth (Ard). This is like throwing four rocks in a calm lake at about the same time. The various wave patterns cross and interfere. We see this interference pattern in terms of the heuristic pattern of bifurcating opposites. The permutation of these opposites gives us a set of 2^N qualitative states which the interference pattern as a whole pops around within or rolls over into opposites through. An example of this is the I Ching with 64 hexagrams. These heuristic devices form the hierarchy based on the 2^N progressive bisection. We can see examples of these kinds of heuristics throughout history.

Figure 72:

	1	Source
1	1	Great Ultimate
2^1	2	Yin/Yang ^a
2^2	4	Major Yang/Minor Yin//Minor Yang/Major Yin ^b
2^3	8	Trigrams of I Ching ^c ; Opposites of Sidi Ali al-Jamal ^d
2^4	16	Ilm al-Raml (Science of the Sands) ^e
2^5	32	Letter Source-forms ^f & Five Hsing ^g

340. Chin-Shu, Lo [1987] *Knowledge Painfully Acquired*. N.Y. Columbia U.P.

2^6	64	I Ching/Chess/DNA ^h
2^7	128	BEI from South Seas ⁱ
2^8	256	IFA from central Africa ^j
2^9	512	Facets ^k exist as 512 plank intervals in a Hyper ⁶ -Kleinian Bottle and also appear in the 512nion hypercomplex algebra. Limit of short term memory 2^9

- a. Yang is a variable for the Unseen Cause and Yin is a variable for the Ard which moves in response to the action of the unseen cause.
- b. Represented by celestial lights represented by Sun, Planets, Stars and Moon.
- c. As seen in the Ho and Lo River maps which have three Yin or Yang lines.
- d. Cf. *Meaning of Man*. op.cit.
- e. Skinner, S. [1980] *Terrestrial astrology : divination by geomancy*. London ; Boston : Routledge & Kegan Paul.
- f. Meaning here the letter source forms of the semetic languages of which the earliest example is Ugrit which has thirty two cuniform letters.
- g. Transformations represented by Earth, Wood, Fire, Metal, and Water.
- h. Goldenberg, D.S. [1975] "The Algebra of the I Ching and its Philosophical Significance" in *Journal of Chinese Philosophy*. Volume 2, pp. 149-179, March.
- i. Lessa, Wm. A. "The Chinese Trigrams in Micronesia" in *Journal of American Folklore* 82(1969) 356-62. See also Lessa, Wm. A. "Divining from Knots in the Carolines" in *Journal of the Polynesian Society* 68(1959) 188-204.
- j. Gleason, J. [1973] *A recitation of IFA Oracle of Yoruba*. N.Y. Grossman Pub.
- k. No known historical heuristic exists for this level.

Depending on the complexity of the situation we can use these 2^N qualitative categories to categorize the interaction and interpenetration of N things and their N^2 relations³⁴¹.

In Homeopathy the system is inside and the meta-system is outside. In Acupuncture the meta-system is inside and the system is outside. There exists another higher form of healing in which these two are simultaneously true. In this, higher form of healing we see "the universe as a big man and man as a little universe" as explained by Ibn al-Arabi. This means whatever sickness that someone has manifests in their social relations with other. The social and the psychological are merely mirrors of each other. In Homeopathic healing there is an annihilation of the disease through an artificial pattern of traces that produces health when the two wave forms cancel with each other. In Acupuncture there is an inward sea of a meta-system which contains all possible patterns. By introducing a pattern of needles on the surface of the body where the Minor Yang acupuncture points appear the restricted economy of the disease is broken and one is returned to the overall set of all possible

341. This is the meaning of the difference between the Ho River Map and the Lo River Map with respect to the Trigrams of the I Ching.

patterns in the probability wave prior to the observation of the disease. In reflexive healing the fusion of the social and psychological is realized. The distortions of the many mirrors in the mirrorhouse cancel each other out. At that level there are four properties to mirrors: reflective, translucent, transparent, opaque. Translucent is the middle non-dual term between transparent and opaque. This is the chiasm between these extreme opposites. Reflectivity is a singularity in the field of the interfering mirrors at the reflexive level. When we combine by conjunction the sea of meanings and the annihilation of opposites we get the reflexive mirroring at the level of the social-psychological. In Buddhism this kind of healing is done between master and student of Zen by use of Koans. Similar healing practices directed at the disturbances of the self appear in Sufism under the auspices of Islam.

Reflexive healing is the highest form of cure for the self. We get a glimpse of it in our own tradition where Plato says he has never written about what he is most interested in. After he says that if any one were qualified to write about it would surely be him, but that it is impossible to express and so cannot be written about. That thing which most concerns him occurs when people are close companions for a long time and then it jumps like a spark from heart to heart. This is an excellent account of transmission. This is Plato's ownmost concern. His writings portray the reflexive world of dialog. Within those dialogs there are two that stand out. These are the Laws that show us an autopoietic social structure built in words and the Republic which is a dissipative structure that is ultimately unlivable by any but the Gods. If we interpret the letters as the System and enlightenment as the Meta-system then we see that the dialogs present us with an ironic picture of the reflexive level with embedded pictures of the autopoietic and dissipative thrown in for good measure. So Plato can be seen as embodying this same structure of the special systems. We can also see this structure in the work of Kierkegaard. If we inspect his work we find the following levels inhabited by his philosophical characters.

Figure 73:

absurd (<i>meta-paradox</i>)	
Transcendental Religion = Pure Presence Being	
paradox = dissipative	
Immanent Religion = Process Being	ARISTOPHANSES
humor = autopoietic -----	
Morality = Hyper Being	PLATO
irony = reflexive	
Aesthetic = Wild Being	
daemon	

When we look closely we see that Kierkegaard's series of stages of the secular to the religious life is a good approximation of the series of the Kinds of Being interspersed with the embodiments of the special systems. Also we find that Plato

deals with all the levels up to and including humor while Aristophanes deals with all the levels beyond humor. So even though Plato's works embody the structure of the special systems the content only deals with half of that structure which is completed by Aristophanes.

