

Steps To The Threshold Of The Social

PART 5: Laws of Form and Pattern, Magician Meta- Systems, Matrix Logic, Special Systems Theory and Artificial Sociality

Kent D. Palmer, Ph.D.

PO Box 1632
Orange, CA 92856 USA
~~palmer@exo.com~~

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1. The Problematic

Ben Goertzel has pointed out (in private correspondence) the connection between the formalism of Laws of Form developed by G. Spencer Brown and his Magician systems formalism. He has attempted various experiments using the Laws of Form as a basic structure for the proving out of the ideas of magician systems. Magician systems have three operators. These are annihilation, gestalt formation, and mutual action. We can relate these to the Laws of Form by postulating that reduction of formulas by using the laws of form equates to annihilation while reversing the laws and using them to build up the formulas by complexifying the arguments amounts to pattern formation. The theorems developed by Kauffmann and Varela can be used to transform one pattern into another. Also Kauffmann has shown that no formula needs to be more than two expressions deep in order to be unique. So we can see the individual magicians made up of Laws of Form elements oscillating between longer and shorter formulas based on their expansion or contraction using the laws of form axioms to either add or reduce elements of the formulas. Further we could imagine two such magicians interacting with each other, where each is comprised of a formula from the Laws of Form (or more specifically the Kauffmann and Varela version of it expressed in "Form Dynamics"). Because formula have variables it is possible for the interaction of two formulas to be by either substitution of variables or by conjunction. These two ways of interacting are

based on the laws of form themselves that define repetition or layering as the two basic ways elements can be related to each other. So mutual action would have four possible outcomes based on the configuration of conjuncted formula from two magicians or based on the placing of one formula into the variable embedded within another formula. In this way we can see how the laws of form can represent the basic operations of the magician system.

Figure 138:

Annihilation	--- reduction via the axioms
Mutual Action	--- substitution of formulas by conjunction or insertion into variables
Pattern Formation	-- by complexification of formula via the axioms

Once this basic congruence between magicians and laws of form systems has been identified then there are many ways to create simulations of the interaction of the magicians in a swarm through the laws of form. Ben Goertzel has tried several approaches to this but has not do date settled on one definitive embodiment of magicians through the laws of form.

The problem we set for ourselves here is to look at this whole process of embodying magicians swarms and attempt to bring more constraints into play in order to develop an interesting simulatable model of magician systems that allows them to be a model of artificial sociality. We want to be able to see the relation between systems and meta-systems and also the role of the special (dissipative, autopoietic, and reflexive) systems. We want to have a rigorous model that will allow us to explore the whole context of normal, special, and meta-systems.

In order to accomplish this we will attempt to produce a link between laws of form and August Stearn's MATRIX LOGIC. We will reinterpret laws of form in the context of this higher logico-mathematical formalism. And we will venture interpretations of many features of this strange and deviant logic showing how it is an excellent example of a logic of showing and hiding and that its somewhat features that go beyond traditional logic are mostly justified in the context of showing and hiding processes.

Once we have developed a bridge between matrix logic and laws of form then we will go on to show how magician meta-systems can be conceived of within the constraints of this overarching formalism. We will go on to show how normal general systems, special systems, and meta-systems play themselves out in the

context of this new set of formalisms.

Finally the real problem will be to sketch the beginnings of a design for an Artificial Sociology simulation based on these structures. Our goal is to establish Computational Sociology and connect it with both Autopoietic Sociology on the basis of reflexive special systems and with Social Phenomenology that takes the non-dual field of the social as the foundation of all scientific investigation.

As a synopsis we will say that magician meta-systems can be identified with the laws of form formalism and that two laws of form structures interact within the matrix logic of showing and hiding. The level of the laws of form simulation of a magician system is a model of the dissipative system. When we combine two laws of form magician system we get an autopoietic structure under the auspices of matrix logic. Finally August Stearn defines a hyper-logic beyond the matrix logic and we will relate this to the level of the reflexive special system.

Figure 139:

Magician System = Laws of Form = Dissipative System

Dual Magician System = Matrix Logic = Autopoietic System

Quadruple Magician System = Hyper Matrix Logic = Reflexive System

Now it has been established already in one of these papers that we can relate the different algebras associated with the special systems with the operators that make up the magician system. So what we are seeing here is the dual definition that takes the magician system and sees it in the context of the special systems. We have turned the table on the magician system and instead of constituting it out of the special systems instead we are seeing the magician system operating in a field defined by the special system.

It is important to keep this in mind. We are working with the dual formulation of the inner relation between the magician system and the special systems. If the production of the operators by the special system was the internal coherence of the magician system then the looking at the magician system in the context of the laws of form, matrix logic and hyper-matrix logic is the external coherence of the magician system.

| 2. Truth values

Spencer-Brown makes one fatal mistake in LAWS OF FORM. He relates the through value null or void to false. This is an source of endless confusion. Spencer-

Brown was striving for the simplest and most elegant formalism to express his proto-boolean system. In so doing he reduced to a single mark that alone or combined with other marks expressed his system. Those marks which look like upside down Ls are two dimensional and so can express two information dimensions simultaneously. A further improvement he made was to use the background itself of the symbol as a sign. So when there is no mark there is only the background.

The laws of form can be expressed thus:

$$\begin{aligned} (()) &= " " \text{ or } 0 \\ () () &= () \end{aligned}$$

When just the background is meant we will write "0" for null and void.

The opposite axioms not used by Spencer-Brown will be called the Laws of Pattern and will be expressed as follows:

$$\begin{aligned} (()) &= () \\ () () &= " " \text{ or } 0 \end{aligned}$$

Instead of thinking metaphysically about the null as the void as Spencer-Brown is known to do we will instead consider it as a blank place on a tape. This is to say it is a memory location that is left unmarked.

In what follows we will be using turing machines as our model of magician systems with the difference that instead of infinite tapes we will instead have expandable mobius strips as tapes. This allows us to introduce non-duality into the argument in a concrete way and also allows us for a concrete interpretation of matrix logic. So a null element will be an empty or unmarked place on a mobius turing machine tape.

We will note along with Manthey (Information Mechanics) that turing machines have implicit synchronization mechanisms between their state machines and their tape reader/writers which are normally not mentioned. But these semaphores will be important to are argument as they are themselves marks or empty places outside

either the state machine or the tape of the turing machine.

Finally we will consider that these tape machines may switch between the Boolean laws of form axioms and the laws of pattern axioms. In fact, it is clear that it is only through oscillating between laws of form and laws of pattern that it is possible to have complete intertransformability between all the elements defined by the laws of form axioms.

Figure 140:

multiplicity or repetition	->	() ()
layering	->	(())
something	->	()
nothing	->	0

Figure 141:

F	P	F	P					
() ()	->	()	->	(())	->	0	->	() ()
() ()	<-	()	<-	(())	<-	0	<-	() ()

So there must be at least one semaphore which indicates whether laws of form or laws of pattern is in force at any one point in time. We will assume that these semaphore for the transition between laws of form and pattern may be as many as needed.

Tape machines may have multiple state machines and multiple tapes. So the number of semaphores coordinating the reading and the operation of the state machines may be many.

Now what we want to do is get a picture of the relation between laws of form/pattern truth values and the truth values of Matrix Logic. Matrix logic was created by August Stearn by combining normal logic and matrix math. Basically Stearn has defined a new meta-logic at the next higher threshold of complexity beyond normal traditional logic. This new meta-mathematico-logic has many unusual features that will be interpreted as we move through our analysis. Here we are only concerned with the truth values. Matrix Logic in its simplest form has only four truth values.

Figure 142:

00	neither true nor false
10	true
01	false
11	both true and false

These are the basic truth values of Indian logic which unlike western logic does not accept the principle of the excluded middle.

The way to think about this is in terms of para-consistency and para-completeness. Something is para-consistent if it is not completely decidable. Something is para-complete if it is not completely distinguishable. So in a para-consistent system it is possible to have active contradictions of the type that appear in Zeno's paradoxes and have been developed at various times in the Western tradition. The truth value 11 Both allows para-consistency of active contradiction. Its opposite is the 00 of neither true nor false which we might call para-inconsistency. Para-completeness enters into the truth values by using fuzzy numbers between 0 and 1 instead of the end points of this spectrum. This allows indeterminateness as well as indecidability to enter into our picture of truth giving some leeway between absolute truth and falsehood.

In matrix logic truth is expressed in bra $\langle tt|$ and ket $|tt\rangle$ vectors. These vectors following normal matrix mathematics are orthogonal to each other. Matrix operations need to operate on both bra and ket truth vectors. In other words matrix operations are between orthogonal mobius tapes. On these tapes one value is written on one side and the other value is written on the other side. The vector looks at both sides of the tape instead of just one side.

We can, following this interpretation, see how the laws of form/pattern fit into the matrix logic mold. The laws of form/pattern marks are equivalent to truth in matrix logic. So the basic truth values equate to the following:

Figure 143:

- 1,1 both sides of the mobius tape marked
- 1,0 only bottom of mobius tape marked
- 1,0 only top of the mobius tape marked
- 0,0 neither side of the mobius tape marked

Because we have mobius tapes there is an additional complication. The mobius tape really means that both sides of the tape are "really" globally the same side. We extend the tape by expanding the mobius strip rather than adding something onto the end as in the infinite turing tape model. But because there is a twist in the tape there is the problem of the unavailability of positions on the tape. So we have another truth value that can appear in our truth vector called -1. Stearn derives this other truth value from the matrix operations within the logic. But what we

immediately notice is that these new truth operations allow us to simulate a showing and hiding system. In other words the negative truth value -1 is equivalent to a "hidden" state of affairs. So we now have the following new truth vectors:

Figure 144:

- 1, 1 top side obscured other side marked
- 1, 0 top side obscured other side unmarked
- 0,-1 bottom side obscured other side marked
- 1,-1 bottom side obscured other side unmarked
- 1,-1 Both sides obscured

Think of the game we play with children of showing and hiding of things from behind our back in our closed hand. This system has exactly this set of truth values.

Figure 145:

- 0,0 Nothing in either hand (negative trick)
- 1,1 Something in both hands (positive trick)
- 1,0 Something in left hand, nothing in right hand
- 0,1 Nothing in left hand, nothing in right hand
- 1, 1 Left hand hidden behind back, something in right hand
- 1, 0 Left hand hidden behind back, nothing in right hand
- 1,-1 Something in left hand, right hand hidden behind back
- 0,-1 Nothing in left hand, right hand hidden behind back
- 1,-1 Both hands hidden behind back

The truth values are a complete expression of the possibilities of this showing and hiding guessing game. The game itself expresses the possibilities of handedness. The game itself has illusory continuity of pure presence as long as the child is distracted by it. The game is however a process in which one is constantly getting something new, placing it in one or both hands or not and then presenting a choice to the child who then chooses and gets or does not get the prize. Each play is separated by a repeated instance of the game and the variety is in all the different possibilities. If you want to reward the child regardless of their choice you play a positive trick. If you want to punish the child regardless of their choice you play a negative trick on them. Otherwise the variety comes from the success of guessing which hand it is in if one is offered. Normally both hands are hidden between games. However, if the child discovers that the game is rigged they may hold onto one hand as you place the other hand behind your back. They use the fact that one or both hands may be hidden to explore the constraints of the game whereas the one offering the choice uses the ability for both hands to be hidden to exchange the

contents of the hands. So Hyper-Being appears as the element of discontinuity between the games, but also as the sinister side of the game in which positive and negative tricks can be played. In such games the sinister side is the hidden intention of the one offering the choice who can use the structure of showing and hiding to manipulate the one making the choices. Wild Being appears in the interaction between the players as they hold or resist the holding of hands of the one offering the choices. It also appears in the variety of things used in the game. Usually it is candy or money but there could be a whole changing variety of things offered as choices. Like tic tac toe this is a game which is very simple and is played only to create the interactional situation between the players. In that situation we fall into a micro trance that gives us relief from some dualistic situation. Thus the purpose of the game is to take us through the four meta-levels of handedness which express on aspect of our animality (finiteness). The game summarizes our construction of the world as a complex showing and hiding gestalt. In dealing with each other within the world we must be familiar with the different kinds of Being and be able to construct small models of that within our social interaction. The game and its truth values perfectly express the showing and hiding social situation and gives us a basic model for constructing mutual actions within the world.

We want to go beyond matrix logic however to add one more truth value beyond those which August Stearn offers. This truth value is the imaginary number. We know that -1 is a singularity in the Real number line that produces imaginary numbers with its square root is taken. Imaginary numbers are orthogonal to real numbers. What we note is that not all tapes can interact within the space of interacting turing machines. Imaginary numbers represent places that are related to other tapes or inaccessible due to the action of other tapes. We should know that in laws of form proto-imaginary values $*i*$ and $*j*$ arise at the trace level when we allow re-entry to laws of form formula. Here we posit that these neither true nor false values may appear as special markings to either side of the tape which is made inaccessible either to itself or by some other tape. We will talk about this as intersections of tapes with each other or with themselves.

We use the imaginary truth values to construct the concept of interfering interacting tapes. And this naturally extends to our concept of the timestreams supported by complexnion, quaternion, and octonion algebras that will allow intertransformability between timestreams or illusory continuities. There are kinds of tapes that only exist in conjunction. A value on one of those tapes may be seen as imaginary by another orthogonal tape which is being read in conjunction with it.

If we add imaginary marking values then we have constructed a Greimas square of extreme truth values:

Figure 146:

i, i	both interfering
-1, -1	both hidden
1, 1	both full
0, 0	both empty

This new imaginary extreme of truth also introduces several new intermediary values not considered by Stearn

Figure 147:

1, i
0, i
-1, i
i, 1
i, 0
i, -1

So there are now 16 truth values in all. And the space of differentiated truth values has become very complex with 12 chiasmic intermediary possibilities. Once we have extended the truth values to i then it is easy to imagine introducing j & k of the quaternions and the I, J, K, E of the octonions. In fact, we now have a stable structure from which to extend the Greimas square of truth values as we have in the last essay to realize the internal structure of the dialectic that is hidden within the Greimas square of the extreme truth values.