Plato deals with healing on the reflexive level as does Aristophanes. Aristophanes takes on the political demigods while Plato takes on the sophists. By giving us a clear picture of sophistry, of those magicians of logos who manipulate the unseen for their own advantage, he helps us to avoid sophistry ourselves and also helps us to recognize it so we do not fall into it inadvertently. Aristophanes does something similar for the political demigods. Both together give us a rich and profound, as well as humorous, basis for living our lives free of verbal magic and politically destructive behavior.

Reflexive healing, together with homeopathy and acupuncture provide a glimpse of a higher level Emergent Meta-systemic level of healing. In terms of enlightenment that level corresponds to the jeweled net of Indra. When the disease of the self is annihilated, and we have fallen into the sea of meanings, and we have realized the mirroring between man and the universe, then all that is left is the realization that the EMS cycle is reflecting around all the jewels in the network all the jewels.

14. Anomalous Science

Science explores the physus directly and the logos indirectly. As Kant pointed out Analysis must processed on the basis of a prior synthesis. Logos is seen to be the source of that prior synthesis. We project the "I" (ego) as the subject of that synthesis which is recognized to be a transcendental projection prior to the subjective consciousness. Kant contrasts to the transcendental subject a noumenal transcendental object. He hypothesizes that it is God which acts upon these two transcendentals to maintain their coherence. Phenomenology also requires this same transcendental framework, but then brackets anything that lies beyond experience as given doing away with the everything taking place behind the scenes. It reduces the framework to the experienced vector of the intentional morphe acting on the hyle of sensation. This transformation is similar to the reduction by mathematical category theory of all the different categories to the arrows (morphisms) leaving aside the elements of the categories³⁴². There is an arrow of intentionality from subject to object. That arrow may be seen as the carrier of coherence so that the transcendental framework is no longer necessary as a basis. We only pay for this move by being restricted to description instead of explanation. Critical philosophy gives up the proof of dogmatism and phenomenology gives up the explanations of causality

342. Arbib, M.A. and Manes, S.G. [1975] *Arrows, Structures and Functors: The Categorical Imperative*. London, Academic Press.

basically acceding to Hume's critique of causality that Kant attempted to answer. Yet even a phenomenological description is based on duality of the active intentional morphe over against the passive hyle. If phenomenology is dualistic in this way then how much more so is critical and dogmatic philosophy. In this implicit foundation on dualism science follows philosophy. All sciences either describe, explain or prove. Generally they attempt to prove, and when that fails they attempt to explain, and when that fails they attempt to describe. The combination of these three ever weaker approaches to understand phenomena is called the formal structural system. Formalisms embody proofs. Structuralisms embody explanations. Systems embody descriptions. When these three are combined we get a very powerful means of dealing with the various domains of disciplines which allows them to be treated rigorously. Science in general applies reductionism to the physus and skepticism to the logos. The formal structural system is an ensemble that can withstand extreme reduction and skepticism. In the pursuit of science we define forms and we attempt to produce viable formalisms within a domain. Then we attempt to extend the power of our formalism by reapplying it to the content of the forms reflectively. When this fails we fall back on descriptions of the wholes we discover in terms of systems. This results in formal structural systematic theories. We apply to those theories an extreme of skepticism which results in a plethora of competing theories each of which covers the domain to a different degree and to a different depth. The continual critique of theories which embody formal structural systems provides the motive force behind scientific discovery. A given theory will have various anomalies. Science progresses by discovering ways to encompass the anomalies and provide a formal structural systematic theory that minimizes anomalies. This leads to the distinction between revolutionary and normal science propounded by Kuhn. However, change within the tradition does not happen only on the paradigmatic level. Instead emergent change may occur on any level of the tradition. These levels include absolute, existence, ontos, episteme, paradigm, theory, fact and given. Sudden far reaching change may occur at any of these levels of the scientific tradition. The tradition can be seen as alternating between revolutionary and normal phases at each of its levels. But what is maintained throughout is the criteria of common experience propounded by Aristotle. In other words, the edifice of science is built out of what is recognized by the preponderance of the members of the scientific community. Experimental results must be verifiable and theories must be universally recognized and designated as real, true, present and identical, in order to form a basis of normal science. Revolutionary science is a shadow that haunts normal science. It occurs because some individuals deviate from the common view and occasionally they turn out to be right and the community of scientists recognize that and incorporate it into the received tradition by changing the basis on which it operates. Dogmatic traditions have heresies which are excommunicated and their proponents killed. The scientific tradition is critical and as such can contain divergent views within itself which are the source for the mutation of the tradition itself as it revolves between normal and revolutionary phases. Around the critical

pivot between proof and description science revolves as a fine balancing act between the maintenance of the tradition and the prudent acceptance of change. We can describe a myriad of divergent points of view within the cultural as phenomenology does but it is only by means of critique which pursues explanation based on formalisms that an advancing scientific practice can be built. It is based on continuous reference to the physical realm through experiment. Reduction and skepticism are extreme forms of testing which establishes a designated reality, or truth, or identity, or presence. Truth is seen only in terms of the verification of theoretical statements arising in the logos. The principle of excluded middle adduced by Aristotle is applied to define self identity within the theoretical structural system. The appearances of experience (what is presented in a particular domain of manifestation) are rendered coherent by the projection of models that strive for consistency and completeness. These models are continuously compared to the results of experiment for verification. The experimental apparatus is compared to the theory for its validation. The work of science is the maintenance of the projection of Being as a delimited realm within the haze of myriad appearances. The discipline we apply with rigor to a domain establishes this domain of essences. The formal relations between essences solidify our world. The structural relations between essences uncover causal and statistical connections within the world. The descriptive relations between essences which is the subject of phenomenology produce the phenomena that we experience in our lifeworld. The lifeworld is the surface of appearances within which we lead our lives. Beyond that is the realm of essences that have Being beyond the process of becoming. Critical Science strives to uncover that realm of essences and establish a coherent projection of theory on experimental experience that gives depth to the lifeworld. Kierkegaard sees that as ascending the various levels he posits between secular and religious. When that enterprise pulls free of the lifeworld as Husserl describes in Krisis, then the result is nihilistic destruction of meaning that we experience in modern life resulting in the nihilistic twin horns of alienation and anomie. When this disconnection between the lifeworld and the designated scientific reality occurs then twin responses which are also nihilistic of dogmatism or relativism that correspond to the formal and descriptive approaches that bracket critical explanation that maintains the designated reality of the realm of essences. The scientific tradition is itself generator of nihilism because its main actions are reduction and skepticism which produce the formal structural theoretical system but as a by product destroy meaning and devastate the context of life. Thus the very thing that gives us insight into the foundations of our life within the world is something that destroys our sense of meaning in the world and makes necessary something like the Logotherapy practiced by Victor Frankl³⁴³ which we can call Philosophical Mentoring³⁴⁴.

343. Frankl, Viktor Emil. [1955] *The doctor and the soul; an introduction to logotherapy*. Tr. from the German, by Richard and Clara Winston. New York, Knopf. See also Frankl, Viktor Emil.[1984] *Man's search for meaning*. New York : Washington Square Press/Pocket Books, 1985.

Now this approach of the dominate culture toward science rooted in Aristotle might be contrasted to an alternative form of science championed by Plato. This alternative science is the dual of Aristotelian science based on what is held in common by the community. Instead Plato suggests we focus on anomalies and see what we can make of them. In other words Plato suggests that the phase of revolutionary science should predominate over normal science. This is exactly the opposite of Aristotle's position and the predominate tack taken in our western scientific tradition. Aristotle attempts to brush anomalies under the carpet until that fails utterly and we are forced to change our assumptions or some other aspect of the framework of the tradition. Plato instead revels in the anomaly itself. He only uses the common as a starting point for elaboration of the anomaly. So Plato does not do away with the common but only accepts it as a starting point for exploration of the significance of what stands out as extraordinary within commonly agreed upon norms of communal experience. What is interesting is what is extra-ordinary. Plato does not attempt to suppress the irreducible difference but exalts it over the norm. So in Plato's dialogues we see a group of unique historical characters engaged in eccentric discourse which exalts the strangest and the most unique of these people which is Socrates. The strangeness of Socrates comes from the fact that he is equivalent of the Buddha in his own social milieu of Fourth Century BC Athens. The beauty of Plato's work is how he builds a rich portrait of these unique and eccentric individuals and their world. By contrast Aristotle gives us caricatures of his precursors whose only duty is to form the ground for the pronouncement of his own opinion. Alan Blum has laid out those discursive differences between Plato and Aristotle which form the backdrop for all Theorizing and using Socrates³⁴⁵ as an example. Theory may either attempt to project a theoretical regime that covers everything as Aristotle attempts to do. Or theory may explore the implications of specific concrete examples that stand out from the norm accepted in common by the community. This Other of Aristotelian science has all but been forgotten within our tradition, yet its possibility still exists and it is this alternate Platonic science that we attempt to pursue here. Homeopathy and Acupuncture appear as similar Platonic alternatives to the Aristotelian norm of Allopathic Medical Science.

When we look at the anomaly our attention is drawn to it by the breaking of the norm³⁴⁶. It is the exception to the law that leads us to isolate certain phenomena from others, and we then wonder at its uniqueness and usually its inexplicability. Explanation normally occurs by relating some phenomena to the norm. When the norm is broken by the anomaly then the norm itself is put into question. Plato looks for the anomaly and tries to adduce what it tells us about the norm rather than the

344. See Palmer, Kent [1998] "Philosophical Mentoring: A Research Proposal and Report on Preliminary Results" also a presentation called "Philosophical Mentoring: A Fundamental Theory." (manuscript; see <http://dialog.net:85/homepage/philcounsel.htm>)

345. Blum, A. [1978] *Socrates: the original and its images*. London ; Boston : Routledge and K. Paul.

346. Humphreys, W.C. [1968] *Anomalies and Scientific Theories*. San Francisco, Freeman Cooper and Co.

other way around. Normal science repeatedly tries to sweep the anomalies under the carpet. First, of course, we must be sure that the norm is well framed so that its violation is clear. But then by contrasting norm and anomaly we explore the basis of the norm and perhaps derive deeper principles than mere subsumption of the anomaly into another norm. Subsumption by which science mutates and advances assumes that all anomalies are merely local violations that a deeper norm may convert into explained phenomena. What subsumption does not address is the contrast between anomaly and norm itself. If we push back the anomalies by successive subsumptions we merely radicalize the phenomena of the anomaly. This is what produces the emergent event in our scientific tradition. The emergent event either arises within by the radical change of explanatory basis or without by the appearance of new phenomena demanding explanation. Emergent events strike directly at the norm we project on experience as a socially constructed reality, truth, identity or presence. The tradition produces the emergent event out of itself as its ownmost possibility. The difference is that Aristotelian science attempts to suppress and prevent the arising of the emergent event while Platonic science attempts to draw out and exploit the indications of the advent of the emergent event by exploration of the anomaly using reason and theory to adduce its implications. Around the fringes of normal science individual researchers have always exploited this possibility in attempt to bring about the resolution of the crisis that multiple unexplained anomalies creates. But normal science itself avoids the elucidation of the anomaly because it calls into question the norm in ever more radical ways. With each subsumption an ever deeper crisis is produced because we are confronted with an open horizon of ever deeper norms with no end in sight. The more we explain the deeper the questions and further uncovered unknowns appear. This fact that norms themselves are temporary and continually mutating has the effect of calling into question the whole procedure of projecting norms. Maybe if we looked deeper into the anomalies we would discover why this continually deepening crisis is produced. Plato's method does exactly that, it looks deeper into the anomalies and asks why any anomalies should exist at all and attempts, by questioning the anomaly closely to understand the nature of the norm which will not change with subsumption. Norms exemplify the *nomos*. When we first begin building a norm we attempt to make it regular and symmetric. But as we go deeper and deal with the anomalies then asymmetries are introduced into the picture of the norm that make it much more complicated. Each subsumption of anomaly deepens the norm but also de-normalizes it because it introduces more and more sophisticated deep structuring to cover more of existence as found under the rubric of the essences that have reality, truth, identity and presence. Anomalies exist outside that umbrella of acceptable phenomena that have succumbed to explanation. We can describe the anomalies which defy deduction from known laws. But we cannot explain them except as "exceptions that prove the rule". Anomalies indicate to us yet another approach toward existence that holds sway in revolutionary science. That is what Peirce called Abduction, hypothesis from single cases. Peirce points out that abduction is the third