What is good about this way of looking at truth values is that the proto-imaginaries *i* and *j* can be expressed directly in this structure in the relation between orthogonal mobius tapes instead of just as the an implicit trace within the oscillating formula structures.

An important point that must be made here is that the | mark is two dimensional and that it expresses the relation between process being and pure presence in its own orthogonality. This is to say that the mark's embedding of other marks is a process that is different from its mere positionality which relates to its pure presence within the chain of signifiers. When we introduce the ability to hyperlink between different positions in the formula structure then we explicitly introduce the representation of Hyper Being. The place Wild Being comes into the structure is in the production of more signs or the reduction of signs within using the axioms. Beyond that Wild Being is not particularly located by the notational conventions as are the other forms of Being.

Now the thing about a mobius strip is that it is a two dimensional surface. So it would be possible to write marks of the kind Spencer-Brown has created on this surface together with the overhanging of marks including other marks. We never have to write marks more than two levels deep in order to have a unique formula as Kauffman shows. So each place the horizontal part of the mark comes down is a memory location that is either marked or unmarked. But parallel to the other edge of the strip the overhanging vertical portion of the mark can extend any number of places covering other marks. Empty places can also be covered in this overhanging. Then we can also see that the traces which give access to variables or empty spaces within the marking structure can allow us to hyperlink in a specific order around within the formula structure. Note that these hyperlinks could be represented by the horizontal components of the marks on the other side of the mobius tape. So tape memory locations are not just little squares that hold bits. Instead each memory location is tied to others by its ability to have an overhanging mark that connects to it. Further the trace level marks can be denoted using the other side of the tape so that there are explicit and implicit connectives between marks. Notice how much this is like a printed circuit board which can have crossing lines going on opposite sides of the board. Since each side could act as the implicit trace structure for the other we can see how there is a possibility of interesting interactions as tape positions on one side of the tape slide past those on the other side of the tape as the mobius tape expands and contracts. We can perhaps relate this realignment possibility to Wild Being and then we can see all the element of the fragments of Being represented in the mobius tape.

When two tapes are brought into conjunction with each other then that is when the imaginary tape values arise from an external point of view where as internally it is from the conjunction of the two sides of the same tape and the incarnation of the proto-imaginaries $*i*$ and $*j*$ that appears in the oscillatory patterns.

In order to transition from the marked tape to the state machine part of the turing machine then it is necessary to introduce a coding system that interprets the marks on the tape and turns them into a programming language that is at least expressed in a state machine minimal method. What we would like to do instead is apply what we have learned about the minimal methods of software design and their embodiments to develop a turing machine formalism that would allow any real-time system to be emulated. What we know from Manthey's analysis is that turing machine mathematicians are obsessed with halting problems. But many real time systems are produced not to halt. So halting problems are just a small subset of the

kinds of problems we need our computing mechanisms to approach. So what we need is a formalism that embodies all the viewpoints on the real time system and all the minimal methods that connect those viewpoints. This formalism already exists as the Integral Software Engineering Methodology what was presented in the [Software Engineering Foundations](#) series of working papers.

If we are going to program our turing machines with their mobius tapes then we need to express the design and programming formalism that addresses the expansion of turing machines into the realm of real time system. Living systems are do not halt except in death. So if we are going to attempt to simulate autopoietic systems we need to design turing machines that do not halt but keep working until they are stopped.

| 3. An Implementation

Mobius turning machines give us good means for realizing laws of form as a programming language. As explained above we postulate that the mobius tape is written on with the marks of the laws of form symbolism. But we start this by assuming that the tape is divided into places. Each place is connected to every other place by the horizontal component of the mark. This means that each place must have a subscript which allows it to index every other place. The single mark thus plays both the role of marking a place but also indexing another place if it overhangs other marks. In my paper “Software Ontology” of the [Software Engineering Foundations](#) series it was shown that computer hardware was based on pointing (index registers) and grasping (accumulators). And by that means it embodied the two kinds of Being that Heidegger talks about in [Being And Time](#) (Pure Presence or present-at-hand *and* Process Being or ready-to-hand). It is because of this that software can have the kind of Being called Hyper-Being. This kind of Being appears as the trace structure of discontinuous hops in laws of form. Spencer-Brown draws these as arcs that go from point to point in a formula giving it a recursive or iterative structure which can represent wave-like phenomena. It is out of these jumps that the trace level is represented. With the mobius formulation we use the other side of the strip to record the jump structure. It is recorded by using marks where the vertical component indicates the direction of the jump and the horizontal component represents the part of the formula on the other side of the tape that is skipped. So when we use the other side of the tape as the control structure for executing the formula on the from of the tape we realize the encoding of the jump structure.

We assume that all places on either side of the tape are always aligned. We assume that there is an expand and contract operation on the tape that will increase the number of places either by scrunching places or actually physically expanding the tape. We assume that there is a special start code in one place on the tape. Other important codes are as follows:

Figure 148:

```
_Meta-symbols_
* Start
# Boot section end
@ program section
^ sub-program section
% state machine section
& data section
$ end data object
! end of section
= end identifier
+ variable end
```

Figure 149:

```
*(((((( ))))0()0(())#%()()00(())000()!
start with boot section and state machine part.
```

Figure 150:

```
@00=( )(( ))(( ))(( ))(( ))^()0=( () )0()0( )(( ))^0()=( () )()00( )0
function with sub functions
```

Various sections of the tape are marked with special symbols that will allow them to be found. So for instance the turing machine will take an inserted tape and will always read to the start symbol first. Then it will execute the boot section that exists at from the start symbol to the boot section end symbol. The boot section may read a state machine from the tape if this is a universal turing machine. Or it may end by jumping to a program section that will work on a data section. All program and sub-program sections begin with an identifier which is the function name. A series of program sections may compose an endless loop of a realtime system. Likewise all data objects have identifiers. Following Manthey we can say that a given turing machine may have several sensors and actuators besides the tape reader. The tape reader is only one kind of sensor/actuator mechanism and we can imagine many others. The purpose of a real time system is to make things happen or sense the happening of things in particular points in spacetime. to do this it will need multiple sensors and actuators depending on the application which are protected by a semaphore from the state machine just like the tape reader.

Reflexive Autopoietic Systems Theory

For structured programming we need only three constructs:

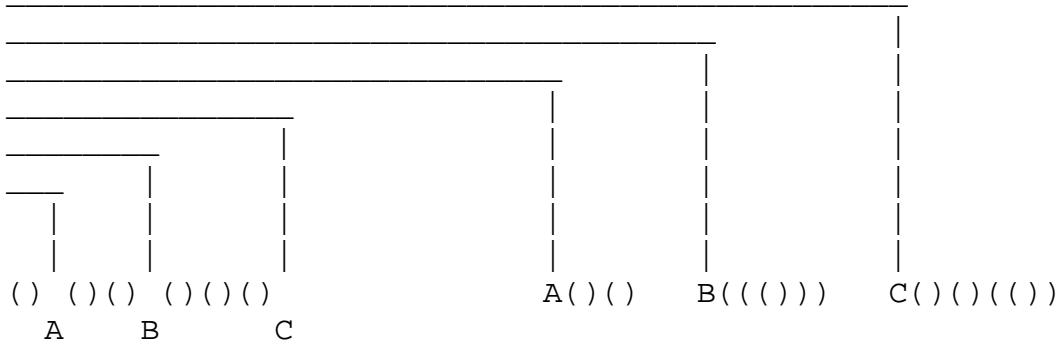
Figure 151:

Sequence
Selection
Iteration
If then

The sequence operation is produced by reading the tape from a start symbol to an end symbol.

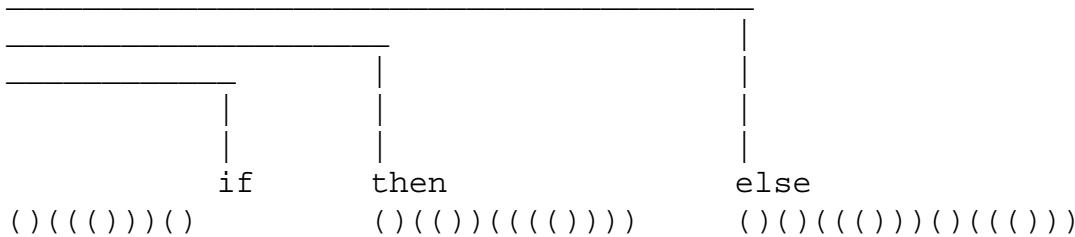
The selection operation occurs when we jump to a name such as the program and subprogram names. The same can be said for data objects. Data objects can have embedded operations (sub-programs) which we can select from. Selection is performed by a search of the tape for the identifier. The selection operators can also be implemented with jumps as follows:

Figure 152:



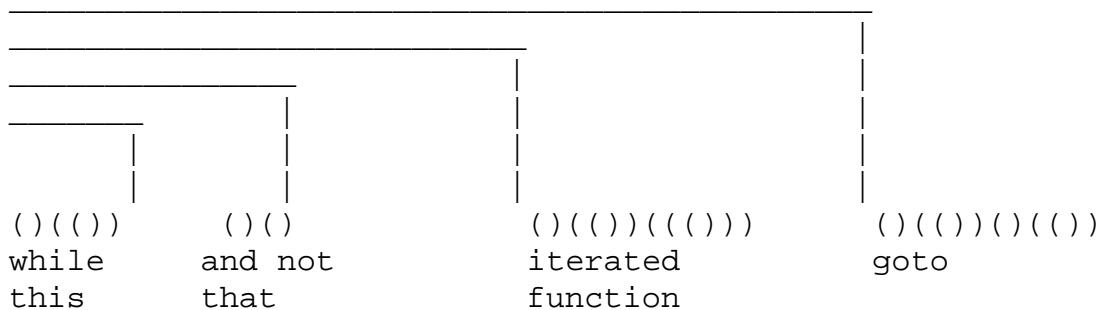
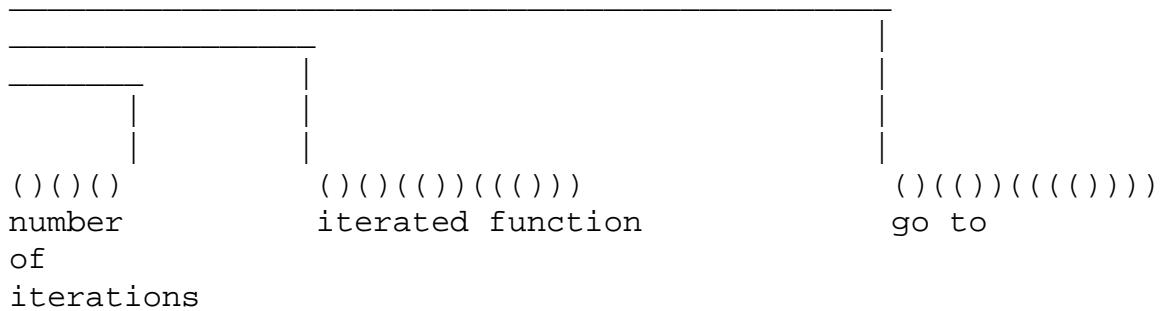
The if...then needs to be implemented with jumps on the opposite side of the tape. Basically this appears as one marker that sections off the condition from another that points to the jump spot if the condition is true and another that points to the jump spot if the condition is false. It would look like this

Figure 153:



An iteration or a while loop can have the following form:

Figure 154:



There must also be a coding of laws of form marks into higher level constructs. We will use braces to denote coded marks as opposed to non-coded marks.

{ () () }	= A
{ () 0 }	= B
{ 0 () }	= C
{ 0 0 }	= D

This is the Boolean permutation of 2^2 . Other permutations would be similarly obtained by enclosing the Boolean marks in braces. But we will use symbols rather than writing out Boolean marks that would only appear in the compiled version of the code for the mobius turing machine.

Of interest is that the Boolean coding goes in two directions due to the two dimensionality of the marks. So we can also have a coding for depth:

{ () () }	= A
{ (()) () }	= B
{ () (()) }	= C
{ (()) (()) }	= D

These two codings can be combined together for a modula three coding scheme as well.

Figure 158:

{()()}	= A
{()()()}	= B
{()0}	= C
{()()()}	= D
{()()()()}	= E
{()()()0}	= F
{0()}	= G
{0()()}	= H
{00}	= I

We do not need to be concerned with the coding but will represent the mobius turing machine in a higher level language that assumes the coding and the hardware that knows how to decode the coding.

Figure 159:

```

START
BEGIN BOOT
END BOOT
BEGIN PROGRAM id
END PROGRAM id
PROGRAM id LINE id statement
BEGIN SUBPROGRAM id
END SUBPROGRAM id
SUBPROGRAM id LINE id statement
BEGIN MACHINE id
END MACHINE id
MACHINE id EVENT id INSTATE id TOSTATE id ACTION id
BEGIN DATA id
END DATA id
DATA id VARIABLE expression
IDENTIFIER IS id
SEQUENCE IS id id id id id id
ITERATION expression PROGRAM id TIL expression GOTO id
WHILE expression PROGRAM id GOTO id
CASE expression DO id PROGRAM id DO id PROGRAM id END CASE

```

This is an outline of a minimal language built around the meta-symbols outlined above. What is interesting is that once one has abstracted to the language level we have completely disengaged from the mobius turing machine underlying architecture so there is a radical break at the point where we institute the translation between underlying assembly language to a higher order language. That higher order language could in fact be almost anything. This break at the point where a compiler is instituted is similar to the break where we institute coding. The

language representation is arbitrary as is the coding. We note that it is by the coding that we get to the elements of the language (i.e. the ASCII code) and then by instituting a compiler we completely abstract from the mobius turing machine architecture so that we could imagine any computational infrastructure underlying our higher order language. In fact we might as run our language on a regular computer.

Figure 160:

Laws of Form -- information infrastructure could be Boolean
 CODING -- arbitrary giving rise to endless variety
 Mobius Turing Machine -- pointing and grasping infrastructure
 LANGUAGE -- arbitrary giving rise to endless variety
 Design elements expressed as minimal methods -- viewpoints
 REQUIREMENTS -- arbitrary giving rise to endless variety

Gelertner notes three basic concepts that have to do with programming language to which we add the obvious algorithmic nature of programming languages.

Figure 161:

SELF-DESCRIPTION -- we can write a compiler in the language itself
 NAMING -- we fill in the names of objects as we build constructs XXXXXXX
 ALGORITHMIC -- basic structured programming constructs exist

Gelertner uses a spacetime framework to look at the differences in structure of languages.

Language exists at the meta-meta-system level. It is the basis for projecting domains within the world.

[*Is the characteristics of language aligned with the special systems?*]

Programming Languages are very different from Linguistic Languages. Programming languages exist within the realm of handedness set up by the kinds of Being and they have no access to meaning where as Linguistic languages have refer to meaning. Linguistic languages go beyond the realm of handedness and receive meaning directly from beyond the void and facilitate its articulation. These are very different purposes that should not be confused. In one case languages are the vehicle for embodying design elements of real time systems in a particular pointing and grasping context (like mobius turing machines or any general purpose computer architecture). In the other case we are going beyond the meta-system not toward

embodiment but toward the effervescence of meaning that appears from out of nowhere (i.e. the void).

But in either case arbitrariness enters into the production of letters and of words as well as in the construction of the relation of syntax and semantics in the emergent grammars. So we soon realize that our construction of mobius turing machines is inessential when we move to the higher emergent level of language because once we specify the language we can forget the exact nature of the computing device that the higher order language maps to. This is somewhat frustrating because we loose all the advantages of the elegance of computing with mobius turing machines using the laws of form. The laws of form embody both pointing and grasping simultaneously in a single mark. Using the mobius strip gives us an elegant picture of non-duality and allows us to see how the laws of form relate to matrix logic. We can use the back side to record the trace information that allows us to turn laws of form into an algorithmic procedural construct. And we can imagine mobius turing machines that have multiple tapes and multiple state machines. But as soon as we go though coding and create a language based on the codes then we disengage from the computing platform entirely and move to another level which is for all intents and purposes independent of the pointing and grasping and trace structure of the hardware.

4. Information Embeddings and the Laws of Form

We will not repeat here our results with respect to the four viewpoints on real-time systems and the construction of the minimal methods. For this see the papers in the Software Engineering Foundations series or our summary in Software Engineering Design Methodologies And General Systems Theory. The point that we are making here is that once we have a programming language covering our mobius turing machine then we can think of implementing any design element that can be described via the sixteen minimal methods described in the Integral Software Engineering Methodology. A turing machine becomes a means of executing functions and each machine or each individual thread within that machine becomes a kind of agent. So the mobius turing machine becomes the locus for satisfying both the agency and functional viewpoints within a spacetime context. That spacetime context is represented from a design point of view by events and data.

As has been said before we can think of the mobius tapes as instead light tapes that also act as communication channels between mobius turing machines. So it is

possible to place the computational scenario within a relativistic spacetime environment merely by rethinking the medium of the mobius strips. We can think of the transversal wave of light as the two sides of the mobius strip that are intimately bound to each other. Once we have opened up our universal turing machines to interaction with other turing machines via light channels then we can consider their exchanging images of each other and setting up protocols between themselves that allow them to become a single computing device. An agglomeration of turing machines reduces to a turing machine, ultimately. But this fact should alert us to the fact that something strange is going on. The turing machines have the same additive properties as the the special systems. The fact that we do not get any higher order construct by adding turing machines together should alert us that turing machines are strange beasts. Many is the same as having one. Once synchronization occurs the multiple turing machines are locked together. You can see this if you connect two independent petri nets. Either they stop due to a conflict or they enter into lock step synchronization. There is no middle ground. So similarly the special systems can either be two separate things or a single thing. The two alternatives are a matter of point of view. Similarly we can see a myriad of unsynchronized turing machines or if they synchronize they can be seen as a single turing machine or myriad synchronized turing machines. It does not matter if they are synchronized. However, since there is no global clock synchronization is not a black and white phenomena. All synchronizations must occur within a relativistic framework. Which is to say that different turing machines in different relativistic frames of reference have a chiasmic relation to each other.

What we want to concentrate on here is the fact already shown which is that the four different embodiments of event and data in spacetime when combined together in pairs give the embodiments of the minimal methods. Those embodiments are as follows:

Figure 162:

Information flow
 Information network
 Global states with local arrows
 Local arrows with global states

We will not repeat the proof that the minimal methods are pairs of embodiments and that all four embodiments represent a turing machine. What is of interest is that there should be three dimensional methods that give a new view of the design. These three dimensional methods should be dissipative in that one embodiment is

ordering the other two dimensional method. These three dimensional methods have yet to be identified. The difficulty is that it is impossible to reconstruct the method from the embodiment. We need some other approach to make it possible for us to discover what these three dimensional methods might be like. All of our current minimal methods are two dimensional. The turing machine itself is four dimensional. The tape is one two dimensional and the state machine is two dimensional and when they are not identical -- i.e. when computation can occur then we have the intersection of two planes which is three dimensional. Between the state-machine and the tape it is necessary to have a semaphore (as Manthey points out) and that takes us into a fourth dimension.

But let us think for a moment about the embodiments. And let us note their similarity to the laws of form. The information flow and network embodiments are linear. In information flow we watch how information flows through two different variables. In information networking we watch how information flows between variables. In both cases we are looking at a reduction of different variables to the same information. In one case the information is about difference and in the other it is information about the similarity of the information that is flowing.

Figure 163:

()()	=	()
multiplicity	=	unitary
two variables separated		
difference in information		
two variables linked in linear ordering		
sameness of information		

Similarly we can talk about the relation between global and local states and transitions. This relationship implies the nesting we see in the other law of form

$$(()) = 0$$

This law of form negates the importance of layering. But we note that every software design must have layers of abstraction. We have already seen these in the introduction of meta-symbols, coding, and compilers in the last section. Laws of form reduces this layering to nothing. Laws of pattern (the opposite of the laws of form) considers them something rather than nothing. Laws of pattern leads us toward a different universe where layering not multiplicity rules. But note how whether it is discounted or not there is a similarity here between the layering and the ideas of the relation between global and local states and transitions. We can take

views of systems that only take into account information flows and networks. But such a view discounts design. What the ability to layer allows us to do is to have different abstract layers within the design. Essentially each of these layers allow for an arbitrary recoding with respect to the lower level and this allows a restructuring at each new design level. A view that concentrates on the layers of design artifacts tends to discount the interaction between design elements. It is more functional while the other is more agency oriented.

So it is possible to see the four embodiments of event and data as the nexus of the laws of form and the laws of pattern.

It is clear that when we combine the different aspects of the laws of form/pattern (multiplicity, layering, something, nothing) then we would get our minimal methods and when we combine any three we should get the three dimensional design alternative methods which are dissipative. Finally when we combine all the different aspects together we would get the embodiment of the turing machine.

Figure 164:

repetition		Laws of Form or Laws of Pattern
layering		Dual formalisms
nothing		
something		
repetition/layering		state machine (mapping tentative)
repetition/nothing		darts
repetition/something		petri nets
layering/nothing		dataflow
layering/something		virtual layered machine
nothing/something		mapping
repetition => layering/nothing		D ____ A \
layering => nothing/something		D / > R
nothing => something/repetition		D ____ A /
something => repetition/layering		D /
repetition/layering/nothing/something = turing machine		

Note that there are four dissipative systems. Each autopoietic system is two dissipative systems combined. Each reflexive system is two autopoietic systems and thus four dissipative systems combined. This the layer just below the turing machine is the model of the special systems. Special systems are embedded within the turing machine. Beneath these are the minimal methods which are two

dimensional slices of the turing machine. Then the embodiments are one dimensional slices of the turing machine which is equivalent to the aspects of the laws of form.

This gives us a very interesting view of the inner workings of the turing machine. It attempts to create illusory continuity and as such is an embodiment of the four kinds of Being. But they are all hidden within it and all we really see is the pure presence of the illusory continuity. However, once we see the three dimensional dissipative systems within the turing machine then the different kinds of Being become separated out as we distinguish the different special systems. Then when we move from the realm of dissipative systems to normal systems we see the minimal methods appear as two dimensional slices of turing machines. Finally we reduce to the level of embodiments which are once dimensional aspects of the relation of information to spacetime.

So now we have a basic understanding of the relation between the laws of form/pattern to the embodiments and have build up from those to the turing machine through the states of the minimal methods and the special systems. This gives us a discrete computational architecture within which the turing machine represents the purely present system. The dissipative systems define the substrate of ideation that creates the illusory continuity of the purely present ideational representation of the system. The minimal methods embody the duality of the meta-systematic shadow of the system. And the embodiments in spacetime give a connection between the information and its actualization which relates directly to the aspects of the laws of form/pattern.

Now when we say that the magician system is equivalent to the laws of form we are really building up one of the dual formalisms based on a certain combination of embodiments. But because we are excluding the laws of pattern connection we are not getting a complete interworking of these elements so we are basically only rising to the level of the minimal system representations. In other words the exclusion of the laws of pattern from consideration in the relating of the aspects of the laws of form takes us to a representation of the meta-system and we know that magician systems are representations of the meta-system also. When we allowed the laws of pattern and we doubled the application of the laws of form to both sides of the mobius strips we allowed our representation to move up to the level of the system. In that we skipped the level at which the dissipative systems appear which exist as combinations of three spacetime embodiments of information. Now we

have posited that the combination of laws of form systems in pairs allows us to create an autopoietic system based on matrix logic. This combination would bring us up from the meta-system (minimal methods) level to the dissipative system level of our hierarchy. Within that level we could also see the reflexive system embodied in terms of the hyper matrix logic. All this occurs under the umbrella of the turing machine that has all four information embodiments.

So what we see is that the turing machine which produces illusory continuity in pure presence is deceptively simple. Hidden within it is an extremely complex embodiment of the special systems. This complex embodiment is what we would like to bring out and model using laws of form, matrix logic, and hyper matrix logic as the formalism by which this is accomplished. All the time we are realizing the three dimensional design methods that are hidden in this layer and should be more efficient than two dimensional design methods that we now use. And finally all this is based on the analogy between the laws of form aspects and the possible embeddings of information in spacetime.

Our hypothesis is that matrix logic arises at a very special threshold of logico-mathematical complexity. It in fact obviates Godel's proof that is the bugaboo for all logico-mathematical systems. Basically Godel proves that given a set of axioms (Firsts) there are theorems that you cannot decide whether they are inside or outside the system. So there is a basic undecidability build into every formal logico-mathematical system of anything but trivial complexity. But what Godel does not take into account is para-consistency and para-completeness. These two limits can be incorporated into our formal logico-mathematical system so that the problems of Godel's proof are no longer the same kind of problem they are when we rigorously attempt to exclude undecidability and indistinctness. It has already been explained how Matrix logic includes both para-consistency and para-completeness through using truth vectors and allowing Both and Neither as values as does Indian logic. And indistinctness is handled by making truth values fuzzy. So Matrix logic sits at a peculiar point of complexity in our building of logico-mathematical systems where the problems singled out by Godel have been incorporated directly into our formalism. It also is exactly at the point where matrix mathematics and logic can be made to intersect with the creation of many interesting and counter intuitive features that must be added to logic such as the negative logic.

So matrix logic and its extension into hyper-logic arise appear right at the point where the dissipative methods appear in our hierarchy. We have shown already how

matrix logic encompasses laws of form as a logical system once we have corrected the problem about null equaling the void. Matrix logic has several forbidden operations which block complete intertransformability of logical values. But the hyper logic allows these blockages to be overcome. So Matrix logic gives the same kind of rotational freedom that the four dimensional rotations embodied in the quaternion and octonion give us. This extra grease intruding into entropic spacetime is an anomaly which is well hidden inside the turing machine. It signals an ultra efficiency hidden within the plodding calculation equipment of the turing machine. This ultra-efficiency only appears under special circumstances as the turing machine breaks up prior to the appearance of the minimal two dimensional methods or the final fragmentation into embodiments of information in spacetime as spinners.

The problem we have is to show exactly how the oscillation between the fragmentation into pieces and the wholeness of the turing machine occurs. Metaphysically we can appeal to Empedocles who was the first to hypothesize such an oscillating model. It is an oscillation that attempts to have change and changelessness alternately rather than simultaneously as Plato's stranger would have preferred having them. The changeless is here the purely present whole system while the changeable is the fragmented Firsts of embodied information fragments.

The intertransformability between the system and the meta-system going through the stages at which the special systems manifest is an important problem to be solved. It is unclear that there is any direct route for the solvability of this transform. There are transformations like that from 2^6 to 4^3 which is possible to solve. But it could be that there is some form of block to the solution of this intertransformability between systems and meta-systems or wholes and their parts.

| 5. Laws of Form and Pattern and the Ontological Fourfold

We have spoken about the four aspects of laws of form (multiplicity/repetition, layering, something, nothing) in the last section and noted its relation to the four kinds of spacetime embedding of information. Perhaps it would be a good idea to explore for a moment exactly what these four aspects mean in relation to each other. It should be noted that the appearance of something out of the back ground of nothing is not a trivial event. In fact all ontology is bound up in that event. And in fact we posit that this emergence of something out of the background of no-thing is an emergent event. As an emergent event all the four kinds of being must be passed

through on its way into the clearing of being from the void. And these different kinds of being are separated by the special systems so that the thing only appears on the basis of the prior emergence of the special systems out of the meta-system. In laws of form the thing is thought in terms of its form or outline as defined by a formal system. Laws of form purports to be the simplest possible formal system which is an algebra of outlines. Laws of form has embedded within it the assumptions of transcendence which appears as the rule that recrossing a boundary yields nothing. In other words only transcendent relations exist within the laws of form and two transcendent relations cancel each other. This is a way of appealing to ontological monism (cf. M.Henry Essence Of Manifestation) because there is only one transcendent relation allowed. But what is allowed is repetition of forms. But repeated forms are equal to the original form so we have an idealism of forms which mirrors the normal assumptions within the western tradition. Different repetitions of the same form are distinguished by marks, if distinguished at all, and these diacritical marks become the basis for a structuralist view when we realize the relation between these signs and the symbol of the form. So laws of form allows the basis for a structuralism to be assumed. But in the book Laws Of Form itself Spencer-Brown stops at the point where time appears so that no structuralism is created. Structuralism is the way formal systems handle time.