combination of the steps in the syllogism that was ignored in the development of logic and which science needs to operate. Dogmatism needs only induction and deduction in order to apply its norms to instances. Critical philosophy which underlies science demands the use of hypothesis on the basis of theory in order to formulate disconfirming experiments. Thus abduction is the crucial basis of revolutionary science necessary to leave the dogmatic phase of normal scientific investigation. But abduction from theory is different from abduction from anomalies. This is the crucial step that Plato's approach to science takes. In one we are extending the norm and seeing confirmation while in the other we are questioning radically the norm and exploring the implications of disconfirmation. Disconfirmation is the radical basis of science because it is the thing we don't want that must be sought in order to discover the underlying order in things beyond our projections. Anomalies highlight the difference between Being and existence. Anomalies' brute existence beyond the umbrella of essential subsumed Being continually call Being itself into question.

Beyond description, prior to explanation and proof, there is givenness which the anomaly exemplifies. when we take the Platonic approach to Science we delve into the givenness attempting to discover the distinctions that derive from the things themselves which appear as natural segmentations of the given natural complex. As Plato says we need to make our cut at the joint not through the bone as reductionism tends to do. When we confront the anomaly per se we get some insight into existence that defies the subsumption into Being. The emergent event is the radicalized process of subsumption of the anomaly. It happens in stages, however, not all at once. First something is out there but we do not know what it is -- it's the unheard of, undreamt of, unknown. It is given but withheld at the same time. At that moment the existence of the emergent event is highlighted. After its being given it is described and isolated and determined as something unknown but delimited. After we describe it then we try to understand it. We understand it by its differences from the norm. Finally, once it is subsumed by changing the norm to accommodate it, then it is seemingly fully comprehended. Understanding by seeing differences from the norm is a process of structural reduction of the anomaly in order to determine the limits of explanations that are available. Comprehension finally occurs when we are able to project our formalism onto the anomaly by induction or deduction from a changed norm. The trajectory of the emergent event from brute givenness of existence into the realm of accepted essences occurs in stages, and makes visible the inner structure of Being itself that is fragmented into various kinds of Being which support each step in the process of assimilation. Dogmatic philosophy does not encounter anything but Pure Being. Critical Philosophy inaugurates the search for a process Being that can explain the unfolding of the scientific tradition. This search was consummated by Husserl who discovered how to retain the critical transcendental framework, yet provide an underlying process level of Being to underwrite both the evolution of things and the evolution of knowledge about things. Phenomenology provides the

basis by elucidating the difference between essences and simple ideas that in philosophy up to the advent of phenomenology were assumed to be the same. Ideas are static abstractions and essences are unfolding constraints on, and coherences of, attributes that possess a subtle but profound developmental dynamic which can be described as a meta-essence. Heidegger attempted to produce the monolith of Being that combined both the static mode and the dynamic mode believing that he had finally solved the age old split between Parmenides and Heraclitus. However, this solution was short lived because it immediately became clear that the difference that makes a difference between those two modes (ready to hand and present at hand) was another kind of Being radically different from either Process or Pure Being. I call that Hyper Being by reference to what Merleau-Ponty calls the Hyper Dialectic between Heidegger's Process Being and Sartre's Nothingness (its antinomy). Heidegger called it ~~Being~~ (crossed out) and Derrida called it DifferAnce (differing and deferring). Heidegger also talks about it in terms of "It Gives" and we can think of it as "the Being of 'Being of Being'" where 'the Being of Being', i.e. *IS is, is* the Monolith. Hyper Being is the IT that GIVES the Monolith of Pure and Process Being together. Phenomenology leads us directly to the distinction between these three kinds of Being because once we isolate the static purely present simple abstract ideas from the dynamic constraints and coherences on attributes called essences, then the difference between these becomes problematic. It turns out that the difference between them is just as strange as quantum mechanical madness or relativity theory discovers in the physics if not stranger. The anomaly appears out of this strangeness. In is that movement of isolation we recognize that the anomaly has the nature of Kant's noumena but manifest in the world as a knot of paradox. There an otherness to the totalitarian domination of Being appears. It cannot be subsumed to either the ideas nor to the projected essences of things that are designated as true, real, present, or self-identical. Even our descriptions fail to capture the Actuality of the facticity of the anomaly because it defies our categories and shakes the foundations of the house of cards built of interlocking essences and ideas. We are led as Merleau-Ponty was to posit another meta-level of Being that is prior to this indescribable eruption. He called it Wild Being, i.e. what is prior to the Hyper-dialectic between Process Being and Nothingness (i.e. DifferAnce). Heidegger called it the Fourfold of the mutual mirroring of the dualities of Being. We can describe it as <The Being of "Being of 'Being of Being'"> or as the Being of the IT that gives the Monolith of Being. We know that there is a stage when we feel something is out there before we isolate it and recognize its protean nature defying our categories which generate our essences and ideas. Castoriadis calls this the *Magma* of Chaotic Being. This meta-level of Being prior to our ability to indicate the anomaly decisively even as a knot of paradox is the point where the anomaly is still merged in the chaos which is excluded from Being. It is a rarefied and subtle kind of Being that borders on the brute limits of Existence. In the Indo-European tradition it was experienced when warriors like Achilles went into a Berserker state, that it is only approached at the limits of altered states of consciousness. There when all the non-isolated anomalies merge into a