The laws of form display three kinds of Being. It displays Pure Presence and Process Being fused in its marks. The positional vertical component of the mark relates to Pure Presence while the horizontal overhanging component of the mark represents Process Being. Hyper-Being is represented by the ability to jump from one part of the formula to another that gives rise to the proto-imaginaries $*i*$ and $*j*$. Wild Being is not explicitly represented in the laws of form except perhaps as the excluded element of time. The mixture of continuity and discontinuity does not seem to be possible within the formalism that Spencer-Brown proposes.

Figure 165:

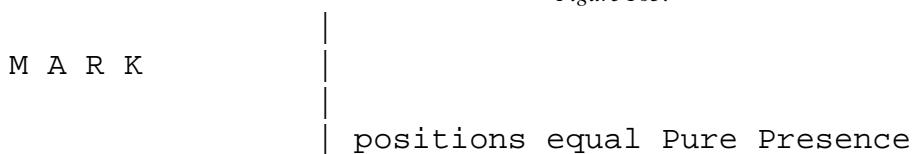
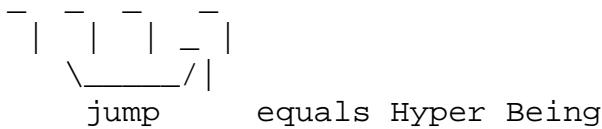


Figure 166:

Overhang equals continuity or Process Being

Figure 167:



The best we can say is that the whole mobius tape with marks on both sides equals a rhizome of continuity and discontinuity.

However if we depart from the laws of form and take into consideration the laws of pattern and treat the four different aspects as independent then we get a different picture. The we see that besides the repetition or multiplicity that gives us structuralism there is the possibility of layering which is denied in the laws of form but affirmed in laws of pattern. Laws of pattern instead denies repetition.

We can look at it this way. Given something we can either see it in relation to repetitions of itself or we can look within it to see layerings where it is mirrored within itself. When we think of it this way we see another strange thing about laws of form which is that it seems to embody exactly what we have discovered with the special systems.

Figure 168:

$$\begin{aligned}(i)(j) &= (k) \text{ or } (j)(i) = -(k) \\ (j)(k) &= (i) \text{ or } (k)(j) = -(i) \\ (k)(i) &= (j) \text{ or } (i)(k) = -(j)\end{aligned}$$

This formula can be seen to be an expression of the quaternionic level that appears with the autopoietic special system. Notice that under this interpretation what the law is stating is that the whole is equivalent to its parts and as soon as we add differentiation to the forms we see that their relation is quaternionic. Here the point is that any part is equivalent to a whole composed of the other parts so that within the quaternionic system this law of form is literally true. This is in fact a surprising result.

$$(()) =$$

Note that the quaternion is like a reflective ball which we cannot see into but which is perfectly holographic because each part reflects the whole. And beyond the quaternion is the minimal system of the inwardly reflecting tetrahedron. So we have one mirror reflecting outward and another mirror reflecting inward. The inner

mirror is opaque on the inside and the outer mirror is opaque on the outside. Within the "interval" between these two mirrors is a space in which infinite reflective illusion is created. So we can see the law of form as saying that if you have a layering of mirrors where the mirrors are facing each other then you have the generation of illusion which is in reality nothing. This is another surprising result. The laws of form correctly indicate under this interpretation exactly the fundamental features of the mirroring between the autopoietic and the reflexive system.

Based on this we could advance an interpretation of the laws of pattern. But to do so we must reverse them from their normal order of presentation.

Figure 169:

$$\begin{aligned} () &=> (()) \\ (()) &=> ((())) \\ ((())) &=> ((((())))) \end{aligned}$$

This is a picture of dissipation. Order in the form of more layering are coming into existence from nowhere. If this interpretation holds water then we can see that we have laws that cover each of the special systems. So it makes us wonder about the last law of pattern which when reversed is as follows:

$$= () ()$$

Here we have difference appearing out of nothing. This is exactly what happens with the special systems where it is merely by creating a conjunction that the imaginaries appear as different from the real numbers. The act of conjunction holds them into existence and the moment the conjunction ceases the difference disappears. So we can see this last law as the sign of conjunction.

So from this perspective the laws of form and pattern are

Holographic patterning where part equals whole
 Facing mirrors create illusions that are empty
 Dissipative order arrives from nowhere as layering
 Conjunction allows differences to appear out of nowhere

If these interpretations hold up then we immediately see that there is real depth in the relation between laws of form and their pattern duals.

So this brings us to the point where we must question the relation between repetition, layering, something and nothing. Let us look at them in terms of the positive fourfold of Heidegger.

Figure 170:

multiplicity (repetition)	= EARTH
layering	= IMMORTAL
something	= MORTAL
nothing	= HEAVEN

Heaven is by very definition the no-where out of which things come. As the Tao Te Ching says the myriad things arise from the mysterious gate of the feminine. Things are created and destroyed and so can be thought of as mortal. Whereas what is at the next higher meta-level above the mortal must be the immortal. So if we see the layering in terms of meta-levels then we can understand that Spencer-Brown has really just created an image of the positive fourfold that was first enunciated as the constitution of the world by Socrates in the Gorgias. Of course that positive fourfold is haunted by the negative fourfold as the system is always haunted by the meta-system. The negative fourfold is

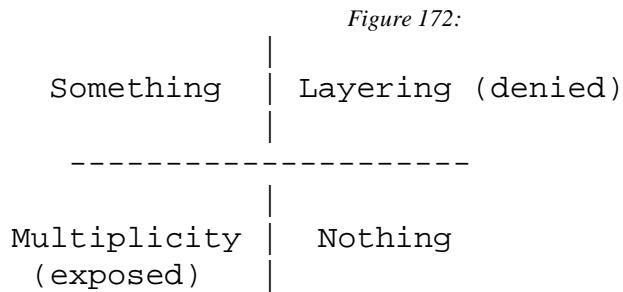
Figure 171:

NIGHT	---> LIGHT
CHAOS	---> ORDER
COVERING	---> DISPLAY (PRESENCING)
ABYSS	---> TRANSCENDENCE

When we turn the negative fourfold into positive attributes we see that it gives an even better definition of the positive fourfold than that given by Socrates. We have already mentioned that the negative and positive fourfold appear together as the ogdad of the early Egyptian religion. Bunge also notes that many of the same characteristics appear in early Assyrian religious texts as well. These eight appear as the background out of which the ATUN (Atom) arises. So the system arises on the background of the positive and negative fourfold. The positive fourfold describes the world as the clearing in Being. The negative fourfold is the feminine repressed elements that haunt the male dualistically dominant elements. In order to have manifestation it is necessary to have both together. Manifestation is transcendence and that is a form of repression. So for everything that shows up there are things that are pushed out of the limelight.

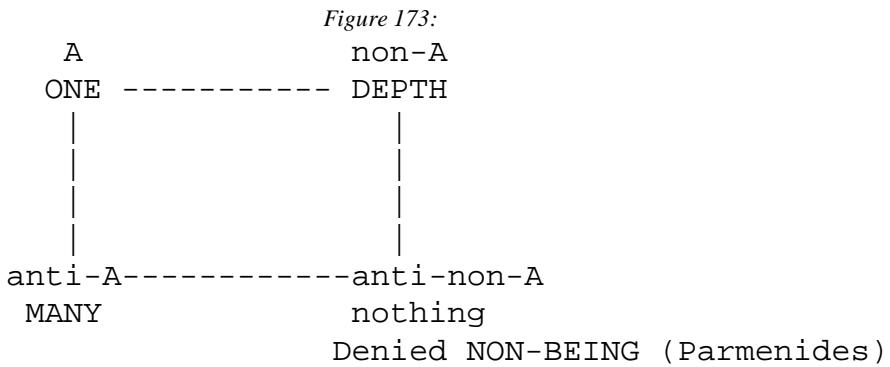
However, if we look at the aspects that are used to define the laws of form and pattern as a representation of the positive fourfold and recognize that they can be

seen as defining not just completely manifest forms but also the incompletely manifest things that must go through the states in which the special systems appear then we have made a fundamental discovery that the laws of form and pattern are not describing finished products but also their essential stages of constitution. Then we realize that the differences between these four aspects are really the kinds of Being. In other words the crossed differences between the two sides of the fourfold represent kinds of being.



Notice that there are levels to the manifestation of the quadrature.

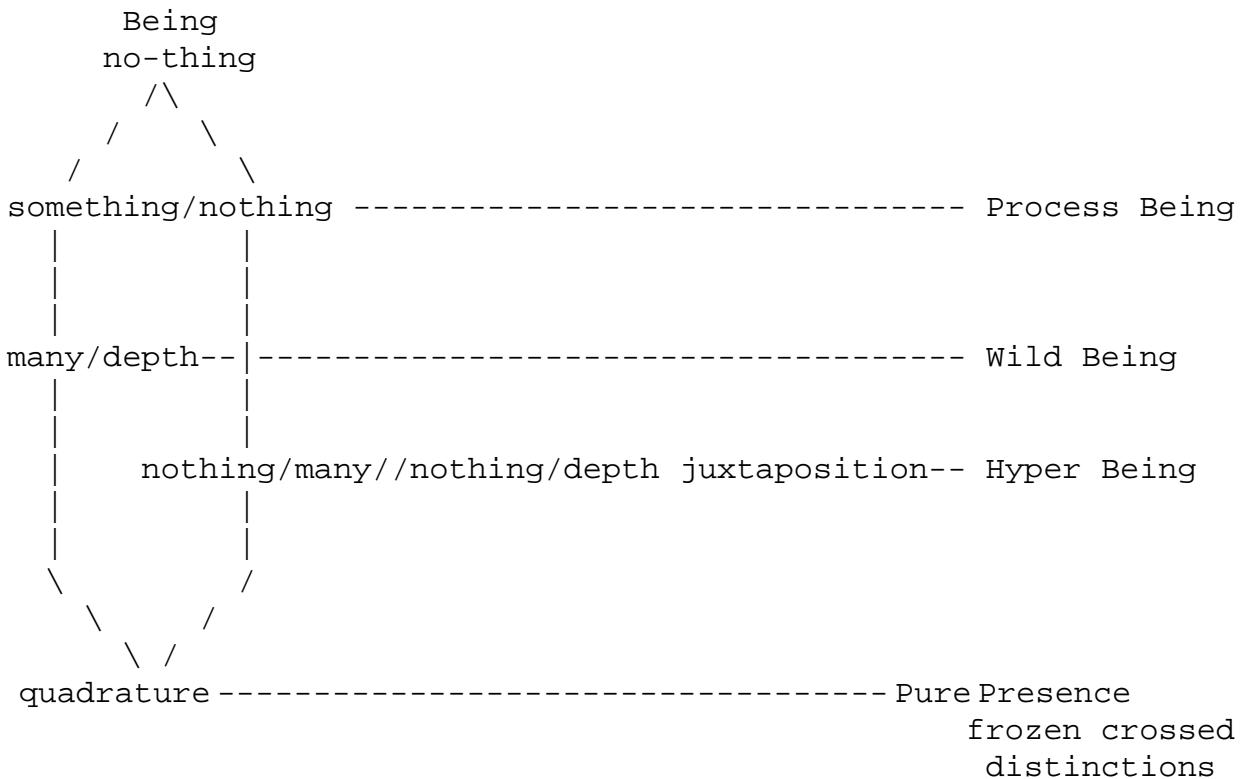
First there is no difference. Then the first difference between something and nothing arises. Then the second difference between Multiplicity of something and the layering of something appear. Then the third difference between the multiplicity and nothing or between layering and nothing appears. Then the quadratic difference itself appears. In this we see a Greimas square:



But the Greimas square is constituted in steps. The point is that the quadrature of the fourfold is crossed and self-blocking and that is why it remains in existence. But we get there by first positing a difference between something and nothing. Then we note that something can either be repeated or layered. We deny layering and concentrate on form and transcendence through the doctrine of the laws of form. But then we notice that nothing is different when compared to the many or depth.

And this final difference leads to the institution of cross-blocked quadrature which is the final difference.

Figure 174:



So we can see that the differences that underlie the fourfold as it comes into existence are related to the different kinds of Being. Given this we go full circle because we see that the four kinds of Being are intimately bound up in the fourfold and that there is a way of looking at the relations of these in terms of the laws of form and pattern which sees the essential ingredients of the special systems. So the kinds of Being and the Special systems are bound up together within the structure of the quadrature which also happens to be a picture of the self-blocking crossed Greimas square. The very structure that describes how things come into existence also describe how they are maintained in existence within the webs of form and pattern and how they leave existence through annihilation.

What comes of this is the realization that the inner structure of the mirroring fourfold that Heidegger talks about is probably the Greimas square of contradiction balanced between dialectical advance and annihilation. The mirroring of the fourfold probably derives from the reflexivity that is embedded in the Greimas square when it is unfolded dialectically. This realization allows us to understand

better how our modeling of the special systems appears manifest in ontology from Socrates to Heidegger in which a simple description of the Worldhood of the world is finally seen to have incredible depth as it unfolds through our exploration of the special systems. The four kinds of Being are implicit in any categorical/ontological quadrature that we might base our analysis of the world upon. The mirroring of the fourfold is necessarily social because mortals appear in social groups that ecstatically project the world together through their heterodynamic nature. And the gods are social projections of the human community at the transcendent level. We see the community of the gods in Plato's Republic, the best city and the autopoietic community of the mortals in Plato's Laws, the second best city. Other cities that Plato relates to these are explored in The Fragmentation Of Being And The Path Beyond The Void.

| 6. Magician Operators and the four aspects of Laws of Form/Pattern

Now that we have looked more deeply into the meaning of the four aspects of the laws of form/pattern it is possible to rethink our position with regard to this formalism. Let us take a different approach. First lets realize that each of the four aspects of the laws of form/pattern (i.e. something, nothing, multiplicity, layering) are essential and mutually interdependent. What the laws of form and pattern give us is two different interrelations between these four aspects. But we can imagine other kinds of interrelation between them. For instance, we can imagine relating them through the operators of the magician system. Those operators we posit to be

Figure 175:

```

~ continuity
! discontinuity (annihilation)
> or < or | mutual action (left, right and commutative action)
# gestalt pattern formation (creation)
~ is associated with the full ordering of the real numbers
! is associated with the complexnions and the dissipative system
> or < is associated with the quaternions and the autopoietic
    system it is not commutative. [a<b /= a>b unless forced by |]
# is associated with the octonions and the reflexive system it is
    not associative. [a#(b#c) /= (a#b)#c unless forced by #' ]

```

Let us name the four aspects that underlie the laws of form and pattern in the following way:

Figure 176:

S = something
 N = nothing
 M = multiplicity
 L = layering

Then we get the following equations:

Figure 177:

```

S~S=>.....  

S!S=>....:  

S|S=>....:  

S#S=>....::  

-----  

S~N=>...:...  

S!N=>...:::  

S|N=>...:::  

S#N=>...::::  

-----  

S~M=>..:...  

S!M=>..:..:  

S|M=>..:..:  

S#M=>..:..:  

-----  

S~L=>..::...  

S!L=>..::..:  

S|L=>..::..:  

S#L=>..::..:  

=====  

N~S=>.::...  

N!S=>.::...:  

N|S=>.::...:  

N#S=>.::...:  

-----  

N~N=>.::...  

N!N=>.::..:  

N|N=>.::..:  

N#N=>.::..:  

-----  

N~M=>.::...  

N!M=>.::..:  

N|M=>.::..:  

N#M=>.::..:  

-----  

N~L=>.::...  


```

Reflexive Autopoietic Systems Theory

N!L=>.::::.

N|L=>.:::::

N#L=>.::::::

=====

M~S=>:.....

M!S=>:....:

M|S=>:....:

M#S=>:....::

M~N=>:..::..

M!N=>:..::..

M|N=>:..::..

M#N=>:..::..:

M~M=>:..::..

M!M=>:..::..:

M|M=>:..::..:

M#M=>:..::..:

M~L=>:..::..

M!L=>:..::..:

M|L=>:..::..:

M#L=>:..::..:

=====

L~S=>:..::..

L!S=>:..::..:

L|S=>:..::..:

L#S=>:..::..:

L~N=>:..::..

L!N=>:..::..:

L|N=>:..::..:

L#N=>:..::..:

L~M=>:..::..

L!M=>:..::..:

L|M=>:..::..:

L#M=>:..::..:

L~L=>:..::..

L!L=>:..::..:

L|L=>:..::..:

L#L=>:..::..:

Form/Pattern => Quality

What this is saying is that each operation relating two aspects of the laws of form/pattern produces an I Ching hexagram. We have already established that the I Ching 2^N level of differentiation of qualities is the basis of the patterning of the social field. It corresponds to the sextahedron of five dimensional space. We have not here attempted to look at the specific mapping of the hexagrams to the meanings of the magician operations with the meanings of the laws of form/pattern aspects. What we are establishing here only is that there is such a mapping. Since the hexagrams are intertransformable via group operations this means that they provide an intertransformable qualitative substrate to the quantitative laws of form/pattern interactions via the magician system operations.

So what we have created here is a formalism based on the laws of form/pattern and the magician operators that allow quantitative aspects of field to interchange with qualitative aspects of a field. By establishing this relation between quality and quantity via the $N^2 \leftrightarrow 2^N$ transformation we are now ready to establish the truth values related to these transformations. Those truth values relate to matrix logic.

For any formula $a?b=>h$ where a, b are aspects of the laws of form/pattern, where $?$ is a magician operator ($\sim !| \#$) and h is a hexagram there is a showing and hiding truth vector associated with one of the values 0, -1, 1 or i. The truth vector signals the status of the formula within the overall showing and hiding of the qualitative/quantitative system. The truth vector may either be a Bra $\langle x,y |$ or Ket $|x,y \rangle$. The bar and greater than or less than signs merely frame and differentiate the bra or ket here they do not have the meanings of the magician operators. In fact we will write the qual-quantitative formula with its truth value like this

Figure 178:

$$\begin{aligned} a?b=>h, & Bx,y \\ a?b=>h, & Kx,y \end{aligned}$$

The inverse is . . .

Figure 179:

$$\begin{aligned} a?b<=h, & Bx,y \\ a?b<=h, & Kx,y \end{aligned}$$

For a matrix operator to be applied to two formula one must be a Bra and the other a Ket. The interaction will either yield a scalar or another matrix operator. The production of scalars is an annihilation effect while the production of logic operators is a creation of a pattern gestalt. But what this means is that combination

of two formula which interact in the right way create matrix logic operators as an emergent effect. Or they might reduce to a normal non-vectorial truth value. Here we see things arising out of nothing and transforming through the qualitative substrate forming multiplicities and layers before vanishing back into nothing. One challenge here is to actually align the operators and aspects of laws of form/pattern with the actual meaning of the hexagrams. But what is clear is that there is a relation between the laws of pattern/form aspects considered operating under the magician system and the qualitative hexagram intertransforming system that model the social fabric.

The formulas give an intertransforming relation between Quantity and Quality and the truth vectors govern the showing and hiding of these relations within the Process level of manifestation. By allowing the truth vectors we have para-consistency or the possibility of active contradiction. By allowing these vectors to carry decimals we can then have fuzzy values that move us into the realm of Hyper Being from process being. Truth vectors can take on imaginary values and thus represent Mandelbrot like chaotic values when iterators so they move us into Wild Being. So the truth vectors will allow us to interface with the different kinds of Being in the showing and hiding relations besides allowing us to experience the chiasmic effects of the Greimas square that appertain between the truth values.

Given a particular thing we can begin to scale the steps of meta-levels. Any one thing is practico-inert. But we can view that thing either in terms of phusus (change) or logos (learning) and begin to scale the steps of the learning social organization. When we split logos from phusus we introduce the split also between the truth values and the formulas that have those truth values. This split is orthogonal to that between phusus and logos. In fact Being has four aspects that flow from its embedding in the Greek language: Truth, Reality, Identity, and Metaphor.

Each thing that has Being can be looked on from each of these perspectives. The perspective of identity relates to the formal and structural system that is projected on the thing. We see this in the formalisms that arise from the four aspects of pattern/form. The truth aspect is captured in scalar and vector truth values. As truth becomes more complex in the showing and hiding system it fragments into its vectorial form. The vectorial form of truth is analogous to the splitting of formalism into the micro-formalism of patterning that gives us the structural aspect of the form. In our system the qualitative aspect is pushed out by an obsession with quantity and it becomes metaphorical. So the qualitative aspects of things are

accessed through metaphors rather than directly as they are in the Chinese system permutational system which is first qualitative and de-emphasizes quantity. So we can see that our formulas that relate quantity and quality via the magician operators to the hexagrams embody identity, truth, and metaphor. What is missing is the reality aspect. But we can see that the reality aspect enters in terms of the magician operators themselves that allow creation, continuity, destruction and mutual action. So reality is also represented in our formulas through the action of the magician operators that represent the meta-systemic aspects that relate the laws of form/pattern. So all the views implicit in Being are present giving us a complete modeling of the mirroring fourfold at the levels of:

structure/pattern:

The structural level is made visible by allowing $()$, $(')$, $(")$ diacritical marks to differentiate different repetitions of the same form.

The laws of pattern represent this level formally.

form/shape:

The level of form is made visible by the mark of laws of form. Kinds are not represented but could be introduced by coloring the forms.

The laws of form represent this level formally.

system/gestalt:

The showing and hiding of the forms and patterns are represented by the vectorial truth values.

The matrix logic represents this level.

meta-system as origin/arena:

The complementarities of the hyper matrix logic can represent this level.

domain/language:

Is represented by the combination of formulas and vector truth values to create a predicate matrix logic.

world/Being:

Is represented by the mirroring of the fourfold seen in the aspects of the laws of form/pattern.

So we can see how the different ontological levels of emergence can be represented within this system based on the combination of the aspects of the laws of form/pattern with matrix logic and the magician system.

7. Magical Operators

Let us continue our investigation by considering the action of magician operators on themselves:

Figure 180:

~~ continuous continuity or meta-continuity	= ILLUSION
~! continuous discontinuity	= ATOMIZATION
~ continuous action	= FLOW
~# continuous pattern	= ORDERING
!~ discontinuous continuity	= PUNCTUATION
!! discontinuous discontinuity or meta-discont.	= BREAK
! discontinuous action	= STEPS
#! discontinuous pattern	= SEGMENTATION
~ active continuity	= STATE
! active discontinuity	= SEPARATION
active action	= CONTROL
# active patterning	= BEHAVIOR
#~ patterned continuity	= ALGORITHM
#! patterned discontinuity	= FRAGMENTATION
# patterned action	= HABIT
## patterned patterning	= FORM

These reduce to ten operations:

Figure 181:

~~ ILLUSION
!! BREAK IN ILLUSION
CONTROL OF ACTION
FORM

In these we see illusion as the creation of illusory continuity or pure presence which holds forms as patterns of patterns in existence. Through control or repression these forms dualistically dominate their contents until the illusion is broken.

There are six chiastic operators:

Figure 182:

$\sim ! / ! \sim$	ATOMIZATION/PUNCTUATION	= QUANTIZATION
\sim / \sim	FLOW/STATE	= CONTINUITY
$\sim # / # \sim$	ORDER/ALGORITHM	= NOMOS
$! / !$	STEPS/SEPARATION	= ANALYSIS
$! # / # !$	SEGMENTATION/FRAGMENTATION	= JUXTAPOSITION
$ # / # $	BEHAVIOR/HABIT	= PROCESS

Where taking two aspects of laws of form/pattern and operating on them with a single operator was posited to yield a hexagram (a qualitative state); here we see that by combining operators we get more concrete operations that have meaning. So we can think of taking two laws of form aspects and combining them with double operators to produce a particular kind of result which is not qualitative but instead quantitative.

Figure 183:

$a??b \Rightarrow \text{Result } Bx, y$
 $a??b \Rightarrow \text{Result } Kx, y$

So we posit that a single operator yields a quality whereas a double operator yields a result that that can be understood in terms of the combination of the aspects of the laws of form/pattern. We will call this combination an eventity.

Figure 184:

```
S??S=eventity (positive wavicle)
S??N=eventity (disappearing thing)
S??M=eventity (scattering thing)
S??L=eventity (differentiating thing)
N??S=eventity (emergent thing)
N??N=eventity (negative wavicle)
N??M=eventity (myriad things)
N??L=eventity (categorical distinctions)
M??S=eventity (gathering things, coral like unity)
M??N=eventity (disappearing myriad things)
M??M=eventity (cloud, heterarchy, swarm)
M??L=eventity (implicate ordering)
L??S=eventity (pearl like unity)
L??N=eventity (collapsing hierarchy)
L??M=eventity (shredding rhizome)
L??L=eventity (hierarchy)
```

An eventity is a minimal system of laws of form aspects and operations. We can see this as the laws of form aspects being rotated into and back out of the underlying

wave substrata. The eventity is a minimal system of elements half aspects of laws of form/pattern and half operators. The operators are chiasmic and the point of reversibility in that chiasm is the wave like substrata underlying the particle like coherence of the entity. When these wavelike and particle like aspects intersect these are called the eventity (wavicle, lave).

8. Connections to Traditional Chinese Sciences

This production of eventities reminds us in Chinese Traditional science of the differences between:

Figure 185:

Major Yang = SUN	= SOMETHING
Minor Yang = STARS	= MULTIPLICITY
Major Yin = MOON	= NOTHING (background)
Minor Yin = PLANETS	= LAYERING (concentric rings around sun)

These are the four major celestial lights. Only comets add to these by the naked eye. Sun and Stars radiate while Moon and Planets reflect. So we might suspect that this is another image of the positive fourfold. Which brings up the question as to what radiates within the reflexive system. For the reflexive system to work there must be a production of light. That light source must exist between the mirrored outer surface of the quaternion and the mirrored inner surface of the tetrahedron that gives us quaternionic reflections. Light is the medium through which the mirrors interact, and as we have seen before the light is autopoietic in its nature.

The four celestial lights define the relation between Homeopathy and Acupuncture. Homeopathy treats emotions and mental distortions which are based in the Heart (sun) and Mind (moon). Acupuncture treats the channeling of Chi in the body. Chi jumps between acupuncture points along the heuristic paths called meridians. The acupuncture points are like the stars. The flow of Chi is governed by the Five Hsing (transformations) that are represented by the five visible planets. The major and minor Yin and Yang cycle is continually rolling over from opposites to their opposites. When it stagnates then closed Yin and Yang splendor is produced. They are produced by the production of a third thing. In this case instead of having two places with two states we jump to three states which as in the Tai Hsung Ching. This produces five extra states with double broken lines. Dual double broken lines is yang splendor. The other four states with either yin, yang, or double-broken lines together represent closed yin. Closed yin is fragmented and yang splendor is unified. This is relevant because the Tai Hsung Ching has 81 states just like matrix

logic with the negative logic has 81 logical operators. These are two views of the same threshold of complexity where showing and hiding occurs. In the Chinese system these 81 nodes are given qualitative meaning. The move from two states in two places to three states in two places takes us from four to nine bigrams. These bigrams taken in pairs produces the 81 states of showing and hiding referred to in the Tai Hsung Ching. Since when a third thing is produced the door is opened to chaos in a progressive bisection this transition that produces the nine states out of the four (yang splendor & closed yin) and creates the possibility of a chaotic system. This transition is the second earliest that the transition can occur in a progressive bisection (i.e. after the second bisection). The earliest is recorded in the Tao Te Ching as From the One comes the Two; from the two comes the three; from the three comes the myriad things. Once the third thing appears then the chaos of the myriad things can be produced.