sense of monstrosity which we only experience with acute horror we recognize the antipodal limit which is the furthest point from the normal and thus defines “normness” from its extreme. The fundamental principle is that it is the rare unconditioned event that is the measure of the norm. Just as we only really know what a system is capable of when we stress it so the real, identical, true, or present limits of our scientific tradition only are known with the arising of the emergent event. The emergent event, i.e. the ultimate extreme, organizes everything within the tradition because the tradition must pro-actively respond to these events. When they occur they reveal the true underpinnings of our tradition and the real articulation of Being into fragmented kinds that are *the face of the world*. The stages of emergence reveal the inner structure of Being under stress as the most radical challenges to the will to power are fended off and subsumed. The *will to power* occurs as the attempt to impose the *restricted economy* of the system within the meta-system that exhausts the cyclical *eternal return of the same*. Just as viable societies organize themselves to account for the possibility of war, as Plato says so, the epistemic and ontological underpinnings of our tradition appear when new things come into existence that are genuinely unheard of and novel. Our tradition is organized to handle these occurrences which cause it to transform the underlying ontological basis in order to mutate the norm to handle the radical challenge. When we look closely at the anomaly this is the response we see. All responses to the anomalies are the same. The tradition does not respond differently at different times, but at the meta-level the meta-essence of the tradition itself is fixed as a set of synergized, yet fragmented, dynamics. So if we look at the individual anomaly we are struck by this difference from the norm. But if we look at the response to the anomaly we always see the same series of unfolding stages, i.e. the fragmentation of Being, that unfolds as meta-levels as needed to cope with the radical nature of the anomaly. In other words, we need to look not at the specificity of the anomaly but the reaction of the normative projection. This is always the same. It is incredibly conserved by the Indo-european worldview because as we go into its history we can recognize the fragments of Being as for instance seen in the differences between major gods in the Vedas which was explored in the author’s Fragmentation of Being and the Path Beyond the Void³⁴⁷. This is the true object of Platonic science. The implications of the anomaly are always the revelation of the true, real, identical, present nature of the normative process. By focusing on the advent of the emergent event out of the hidden shadows of existence into the Clearing *of* Being, we discover the infrastructure of the projection mechanism that produces the clearing, and thus gain collective self-knowledge higher than the mere knowledge of things. Knowledge of things always advances but collective self-knowledge ever recedes. Collective self-knowledge advances momentarily when we stop seeing anomalies as isolated differences from the norm and instead look at the way the norm responds which at the meta-level is always the same, i.e. by unfolding step by step the emergent meta-levels of Being

347. (manuscript, see <http://dialog.net:85/homepage/fbpath.htm>)

itself, and thus revealing its own meta-essence, which like the roots in Indo-European languages for Being, is inherently fragmented, yet synergetic. When we look at these synergies we see the face of the world. For with the advent of Wild Being we see not just a difference of kind but a difference of integrity between the different layers of Being. Wild Being mixes continuity and discontinuity, or order and disorder, chaotically. Hyper Being is continually “slip sliding away” from itself, always differing and deferring. Process Being has streams of continuity and unfolding as in a developmental series. Pure Being has illusory continuity that projects the appearances of stability that is designated as real, true, identical or present. Each meta-level has its own integrity beyond the mere difference of kind. Ideas live within the realm of Pure Being. Essences of things cannot ultimately be reduced to this static image but differentiate into meta-essences as discontinuities appear in their unfolding. The difference between unfolding essences and static abstractions produces a strange effect which is non-reducible to either. This difference separates Ideas and Essences into different kinds, but it is not until the advent of Wild Being that we realize each meta-level of Being has its own different form of integrity. It is this radical difference that goes beyond kindness that allows them to synergize. In each synergy of the kinds of Being the infra-structure of the world is manifest. It is this infra-structure that underlies the articulation of the world that Heidegger calls, following Socrates, the Fourfold. The world has the structure of difference between Heaven, Earth or Mortals and Immortals in the mythopoetic era, and in our own era this translates into the differences between Physus and Logos or Limited and Unlimited (Apeiron). These quadrants participate in a mutual mirroring. The nature of the mirroring is manifest as the infrastructure of the meta-level of Being which are four in number. As we saw the meta-levels represent increasing intensity of the mirroring. At the radical limit of existence the mirroring becomes infinitely deep interpenetration. Each quadrant of the fourfold is a different manifestation of that intensification of mirroring. The fourfold of Heaven/Earth//Mortals/Immortals is the disposition of the world in the mythopoetic era. This is transferred in the metaphysical era into the difference between Apeiron/Peiron (Limitless/Limited) and the subdivision of the Peiron into Physus and Logos. In both eras there is a mirroring of the quadrants the dualities of the fourfold. We see in this mirroring the non-duality and nomos (ordering) and even more fundamentally of *Rta* (Right), Good and Wyrd (Fate).

Figure 74:

Physus/Logos (non-dual = order)
 Limited/Unlimited (non-dual=right)
 Have/Have Not (non-dual = good)
 Exist/Exist Not (non-dual=fate)

Figure 75:

Immortal/Mortal (non-dual = right)

Earth/Heaven (non-dual=order)
 Have/Have Not (non-dual = good)
 Exist/Exist Not (non-dual=fate)

What we notice is that Right and Order non-dualities change places in the two eras. We see this in the relation between constitutional government and kingship. In kingship the rights of the king are more fundamental than the law whereas in constitutional government the constitution embodies the *nomos*, while the Bill of Rights is a supplement to the constitution giving rights to the citizens who formerly had none. Rights are distributed to all the citizens instead of being vested in the King alone. It took more than 2000 years for constitutional government to replace kingship after the advent of the metaphysical era. With the metaphysical realm human generated law replaced the laws of the gods, but it remained subservient to kingship up until very recently. But with the advent of the metaphysical era the rights of man superseded the rights of gods, and man took on himself composition of his own laws. These laws were no longer ecstatic speech of those who “channeled” the gods especially at the oracle sites. The mythopoetic era was opened with the establishment of the first oracle at Delphi. It ended with the establishment of humanly based laws such as that of Solon, or Hamarabi. But even with the displacement of the role of the gods, the precedence of Right over Order was carried on by man within himself. But the externalization of the laws in the form of the constitution, prefigured by Plato’s *Laws*, is the fulfillment of the metaphysical era. It is no accident that we are discovering the “laws of nature” at the same time we are making our own human social and political laws. The dispersal of rights into the citizens from the King was also prefigured by Athenian tragic experimentation with democracy. But the fundamental tension within the Western Tradition is always between the Right and the Order as intrinsic non-dualities that exist below the surface of dualities that we see when we look at our worldview and its will to power on the globe.