9. The Logico-mathematical Structure of Interpenetrating Eventities

If we think through the direction that we are going carefully it becomes clear that what we are actually building here is a logico-mathematical formalism which treats the eventity as a minimal system composed of aspects from the laws of form/pattern and magician operators. The complete eventity is a combination of two entities (form/pattern aspects) and two events (magician operators) combined into a minimal system. When we take the eventity as a whole we get a result whereas if we take a slice of the eventity (two events and one entity or two entities and one event) then we get a hexagram instead (i.e. a quality or wave like state of the minimal system). Looking at this we can see further that there are the following formula by which this eventity can be represented:

Figure 186:

```
ab == tetragrams t [16 possibilities]
?? == t
?a == t
a? == t
```

Figure 187:

```
a?b = hexagram h [64 possibilities]
b?a = h'
??'a = h
?'?a = h'
```

Figure 188:

```
a??'b = result r [4^4=265=2^8 possibilities]
b??'a = r
a?'?b = r
b?'?a = r
```

We can add quantification [E and A] to these formula and truth vectors from the matrix logic to produce a complete logico-mathematical system based on the adumbration of the different aspects of the eventity in their relation with each other. We see in the eventity a combination of two entities (law of form/pattern aspects) and two events (magician operations) that combine into a minimal system in stages. Each stage appears due to the addition of possible relations between the noetic (action) and noematic (perceptual) elements of the minimal system.

We might say that the eventity is a combination of a relation between events with a relation between entities. In this sense it appears as an embedding in spacetime that shows us either what Manthey calls coexclusion or coincidence. By relating two events and two entities together we create a spinnor structure that has a particular static position in spacetime. Each entity and each event have chiasmic relations with each other from the point of view of an inertial frame. Yet the eventity structure decomposes into hexagrams that represent the wave like structure underlying the structure of the eventity.

Now that we have defined the eventity structure as a minimal system of two events and two entities using the aspects of form/pattern and the magician operators lets look again at the implications of this definition. We can see that the combinations of aspects with each other, aspects with magician operators, or magician operators among themselves give us 64 different combinations. This is the same as we get if we take any three way slice with two aspects and one operator or two operators and one aspect. It is only the complete eventity structure that gives us 256 results which might be embedded into the 64 by overdetermining each hexagram with four results. Now when we look at this structure what is striking is the fact that there are four aspects and four operations that when looked at carefully can be seen to align with the eight kinds of numbers expressed in the octonion. When we make this connection we get the following patterning:

Figure 189:

r i j k E I J K
S N L M ~ ! #
rS r r r r r r r r
iN r-1 k-j J-K-E I
jL r-k-1 i I E-k-J
kM r j-i-1 E-I J-K
E~ r-J-I-E-1 i j k
I! r K-E I-i-1-k j
J r E K-J-j k-1-i

K# r-I J K-k-j i-1

When we look at the relation between something and nothing we see that it has exactly the kind of relation between r and i when we think of them in relation to the dissipative system (i.e. i represents nowhere beyond the singularity). When we move from this level up to the quaternion level what is added is Layering and Multiplicity which are two ways to relate something to something else. But when we start to consider that multiplicity and layering also might relate nothing to nothing or nothing to something then we can see very strange structures arising that have an affinity to interpenetration. What is interpenetration but the relation of things to each other through the no-where of the layering and multiplicity of nothing. Intermediate between the interpenetrated state of affairs and the non-interpenetrated state of affairs is the various connections of something to nothing through layering and multiplicity. Note that layering and multiplicity can be seen under the rubric of typed meta-levels (ramified higher logical types) proposed by Russell to solve paradoxes. So the layering and multiplicity may be a layering of metalevels and a multiplicity of types by which things are related to nothing. When we posit that these relations follow the holographic forms of the quaternions then we suddenly see the relations of something, nothing, layering, and multiplicity in a new light all together which makes sense of the jump from something to nothing and the even bigger jump form nothing to layering and multiplicity.

However, it is only when we compare these aspects from the laws of form/pattern to the magician operators that we get the full impact of looking at this within the octonion framework. Here we see that ~ continuity is a lot like something. In fact, continuity is having something present over time or space or both. And we immediately see that discontinuity is a break in the space, time or spacetime continuity that we posit with the real numbers. This break can be seen as the intrusion of no-where, no-time or no-thing into the continuum. We see this logically as cancellation and physically as annihilation. In both cases it causes a disappearance of what was persistently present continuously. So note the similarity between something/nothing and continuity/discontinuity. Now when we move to gestalt pattern formation and mutual action there is a similar jump to that we found with the move to multiplicity and layering. Gestalt pattern formation and mutual action are at least an order more complex than the mere distinction between continuity and discontinuity like the ramified higher logical types are at least an order of magnitude more complex than the something/nothing distinction. See the isomorphism between the aspects and the magician operators. When we place this

isomorphism in the context of the octonion multiplication table then we see that the E is like continuity and that the I, J and K can be seen as isomorphic to the other magician operations. So that the octonion square can be seen as interrelations between the imaginaries at the octonion level and at the same time the interrelation between the laws of form aspects and the magician operations.

But when we look deeper into the relation between E and IJK in relation to r and ijk we must take into account the difference in associativeness between these two structures. When we take that into account that causes us to refine our mapping in the following way.

Figure 190:

r i j k E I J K
~ ! S # N L M
r~ r r r r r r r r
i! r-1 k-j J-K-E I
j r-k-1 i I E-k-J
kS r j-i-1 E-I J-K
E# r-J-I-E-1 i j k
IN r K-E I-i-1-k j
JL r E K-J-j k-1-i
KM r-I J K-k-j i-1

In this patterning we give continuity to the reals which are the best representative of continuity we have through full ordering and the existence of transcendental limits. The interaction of the reals with the imaginaries is through conjunction which allows annihilation to come into existence. The discontinuity between the reals and the imaginaries seen in conjunction allows annihilation to be manifest. So at this point the very property we explicitly gave to the imaginary numbers which allowed the dissipative system to exist has come into being within the formation by a doubling procedure. The two imaginaries annihilate into the singularity -1. When the doubling procedure is followed again we get j and k in the form of mutual action and something appearing. When we loose the commutative property mutual action as > (left) or < (right) acting appears and by the asymmetry of action things manifest as closed autopoietic unities. So noesis and noema arise simultaneously. The J is the generator and so it is associated with the action rather than the agent or passive receptor. Now when the doubling occurs again the E is the generator and the magician operator that is left is pattern formation. Pattern formation occurs not just by continuity but by the introduction of juxtaposition. This can occur because there is nothing added to the system at this level and there is an interaction between

something and nothing in the mutual reflexivity of Layering and Multiplicity. So here we get not just the closed unity but the reflexive structure of interpenetration as things holographically mirror each other at a distance and with distortion via the nothing that is layered and multiplied. And there is also an interface between something and nothing -- an interface between heaven and earth that appears as well. The action of pattern formation $E=\#$ causes partial associativeness between the elements that are normally disjunct of nothing, layering and multiplicity. Pattern formation causes these to interact to form quaternion reflections of the something in the adumbrations of nothing, layering and multiplicity. We can see these reflections in the following combinations of imaginary elements.

Figure 191:

i j k annihilation:mutual-action:something	= annihilation mosaic
i J K annihilation:layering:multiplicity	= interpenetration
j I K mutual-action:nothing:multiplicity	= karmic action
k I J something:nothing:layering	= dharmadatu
i I E annihilation:nothing:pattern-formation	= tatagata gharba
j J E mutual-action:layering:pattern-formation	= samsara
k K E something:multiplicity:pattern-formation	= myriad things
E I J K pattern-formation:nothing:layering:multiplicity	= emptiness

In other words the reflections of the ijk annihilation mosaic appear as different patterns that can be interpreted as faces of interpenetration. So the group patterning of the imaginaries gives a very concrete model of interpenetration by which heaven and earth achieve their empty balance -- that empty balance, or fulcrum in the void is precisely represented in the pattern of the octonion multiplication table. That table when applied to the aspects of form/pattern and the magician operators give us a logico-mathematical model of the special systems in which the new operations at each level appear by the hyper-complex algebraic doubling procedure. Our logico-mathematical formalism is a model of interpenetration and emptiness while at the same time allowing us to understand the structure of the fourfold. The 64 representations of the octonion that comes from permutating the minus signs map to the 64 hexagrams that are the wave like structure underlying the eventity. The 480 multiplications show us the reflectivity within the octonion structure.

| 10. Non-dual and Dual Fourfolds

This leads to a further insight. If we posit that the major and minor yin and yang formation is a non-dual representation of the fourfold and that there is a connection between the aspects of form/pattern or the magician operators and this nondual representation, then it is possible to see how the dualistic forms of the positive and

negative fourfold arise step by step.

Figure 192:

Major Yin	Minor Yin
Moon	Planets
Something	Layering
continuity	pattern formation
<hr/>	
Multiplicity	Nothing
Stars	Sun
Minor Yang	Major Yang
mutual action	discontinuity

What occurs is that into the non-dual fourfold is introduced a third quality. This third quality creates five more bigrams. The bigram that is made up only of the third quality in both its places would then be Yang Splendor while the other four bigrams that have the third quality in only one of its places and either yin or yang in the other place would represent Closed Yin. Now after the arising of the third quality an usurpation takes place in which the third quality proclaims itself to be the Yang and exchanges signs with the yang. So now yang is represented by a doubly broken line and the third quality is shown as an unbroken line. After the usurpation a conflict is posited between the extreme nihilistic opposites and this is what gives rise to the male (positive) and female (negative) versions of the fourfold. These versions exist in an eternal struggle (war of the sexes) like Ahura Mazda and Ahriman of the dualistic Zoroastrian religion from which we inherit many of our cultural motifs via the Greeks.

So we have a series of steps:

Figure 193:

Entry of the third thing

Usurpation of the throne of the Yang (unseen cause)

Extremism and the production of nihilistic opposites

Anti-production of conflict between eternal enemies

This series is the real meaning of the steps of emergence. The emergence is the emergence of the third thing. We know that the entry of the third thing is what produces chaos in chaos theory. We know that for anything to be seen erratic change must be produced as a background phenomena upon which things are highlighted. The eternal conflict between extreme opposites serves the purpose of

creating the desired entropy in the background to make neg-entropy ultra-visible. Out of the melee are constantly arising nihilistic opposites that only appear different but are in effect the same. The conflict between these opposites hide the actual unseen celestial causation. And the culprit, the third quality, goes unseen as it destroys the non-dualistic balance and replaces it with chaos and dualism.

Now we also note that the five new qualitative states mimic the celestial Hsing associated with the planets. And so we realize that the fire of Yang Splendor stands in contrast with the earth, water, wood and fire Hsing that represent closed yin. This makes sense finally of the doubling of the Hsing to create the organs in acupuncture. There is a true and a false set of Hsing which the Chinese called yang and yin Hsing and which they called the ten principle organs. We can check this insight by referring to the standard image of the Hsing which is a pot on the cooking fire.

Figure 194:

Chi steam	
water in boiling in pot	Three Yin
metal pot	Three Yang
fire	Three Three > Yang Splendor
wood on earth	Yang Three
earth	Yin Three

Notice that the fire is in the middle between the other four Hsing. Fire is in the position of cause. You apply the fire and you get the Chi Steam. So here too fire is in the center as it is in the Tai Hsung Ching where the third has Usurped the role of the Yang and is interpreted as the undifferentiated center. So we posit that what Chinese medicine is giving us is a picture of imbalance that occurs when the third quality arises and usurps the role of the celestial causation -- that is causation out of nowhere. When this occurs false Hsing are created that eclipse the true Hsing and you get a shifting of responsibility from the true centers of powers to the peripheral centers of power. The Chinese saw the body and everything else as autopoietic special systems that are ultra efficient. When an imbalance occurred then the nihilistic extremes are created that rage within the body producing symptoms through the imbalance that they create. Treatment balances the body back toward the autopoietic mean away from the imbalances of surplus (whole greater than the sum of the parts) and insufficiency (whole less than the sum of the parts). The whole of Chinese medicine attempts to right the natural balance that our bodies have when they become autopoietic. This is why Hun Tun is the symbol of perfection to the Chinese -- he represents the closed autopoietic state.

| 11. Phenomenology of emptiness

When we look at ourselves and our experience from a phenomenological perspective we see that it is possible for us to consider what we experience as wholes greater than the sum of the parts, wholes less than the sum of the parts, and wholes exactly equal to the sum of the parts. Normally we think of the things as systems and consciousness as the meta-system within which we experience the interaction of these things. Or conversely we consider the surplus to be in consciousness as our intentionality and the lack to be in things that are noematic. But the third possibility hides itself between these two and is normally never seen. That is to consider that consciousness operates on the rules of the special systems and that it merely projects systems and meta-systems to contrast to this third possibility in which there is not third thing as either surplus or lack. You see as soon as we enter into the special systems we have entered the realm of non-duality upon which the Chinese built their sciences. And that was because they looked on everything as purely conjuncted into special systems and they concentrated on the autopoietic special system because that was the absolute mean between system and meta-system and further between dissipative special system and reflexive special system. When we consider consciousness from the phenomenological perspective then we are again striking that balance by clinging to only what appears. We are ignoring any surpluses or lacks beyond appearances. As Wm James says we are looking at the "object" as pure apperception 'nothing more nor less.' When we cling to appearances that are isolated by reduction then we discover that consciousness has all the aspects of ultra-efficiency that we have associated with the special systems. So we can posit that there is a plane of pure appearance on which the special systems organize the internal workings of consciousness. When we deviate from this plane we first get dissipation and reflection and then later get systems gestalts and meta-system contexts. At the dissipative level we are thrust into our own bodies and become what Merleau-Ponty calls Flesh. At the reflexive level we are swimming in the sea of intersubjectivity within which thought arises as first intersubjective mythic thought and then later as individual metaphysical thought.

The oddity of our consciousness under phenomenological scrutiny is like the oddity of the medium of communication, light, which takes its structure and form from the ultra efficient properties of the special systems. We think of this ultra efficiency as the intrusion of four dimensional rotations into three dimensional space -- but we forget that we are four dimensional beings already due to our embedding in spacetime as entities that when we consider as minimal systems

become spinners which are stable within spacetime. This is our dance. And that dance is the ultra efficient movements that appears as hyperdimensional rotations in place within spacetime.