The norm is the expression of the Order. The Aristotelian emphasis on experience held in common embodies the order at the level of the dualities. That experience is the common unfolding of the *physus* resonating with the upwelling of the speech and thought. When this resonance is broken then we get the sophistry which Aristotle perfects, and the alienation from nature exemplified by the pursuit of natural philosophy. *Nomos* appears in the *physus* as natural laws and in speech as grammar. These both point back to the pure order of mathematics which combines the order of grammar with the regularities of things. We quantify the things and produce an order like that of grammar which allows the manipulation of quantities. It is significant in this respect that the letters in the first alphabets also stood for numbers as they do in Arabic³⁴⁸. So it is possible to go directly from language to number and from things to counting. Letter forms were abstracted into pure countable quantities as were things which lost their attributes. In both cases it was quality that was suppressed in favor of quantization. Number became the abstraction

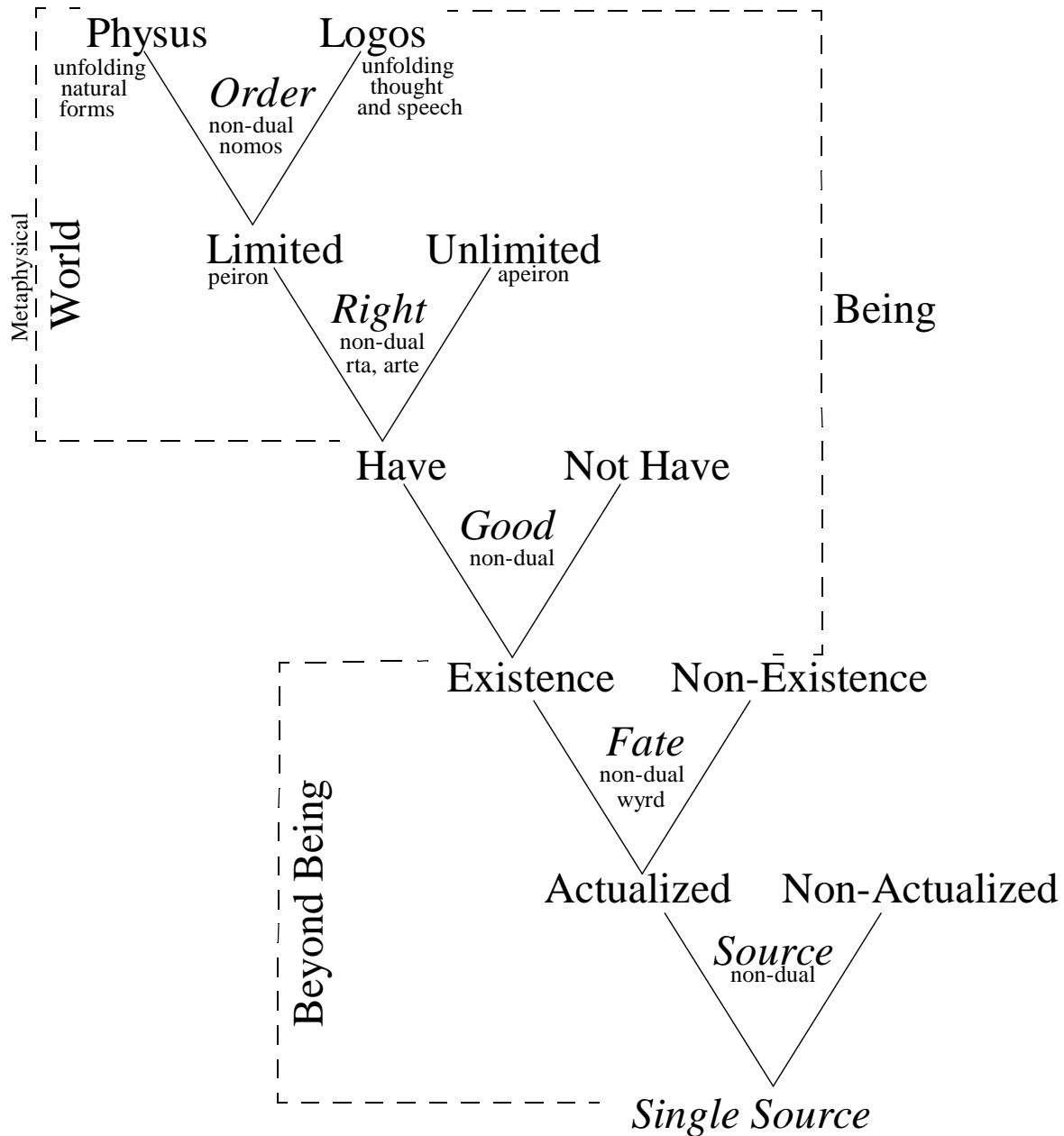
of the norm that underlies both speech and thought as well as the unfolding of things.

The Nomos is generally something static which easily gets out of synchronization with states of affairs in the world. This difference is highlighted by RTA (right)³⁴⁹. RTA originally meant “Cosmic Harmony”. In Greek it is ARTE, or excellence. We still differentiate the law from the spirit of the law. This adaptability to circumstances beyond the law or going beyond the norm in performance (arte) has a dynamic quality not comprehended within the law. We can see in this the difference between static and dynamic clinging. We statically cling through the law which does not change and is incredibly conservative. We dynamically cling through the adaptability and excelling in performance exceeding the common. From this analysis we can see that Aristotle’s science emphasizes the role of nomos over RTA. Plato on the other hand emphasizes RTA over nomos. We see in the anomalies the spirit of the law in action, because these call forth the excellence of the Western world. We see in the adaptation of the norm the inner dynamism of the projection mechanism of illusory continuity. In the tension between nomos and RTA, the underlying non-dualities below the surface of the duality of the world, we see the fundamental interaction that drives the worldview and determines its infrastructure. The anomaly is the key to unlocking this secret. But not if we treat it like Aristotle as only the means of subsumption to establish a deeper law. Only when we consider the anomaly as the irritant of the norm and look to the response of the norm do we see, as Plato did, into the inner structure of the worldview itself and thus ourselves.

348. The sociable number group of order 28 is an image of the holonomic relations between the Arabic letters. This is a more interesting relation between numbers and letters than the traditional correspondance which has an element of arbitrariness that negates all efforts to use the numerical values to derive hidden meanings. The first 22 letters have a fixed numerical correspondance but the last six letters are in dispute as to their numerical values. There is an interesting relations between the structure of the letters (as divided by sun and moon and in relation to those that appear at the beginning of Suras in Quran), the sociable group of order 28 and the deep structure pentagrams made up of five yin and yang lines.

349. Miller, J. [1988] *The Vision of Cosmic Order in the Vedas*. London, Routledge Kegan Paul.

Figure 76: Non-duals within Dualities of the World



Therefore it is important for us to explore the non-dual substructure of the world that goes on deeper into the Good and Fate as even deeper non-dualities. We can only do that by looking at Wild Being and beyond into the bedrock of existence itself. We need a theory of holonomics that allows us to define very precisely the nature of the non-dual. We get that by exploring anomalies and thinking through their implications. It is the anomalies in the physus, logos and nomos that give us a clue to the construction of a fundamental science of holonomics. We achieve that by drawing out the implications of the anomaly for the norm, not as an exception, but

as an exemplar of the RTA in relation to the nomos, that is of dynamic clinging to static clinging. Being has been called from the Buddhist perspective by C.G. Chang a subtle clinging and craving³⁵⁰. But it takes two forms related to either Pure Being or Process Being. The difference between these is the provenance of Hyper Being (Neither... nor...) and the mixture of these is the provenance of Wild Being (Both... and...). Plato opens up for us a different way of pursuing science that leads to self-knowledge rather than knowledge of the Other. Plato shows us how to draw out the implications of the anomaly. We use a series of anomalies that form families, and then we play these families off each other in order to see beyond the anomalies in the logos (as expressed in algebras), beyond the anomalies in the Physus (as expressed in solitary particle wave formations), beyond the anomalies in nomos (as expressed in the topological formations discovered by Mobius and Klein). Seeing how these series of anomalies mirror each other yet differ and then play off of each other gives us insight into the inner structure of the nomos. In that inner structure the nomos breaks its own rules in very specific and precise ways that allows us to describe exactly the non-dually dual holonomic states. With this encounter we see mirrored in the depths of the nomos the imprint of *Rta* (Right). In the meditation on the anomalies as families that are mutually elucidating, we see the image of the spirit of the law in the law itself. This fusion of the non-duals (of heart and mind) brings with it the direct encounter with the next deeper non-dual which is the Good (the source of endless variety) that occurs at the interface between Being and Having. Beyond that is the even deeper non-dual of Fate which brings us out of Being into touch with the bedrock of existence. Holonomics is about the interaction of the non-dualities at the core of our worldview and their relation to the surface dualities which define so much of our experience. When we look into these dualities we discover the mutual mirroring of the *fourfold of the world* which Heidegger describes in “The Origin of the Work of Art” based on Socrates earlier description of the world in the Gorgias. That mutual mirroring of the fourfold has a specific structure that is described by the special systems, and amplified by other anomalous series like that of the solitons or the topological surfaces. Taken together with the mathematical grounding in the nomos and the physical examples of these anomalous Special Systems found in the physus, the logos of the theory of the special systems achieves scientific respectability and goes beyond that to found a new kind of Holonomic scientific enterprise. That enterprise looks for examples of Holonomic Special Systems in various disciplines and attempts to discover the strange supra-rational norm that binds the various families of anomalies together. It also looks into history of various cultures for artifacts that embody previous knowledge concerning the special systems or the Emergent Meta-systems. It finds these artifacts in Chinese and Islamic traditional sciences as well as within the history of the Indo-european worldview both in India and in Europe. Between looking for ancient remnants and modern

350. Chang, Chen-chi [1971] *The Buddhist Teaching of Totality: the philosophy of Hwa Yen Buddhism*. University Park, Pennsylvania State University Press.1971

examples of anomalous special systems and emergent meta-systems there is much work to be done understanding the mathematical underpinnings of the theory in the various underlying anomalous mathematical structures which present to us a strange synergy that as yet has not been elucidated.