When we look at consciousness as Aron Gurwitch does in The Field Of Consciousness it is clear that when we reduce it to appearances only, nothing more nothing less, that it is a field of synergetic nodes. Each thing appears in consciousness with an inner horizon of noematic implicit meanings that may be unfolded and a series of noetic anticipated actions implied within it. This synergetic infolded nature of all things that appear within consciousness is very striking and reminds us of the synergism of fourths. Consciousness considered as a field is full of fourths and the Firsts, Seconds, and Thirds unfold from these as if from a cornucopia of implicit contents and actions that are infolded in every thing and which can be almost effortlessly unfolded unless there is some constraint that prevents it, like too little light. When we look at the relation between all these synergetic nodes then we see that they all effortlessly revolve around each other making up the constitution of the world as a synergy of the horizons of all the things that appear within the world and all the perspectives on those things. It is as if not only are the things holographic but the viewpoints upon the world make up a meta-hologram that is encompassing a myriad of sub-holograms with interpenetrating nodes. Each part of the hologram is a point of synergy which we only later dissect into Thirds (by recognizing the invariances of the noematic nucleus), Seconds by recognizing the relations between natural complexes of different kinds, and Firsts (by recognizing the integration of contents which give each thing its uniqueness). The effortless and ultra efficient unfolding of the infolded nodes in the field of consciousness reminds us of the special systems more than it reminds us of systems or meta-systems. So we posit that at the level of pure appearance under phenomenological reduction we are at the point of ultrafine balance between all extremes and at that point the functioning of consciousness is autopoietic as modeled by the quaternion four dimensional rotations. These rotations of autopoietic synergetic nodes are effortless and can be described as a perpetual motion machine like that which appears in superconducting systems. When we fall away from this point of balance then we find that we either see consciousness as dissipative or reflective. If we see it as dissipative then we notice the ordering of consciousness from unknown and hidden sources beyond the surface of appearances. If we see it as reflective then we look at consciousness looking at itself and we see it as a distorted mirror mirroring itself. This distorted mirror is the same if we look at the individual embedded in the social consciousness or at the cognitive

mechanisms that make up the individual that reflect each other in a distorted indefinite reflection that is open to our introspection as it looks in on itself. If we fall further away from appearances only then we see consciousness in terms of systems or meta-systems. As such there are two views. If we see consciousness as full of gestalt systems as Gurwitch does then consciousness itself becomes a meta-system in which these systems arise and interact. If we see consciousness itself as a system as Jahn and Dunne do with their quantum model of consciousness, then it is always haunted by meta-systematic shadows with penumbras of undecidability and umbras of indistinguishability. Such a consciousness is always haunted by the unconscious or the possibility of self-consciousness which are never realized except in momentary discontinuous aspects of experience. And ultimately it is haunted by the spirit and anti-spirit that arise from the dialectical completion of the unfolded Greimas square of consciousness.

So phenomenology gives us access to the special systems characteristics of consciousness itself that are normally covered over by everyday engagement in the lifeworld. When we enter the realm of pure appearances we notice the synergies of consciousness that appear both on the noetic and noematic horns of the Logos/Physis split which phenomenology has transported into consciousness. We see this split in the separation of the aspects of form/pattern from the magician operators. What we really need is a non-dualistic phenomenology which allows us to go back before the noesis/noema dualism to the celestial fourfold as a description of non-split consciousness. This is before the split of the individuals from the social field. The field of consciousness at that point is no different from the social field and the nodes of synergy there are the embodied consciousnesses embedded in the social field with primordial social consciousness. It is only later when the individual becomes reified that we talk of our own individual consciousness and the appearances of objects within the field of our phenomenologically reduced consciousness. For the ultimate object in the field of consciousness is the Other with whom we have a significant relationship. We have already seen how the unfolding of the Greimas square helps us understand how we can think of a chiasmic relation to the other without infinite regress. So when the field of social consciousness and individual consciousness are one single field then we have achieved a non-dualistic view at the point where there is no difference between noesis and noema. The noesis of the other is my noema and vice versa. When I assume a chiasmic relation to the other then we become one flesh as Merleau-Ponty has said.

Similar viewpoints can be given in relation to the other Humanistic methods (Dialectics, Structuralism, and Hermeneutics). We have already seen how the inner structure of dialectics leads us to understand chiasmic non-dual relations. Similarly with meanings. Meanings are timeless as Gurwitch says. The unfolding of meanings is prior to the split between noesis and noema. And so it is with the constraints within consciousness. We can explore those discontinuous constraints just as easily as we can explore the timeless meanings that lie behind the noesis/noema dichotomy. Dialectics describes the unfolding of the infolded horizons of noesis and noema. Beyond that chiasm of noesis/noema there is the emptiness out of which meaning appears and which can be explored as an essential horizon of consciousness on emptiness itself. There are the constraints of consciousness that give rise to the structures that appear in the world that we can explore and their is the field that is constrained of appearances that operates ultra-efficiently continuing nodes of synergy that have infolded noetic and noematic horizons. Finally we appeal to heuristic research that releases from the constraints of distancing that all the other humanistic methods operate under. We know our consciousness ultimately by dwelling within it with others and experiencing the field of consciousness in all its ramifications and adumbrations. We fall into non-dual states and fall back out of them into dualistic states continuously on the ebb and flow of the dynamic processes of consciousness. We can see consciousness as tertiary process, but as we explore it more deeply we realize that we ourselves are embedded in the secondary processes or living and the primary process of manifestation. So we know very well the ultra efficiency of the workings of consciousness and take it for granted as we experience the lifeworld. Who can deny the synergy of things within the field of consciousness and the ease of unfolding those synergies. Who can deny the ultra-efficiency of meanings that flow back and forth between us so effortlessly. Who can deny that effortless dialectical unfolding of consciousness by which new synergies are continually being produced some of which are emergent and which change us essentially. Who can deny that the constraints of consciousness discovered by structuralism have the ultra-opaqueness of the autopoietic system. Who can deny that when we view our own consciousness without imposing artificial distance that we are living in a non-dual world in which we continually interact with others and ourselves based on the assumption of the ultra-efficiency of the special systems.

| 12. Cognition

Figure 195:

homeostasis	ATTRACTOR	NEGATIVE FEEDBACK
heterodynamics	REPULSOR	POSITIVE FEEDBACK

In the dissipative system there are ordering functions.

In the autopoietic system there are homeostatic loops (attractors, feedback loops) that operate as a network to maintain the organization of the system itself. Note it is the organization that is being maintained not a single variable. That is a whole set of variables and their relations that need to be maintained. So we have a whole network of homeostatic loops to do that and these working together produces self-regulating hyper-cycles (a control program). It is the control program (hypercycles) that make the system SELF-producing not the network of the homeostatic loops.

In a multi-dimensional dynamic system you need a lot of homeostatic loops to hold something in the organization static. Basically the loops must work against each other to do that. Loops that work against each other provide structure to the organization. Loops that do not work against each other provide flexibility to adapt to change. Basically this is like a systems dynamic model with a lot of feed back loops. After a certain complexity you have no idea what it will do given an input. This is the meaning of the closure of the autopoietic system. It is closed because all the interacting attractors are just too complex to understand. A given input depending on where everything else is in its cycles could give very different outputs. Within the system we cannot differentiate from phenomena produced by the homeostatic loops themselves interacting and internal phenomena. So from a cognitive point of view we cannot separate the observer from the system.

Now when we move on to heterodynamics we see repulsors added to the system. Repulsors are positive feed back loops which is what gives the system its ecstatic quality. Here instead of maintaining a static structure around which to organize there is a more dynamic kind of organization which is continually changing and adapting to the current relation between positive feedback loops. The negative feed back structure has to continually change to compensate the positive feedback within the system -- that makes it ecstatic. To do this it begins feeding forward instead of just backward. This feedforward or planning allows it to compensate in advance for projected changes. When we reverse this process based on experience then we have learning. So a heterodynamic system has repulsors or positive feedback, but not so

much to overwhelm the system, and it does planning (feedforward) and the comparison of feedforward to what really happens gives us learning. Learning can occur at all the different meta-levels of learning with respect to the different meta-levels of change.

Now the heterodynamic ecstatic system pours distortion into the overall closed autopoietic system. This is the opposite of the dissipative system that pours order from nowhere. Now we are pouring in distortions from everywhere as the relations between the repulsors within the system change. This distortion allows us to see the *true constraints* under which the girating heterodynamic system is operating. These *true constraints* are invisible in the heterodynamic system except for the difference between the distortion and what cannot be distorted. Those things that cannot be distorted we call *abstract ideas* when they are recognized within the heterodynamic system. When they emerge cognition separates from the living underpinnings of the system. Now what happens?

When we recognize the abstract ideas (invariant constraints that are embedded in the emptiness) we realign the organization of the autopoietic system to embody these invisible structures with visible representations. Lets call these simple or concrete ideas. Now we have a heterodynamic system which has aligned its autopoietic substrate to represent the invariants which it sees through the distortions. Lets call this process a paradigm shift. Once the paradigm has shifted and we have a new organization the repulsors might change in relation to each other and reveal different or changed invariants or greater precision approximations to the invariants. So later we get another paradigm shift. This could occur at different ontological levels as episteme shifts or changes in worldview. The point is that when the shift occurs a change in the essence of the heterodynamic system occurs. What is this? Because we cannot really differentiate the distortions from the undifferentiatedness of the inner versus outer stimuli. Only because of the distortions can we see the invariants and this allows us to differentiate inner from outer -- because we are ecstatically producing the inner and compare the outer to what we produce to derive reality.

The dissipative system produces order blindly within the boundary. The autopoietic system feeds off this order production to set up catalytic hyper-cycles within the boundary and thus separates its structures from its organization. Notice the structure is both the content which the organization uses to order itself and the invariants that are established via multiple homeostatic loops controlling the same

variable. Organization then by this definition (perhaps not Maturana and Varela's) is the flexible response due to multiple interacting feedback loops which makes it impossible to tell internal from external stimuli within the autopoietic system. Then then the heterodynamic system adds to this the wild cards of positive feedback loops, just enough to be unpredictable in their interaction but not so much as to overwhelm the system. This creates distortion. Via this distortion we can now tell the inner from outer stimuli *and* we can see invisible invariants within the system. The gyrations of the system as it aligns with these invisible invariants are paradigm changes. When the paradigm change occurs then theories that represent the invariants are produced in which the simple or concrete ideas represent the invisible "forms" of the invariants.

It is a beautiful system because it is the distortions that allow us to differentiate inside stimuli from outside stimuli and to see the invariants (timeless meanings in Gurwitch and Abstract thoughts in Maturana). I think this is a complete cognitive model -- we should see this cognitive model operating in the social and the psychological realms as mirrorings of each other. In the social realm we are distinguishing us from them and positing the generalized Other as an invariant. The ultimate invariant in these terms is God. So we can interpret Eric Gans ideas in this light. On the psychological side we each are trying to discern reality as we live in the articulated dream of consciousness. And we are each trying to represent the invariants in the world we see with ideas.

The dissipative system pours in order form nowhere.

The autopoietic system is a network of feedback loops some of which together form a hyper-cycle.

The reflexive system can learn because it is projecting plans -- feed forward loops that is compared to what happens. It pours distortions into the closed autopoietic system and on the basis of that makes it possible to discern inner from outer stimuli and to see invariant forms which are articulations of the emptiness that engulfs the system.

The homeostatic loops work against each other to create structure and together to create organization that is differentiated in the autopoietic system. In the dissipative system these two are not differentiated. Everything is just a pattern imposed from nowhere in the dissipative system.

<begin quote of Onar Aam personal correspondence>

I am not sure that heterodynamics is characterized by repulsion. There are several reasons for this:

1) the algebra hierarchy involves specialization. That is, autopoiesis is a special kind of dissipative system, reflexive autopoiesis is a special kind of autopoietic system.

2) in Tony's physics model the octonion distortion was associated with gravity. And as we know, the social is a gravitation field, never repulsive always attracting.

I believe that heterodynamics is not repulsive. It is just as attractive as autopoiesis. The dynamics I believe arise as a *conflict* between the closure of the mind and the closure of the social. (Freud's Id vs. Super-ego) Recall that the quaternion has perfect closure (associative), the octonion however only manages to produce partial closure. Partial closure is closure with holes/flaws in it. It is from these holes that distortion flows. Distortion is a product of failed closure and hence the dynamics of the octonion.

As such I think we can say that the dynamics of the mind comes from two conflicting attractors. There is no repulsion, only tension and conflict. So like the dissipative pours in order from nowhere the reflexive pours in distortion from the flawed closure.

I have suspected for a long time that the mind may not be autopoietic, but reflexive. You've pointed out that the only aspect of our mind which stays invariant is our knowledge. We've also seen how habits/mimickers are homeostatic. Therefore I am suspecting that knowledge is an autopoietic network within the mind. I am dead certain that the mind as a whole is not a homeostat, yet there are still invariants within the mind. Have you noticed how values and knowledge refuse to adapt, as if they were autopoietic? Ideas are the most rigid. When in the field of reflexion (ideation=homeostasis²=stasis) ideas refuse to be plastic. Ideas enforce deductions, something which mathematics is an extreme example of. You can't deduce any laws you like from a particular kind of axioms. As such, mathematics is the most extreme autopoietic system possible.

<end of quote>

I think perhaps you read my explanation a little too literally. I tried to say several times that there is not too much repulsion to disrupt the autopoietic system. So think of the autopoietic system as having structure which is held rigid by multiple feedback loops working against each other. But it has organization which is its flexibility, the flexibility is such that the same input may result in different outputs at different times due to the internal state of the system in its multiple homeostatic balancing routines that form a network and hypercycle of multiple attractors (negative feedback loops).

Now think of this flexibility of the organization as having not just many interacting feedback loops but also some positive feedback loops. These can be of two types leading to either blackholes or unending escalations. Now if the organization is flexible enough to contain these escalations or drains then the repulsions that force the positive feedback could be seen as interacting to produce distortions within the field of feedback loops. When the positive feedback loops are too strong for the flexibility of the autopoietic system to contain then they break out and become the black holes and miracles of the meta-systemic environment. But due to the flexibility of the organization of the autopoietic system they can contain some marginal positive feedback that is compensated for without bursting the boundary of the autopoietic system.