15. Discovery

The discovery of the special systems is an excellent example of serendipity. It resulted from the collision of two completely separate lines of investigation with an Aha! realization that these two divergent strands were intrinsically related. It occurred in the summer of 1993 at a time when I was studying the application of George Klir's General Systems Theory to the processes that underlay the use of methodologies in software design. These studies had always gone on in a broad philosophical context and I was engaged in attempting to redefine General Systems Theory in relation to the methodological distinctions that Klir discusses in his Architecture of Systems Problem Solving. The lattice of methodological distinctions that were intimately connected to the viewpoints on real-time design ended in the creation of the reals as the model of illusory continuity upon the background of which dynamical systems were described and measured. On the other hand for a long time I had been studying Chinese Traditional sciences such as acupuncture³⁵¹ and was using the bifurcation of hyper-complex algebras as a model of those autopoietic systems. One day I realized that the hyper-complex algebras began in the reals and the lattice of methodological distinction ended in the reals. So I wondered what would happen if I connected these two very different structures together in the same model. This effectively created a bridge between General Systems Theory construed in terms of orderings and the models of autopoietic systems that I had developed separately based on Hyper-complex algebras. The combined structure had many implications that I am still exploring. The stages of the development of these ideas are recorded in two series of working papers called On the Social Construction of Emergent Worlds and Steps to the Threshold of the Social. The papers were concentrated on the implications of the extension of the autopoietic theory into the social based on the analogies to the hyper-complex algebras. However, they cover the entire structure and its derivation and philosophical grounding with extensive work on the implications of Goertzel's 'Magician' systems. These papers attempt to found the new disciplines of Autopoietic Sociology and Computational Sociology, as well as ground a new Social Phenomenology. But the discovery of the general theory of ultra-efficacious special systems applies to many different fields which have been haunted by their lack of scientific basis due to the fact that what they describe and explain follows strange hard to capture rules which do not seem to fit normal physical models. When the subjects of these other sciences have some aspect which is ultra-efficacious in some sense then a study of the implications of the

351. Porkert, M. [1974] *The Theoretical Foundations of Chinese Medicine*. Cambridge Mass., MIT Press. See also Porkert, M. [1983] *The Essentials of Chinese Diagnosis*. Alta medicinae Sinensis, Zurich, Switzerland, Chinese Medicine Pub.

general theory of ultra-efficacious phenomena should be made to see if these mathematical analogies that have been discovered to apply to the special systems also describe aspects of these other phenomena. There are many phenomena that probably fit under the rubric of ultra-efficiency and the special systems that have not been recognized because of their seeming violation of physical laws and norms. This new science of Holonomics recognizes that there are rare exceptions to the norm that must be studied separately and that these anomalies in various fields have functors between them that are mediated by the theory of the special systems.

An earlier version of this paper was submitted to the International Journal of General Systems on 11/01/95. It has grown in the process of editing and reworking to something much larger than the original journal article. In the mean time the working papers in the series “On the Social Construction of Emergent Worlds” and “Steps To the Threshold of the Social” and an earlier version of this article were published on the internet under the title Reflexive Autopoietic Systems Theory³⁵². Then, several other papers were published in rough draft form such as Autopoietic Meta-theory³⁵³ and Deep Mathematics and Emergent Meta-systems Theory³⁵⁴. A new summary of research into Emergent Meta-systems called New Monodology is in work. And another summary work called Emergent Worlds has been begun³⁵⁵. A summary of my entire philosophy in a shorter form has also been produced called Maitreya Suttra.

16. Acknowledgments

This essay is dedicated to my grandfather and grandmother Joseph and Beulah Emanuel.

I would like to acknowledge first the help of my teacher and mentor Ian Dallas³⁵⁶, who set me on the route that led to this discovery. I would also like to acknowledge the contribution of Onar Aam³⁵⁷ who contributed an intimate knowledge of the workings of the algebras and many useful insights that has extended the theory in many unexpected ways. Also Ben Goertzel³⁵⁸ who inspired much of the theoretical work that led to the formulation of the implications of the

352. <http://dialog.net:85/homepage/refauto2.htm>

353. <http://dialog.net:85/homepage/at00v00.pdf>

354. <http://dialog.net:85/homepage/deepmth2.pdf>

355. <http://dialog.net:85/homepage/emergent.htm>

356. Ian Dallas [1992] *Oedipus and Dionysus*. London: Frieberg Books. Curzon Distribution. Also [1990] *The New Wagnerian*. Granada: Frieberg Books. Also [1989] *The Ten Symphonies of Gorka Konig*. London: Keagan Paul International. Also know as Shaykh abd al-Qadir as-Sufi ad-Darqawi al-Murabit. See [1984] *The Sign of the Sword*. Madina Press. Also [1981] *Letter to an African Muslim*. Norwich UK: Diwan Press. Also [1982] *Root Islamic Education*. Norwich UK: Diwan al-Amir Pub. Also [1988] *For the Coming Man*. Norwich UK: Murabitun Press.

357. <http://www.stud.ux.his.no/~onar/>

358. <http://goertzel.org/>

relation between the algebras and special systems. His model of the 'Magician' system helped to supply a crucial link in the puzzle that I was struggling to put together. Thanks also goes to Leonard Woo who was working with me at the time of the major discoveries and supplied their initial reality check. Tony (Frank) Smith³⁵⁹ also contributed much to our understanding of the structure of the Octonions and their implications for the unification theory in physics. Also thanks goes to Robert J. Cummings who read the working papers and contributed many hours of fascinating conversation about the implications of the discovery. I would also like to mention Dennis Keagy³⁶⁰ with whom I have had many interesting philosophical conversations over coffee and who taught me about Kierkegaard. I have learned a great deal about Acupuncture and Homeopathy from Hajj Abd al-Aziz Redpath, Muhammad Eckhaus and Mikhail Esfandier. I am indebted to Arshad Mahmood who proofread the previous version found many small errors which hopefully have now been corrected. There are also many others who participate in the Thinknet philosophy and systems theory email lists that deserve some credit through many computer mediated conversations over the last few years. Among those lists is the `autopoiesis@dialog.net` list where Onar Aam and I met originally.

To find out more about those lists send a blank message to `help@dialog.net` or have a look at the DialogNet homepage at URL `http://server.snni.com:80/~palmer/dialognet.html` or `http://dialog.net`. The DialogNet Web-BBS is available for telnet at the address `bbs.dialog.net`. The working papers mentioned above are available from the author. You can also reach me at `palmer@dialog.net`, `palmer@netcom.com` or `palmer@exo.com`.

If you discover any ultra-efficacious phenomena using this theory as guidance please contact me, as I am collecting examples of phenomena that have relations to structural aspects of the theory.

359. <http://galaxy.cau.edu/tsmith/TShome.html>

360. <http://www1.occ.cccd.edu/dkeagy/default.html>

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