Think about it this way. Negative feedback loops reduce distortion by their very nature. In order to get distortion in the system then you need some partially uncontrollable element that is producing positive feedback erratically. This is exactly the condition for the appearance of anything, cf the erratic motion of the eyes, But if the positive feedback gets out of hand then the boundary is burst and you have a meta-system. Think of it this way, the flexibility of the autopoietic systems organization allows it to have internal weather which causes the differences in the outputs given the same input at different times. This micro weather system can have little white and black tornados (positive feedback loops contained in the overall negative environment within the autopoietic systems organization). These little black and white tornados move around within the sea of negative feedback and interact to give the distortions. They could be seen as the saddles between attractors that turned into vortices. Those contained repulsive centers that force elements away from the attractors disrupting them perhaps are the source of ecstatic projection of the world. The world is closed yet projected. So it is true that it is like an autopoietic system. But autopoietic systems do not have positive feedback elements only reflexives systems have these and it is this that allows them to learn

based on comparison of actual experiences compared with plans.

I think I still stand by this interpretation. I think perhaps I misunderstood what you meant by the stasis that comes from homeostasis^{^2}. I thought that was the production of stasis within the autopoietic system and that it was different from the invariances within the reflexive system. But it appears that you meant what I am calling the invariances. So I believe there is a terminological problem we need to sort out. But basically if you look at electronic systems distortion is produced from positive feedback structures and is taken out of these systems using negative feedback structures. for instance if you get a microphone close to a speaker in a stereo then you get a positive feedback whine. The circuits that attempt to prevent this are negative feedback circuits. Not those circuits will attempt to catch a run away positive feedback and cut it off submitting it to negative feedback after some threshold is crossed. Likewise we can think of the sea of negative feedback loops within the autopoietic system as having thresholds that are used to catch the positive feedback loops before they run away completely. This introduction of thresholds gives a new element not appearing in the autopoietic system itself. That distinction (what Bateson calls a difference that makes a difference) makes it possible to distinguish the cognitive from the living aspect of the autopoietic system and to distinguish the invariants within the reflexive system that are invisible within the autopoietic system.

I hope we can continue to explore this aspect of the system to understand better each other's perspective because in general I think we are on to something here that is very important. The making visible of invariants via distortion (which I think we are agreeing on) is what allows the cognitive to arise within the reflexive system as an emergent phenomena which does not appear in the autopoietic system as a separate aspect but only chiasmically fused to the living aspect. At the reflexive level what is fused chiasmically is the social/psychological. In other words both social and psychological phenomena are cognitive in different ways. For instance, social thought is myth.

Anyway lets keep exploring this because I think you have stumbled on a rich vein which coincided with some thoughts I had upon reading The Field Of Consciousness again after about twenty years. Gurwitch's saying that meanings were timeless really struck me and with Maturana's comment we can place that within an autopoietic context. But Maturana does not know about the reflexive system (I don't think; did you find any evidence that he does?) so I would interpret the stasis that he

is talking about as being something that appears between organization and structure within the autopoietic system and I am trying to extrapolate to the reflexive system based on Gurwitch's comment about the timelessness of meaning. I think you are jumping to applying Maturana's comment to the reflexive. As far as I can tell from reading them they do not know about the reflexive level because it does not show up in the phenomena they study and they deny that social systems are autopoietic. Varela says they may exhibit a weaker characteristic of autonomy but not autopoiesis.

So unless you can prove that Maturana distinguishes between autopoietic and reflexive systems (in which case what we are talking about is not new) then I would say that your insight about how homeostasis againsts itself produces stasis must apply to the relation between organization and structure. It is still a valuable insight when we find its analogy in the reflexive system as we see the invariances via the distortions. But the static elments of structure are different from those invariances. The invariances would be like the constants in nature (plank's constant for instance) where as the stasis in the structure would be persistent features of physical structures, like crystalline patterns.

<Begin Quote from Onar Aam personal correspondence>

During the vacation I conceived of an octonion pendulum function inspired by the words of Hemmingway: "History does not repeat, but it rhymes". In history there tends to be a pendulum motion: revolution followed by contrarevolution followed by contra-contra-revolution etc. I've translated this thesis/anti-thesis pattern into a function. In complex and quaternion algebra the multiplication corresponds to a rotation. Suppose now that you defined a rotation vector X and its inverse anti- $X = X^{-1}$. These cancel each other out. $X * \text{anti}X = 1$. In terms of rotation this is the same as rotating a quaternion to some point and back. But this is not the case in the octonion due to its non-associativity. $F*X*\text{anti}X$ usually isn't F , but it resembles. As such we may say that it "rhymes" with F . By recursively multiplying this new F with X and anti- X we then produce an infinitely varying pendulum. This is the octonion distortion in action. I don't know if the resulting pendulum swing is stochastic, chaotic or has a structure. I'll have to check that out.

<End quote from Onar Aam>

This phenomena I would interpret to be completely differnt from the invariance

yielding phenomena. If you look at Foucault's *The Order of Things* you will see that the first kind of episteme functioned on similitudes. You are really talking about a mechanism that produces similarity which is a result of the overall Sameness of the Mirrorhouse/meta-hologram itself. The production of sameness plus the making visible of invisible invariants seem like they are related to each other as duals perhaps. Similitudes lead of course to metaphors when Being enters the picture. They are a way of talking about quality by way of other different things. Since invariants are usually expressed as quantities it is possible that this duality is an expression of the quality/quantity chiasm in some way. Perhaps this is how these categories arise as different. If we could show that the quality/quantity category distinction arose from the octonion structure that would be wonderful -- and in fact perhaps we should look at Kant's other categories and see if we can generate them. I can't tell you what an important find it would be if it were true that the categories were generated from the octonion structure. For instance Kant has One and many as a category and that is definitely fulfilled by Sameness of the octonions. I will look into it and find out what the other categories are and we can try that one out.

[END OF WORKING PAPER as of 950801]

| 13. Social Nature of Space and Time

In an earlier paper I have defined the Matrix as the combination of spacetime and timespace. Spacetime is the fusion of space and time in relativity theory that produces an interval which can have different reversibilities between phases based on the inertial frame of the observer. Timespace is defined by Heidegger and Minkowski as the causal view of relations between events in spacetime which is different from the container view. Igvar Johannson exclusively considers only the container view of spacetime and does not consider its dual which is the causal view. Where spacetime is composed of $x+y+z-t$ on the one hand timespace is composed of past-present-future+nowhere. The nowhere is outside the light cones that Minkowsky talks about. From the point of view of Heidegger nowhere is the always already lost origin of manifestation of Being in Time. Michael Henry talks about this in terms of the Essence of Manifestation. It is the equivalent of the unconscious in psychology -- a realm that is never made present but whose very existence has a profound effect on every thing that is present.

Recently Onar Aam asked me about the definition of timespace and this produced as a side effect the realization due to the context of the question that there was an intrinsic relation between timespace and the quaternion structure that we have dealt

with in other sections of these essays. Let me begin by explaining why we are interested in the question of the relation of spacetime to the social. It is clear that there is a relation between the description of relativity theory and what Merleau-Ponty calls the chiasm of the flesh. The chiasm is reversible non-dual way of looking at the relations between what are normally construed as dichotomies in thought. The dichotomies of thought can be seen as the limits of an interval. Within these limits there are phases associated with the two dichotomous limits and between these there is a reversibility which may appear in different places from different points of view. Taking the mobius strip as our model it is clear that these reversibilities change places so that the distinction between the components of the dichotomy change depending on the view of the observer. From a global perspective the two limits are the Same and only locally distinct in a particular configuration. The changeable reversibility stands as a flaw between the poles of the dichotomy that is normally hidden because we make black and white distinctions. But when we admit that distinctions are not black and white then we see the reversibility between the phases smears out as we focus on the non-duality at the heart of duality. Merleau-Ponty points out that this phenomena defines the relations between our mind and body in the mindbody chiasm. Ultimately it is very confusing what is mind and what is body when we attempt to pin down the distinction precisely in a way that satisfies multiple view points. Merleau-Ponty points out that beneath our ideas about perception the noesis and noema become so mixed together as we realize our embodiment that we can ultimately only think of ourselves as flesh -- the complete fusion of mind and body. From flesh comes flesh. So there is a social component that is prior to each individuals experience and this social component defines first of all the social space and times within the individual exists as it pulls away from the social space and times to individuate itself within the reified social field. So from the point of view of ourselves as flesh spaces and times are projected within that social manifold and differentiate into the abstract a priori structures we experience as socialized individuals. This is done through the differentiation of the body schema in a series of genetic steps. Piaget was the first to study this development in detail through empirical study. Durkheim was the first to suggest that the philosophical categories where first and foremost social constructions -- even the a priori schema of the space and time. Abstract concepts depend upon embodied and genetically developed contents of the primal social situation set up by reproduction. Igvar Johansson identifies spacetime as his first category. But he only considers containerized spacetime not the causal timespace dual. We combine both of these dualism into a fundamental pre-category called the Matrix which we identify as primarily social in nature and out of which the

abstractions of timespace and spacetime unfold.

Timespace = past - present - future + nowhere (minkowski & heidegger)

Spacetime = $x + y + z - t$ (einstein)

Notice the dual broken symmetries. These are probably quaternionic. Quaternions are regularly used to do rotations of vectors in spacetime. Now consider past, future, and nowhere (eldorado) as i, j & k. The present and t could be construed to be the same thing. So one view gives rotations in spacetime that are necessary for something to stand still (i.e. spinnors); while the other view gives rotations of what is not present in the showing and hiding relations. Past and Future collapse into absolute time which like nowhere has never been present. So if that is the case then the other Lie products probably apply as well. What is not present is holographic. Each moment in the present is like the photographic plate that slices through the interference pattern of the light.

Let us consider timespace for a moment in relation to the structure of the quaternion. If we do that we notice that it has a peculiar structure that may be seen as similar to that of the quaternion.

Figure 196:
past-present-future+nowhere
i r j k

In other words we identify the elements of timespace that are not present with the imaginary values and the present with the real value of the quaternion. If we apply the laws of association of the imaginary elements we get the following statements:

o past future = nowhere (absolute past) never present

It has already been noted that the relation between past and future is inessential and that they together make up something called the absolute past. This is the past of mythology that is filled with occurrences that never happened but are always being re-enacted. This is the time before endless time (i.e. some super-rational time that is always already lost).

o past nowhere = future

If we take the past and combine it with the nowhere we get the opposite of the past which is the future.

o future nowhere = past

Similarly if we take the future and combine it with the nowhere we get the opposite of the future which is the past.

o future past = - nowhere (absolute future) never present

Reversing the relation between the future and past gives us the opposite of the absolute past which is the absolute future. This is the time after endless time (i.e. some super-rational time that is always already found).

o nowhere past = - future

The negative future is obtained by reversing the relations between nowhere and the past. The negative future is the one that has been negated by the actualization of possibilities in the present. The negative future is the realm of unactualized possibilities that existed for this universe among the pluriverse.

o nowhere future = - past

The negative past is obtained by reversing the relations between nowhere and the future. The negative past is the one that has been rewritten once the emergent event has occurred. The negative past is the realm of negated actualities that existed prior to the arising of the present universe through the advent of the emergent event.

o past nowhere - nowhere past = 2 futures

Two possible futures are created out of the bifurcation of the past by the unmanifest. One past relates to the universe without the emergent event and the other relates to the universe with the emergent event. The two futures are also related to the presence and absence of the emergent event.

o past future - future past = 2 nowheres

When we take the difference between the future that is now past and the past that is

projected into the future we get two unmanifest states which are undecidable. One of these is the result of the emergent event that causes the projection of the future by futurists to be derailed and the other is the realization that past futures are disconnected from our actual path of development and so we are leaving a trail of unrealized discontinuous universes not an continuous path of progress. The two nowheres are the two directions out of which emergent events can arise. They can arise by us changing the structures through which we view the world and they can arise through new unheard of things arising in existence to challenge us. This is to say they either come from inside our social worldbuilding project or from the outside. Either way there is a discontinuity both from the future to the past and from the past to the future that must be reckoned with eventually.

o future nowhere - nowhere future = 2 pasts

Two possible pasts are created out of the bifurcation of the future by the existence of the emergent event. As the non-manifest enters into the future different pasts connected to the bifurcated futures come into existence where there was one past.

Notice that the Lie product is taking the difference between two chiasma. This means that it must be finding the constants or invariants within the chiasma's differences from itself.

o future nowhere past = singularity ($ijk = -1$)

The three non-presences together form a singularity. This singularity is the emergent eventity.

o 2 futures = singularity ($i^2 = -1$)

The singularity of the emergent eventity produces two futures -- the road taken and the road left un-taken.

o 2 nowheres = singularity

Ultimately both the inward and outward direction from which the emergent event occurs is the same.

o 2 pasts = singularity

The singularity of the emergent eventity produces two pasts -- the road left behind which did not really happen as we thought and the one we have constructed anew based on what we now know due to the actualization of the emergent eventity.

o singularity = 2 pasts = 2 futures = 2 nowheres

The singularity is the origin of the true and false past and futures as well as the inward and outward direction from which deep change proceeds.

So we see that when we take the dichotomies of the timespace minimal system we get a picture of the arising of manifestation of the genuinely novel from within manifestation. We get a picture of the non-present imaginary values rotating around the present allowing the essence of manifestation to enter into presence through the relations between that unconscious force and the past and future. In psychic manifestation Jung calls this synchronicity. But it occurs in a way that discontinuous elements are thrust into the present through the advent of the emergent eventities.

Given this view of timespace we can turn to the view we have of spacetime and consider it in the light of the quaternion structure. Here we see that quaternions are regularly used as an elegant way to calculate rotations of things with respect to the x, y & z axes. When we view that rotation to occur in time then the i becomes the time axis but when we view that rotation to be of a scalar quantity then this becomes a convenient notation for the expression of the interaction of forces in 3d spacetime. In any event rotations is what is needed for spinners to occur which designate a still point in spacetime via their 720 degree rotations. So the spacetime component already has a convenient expression in terms of quaternions. What we have added here is the notion that timespace has a rotation based on the quaternion that underlies manifestation and also the idea that these two quaternions combine together through conjunction to form the octonion structure of the Matrix.

<Begin Quote from personal correspondence with Onar Aam>

This looks very interesting. Recall that the octonion is precisely two autopoietic rings:

Figure 197:

$$\begin{array}{c} i \\ R + / \backslash + | | \end{array} \qquad \begin{array}{c} E---I \end{array}$$

$$k--j \quad K---J$$

I guess, we can include R in the ijk ring and then we obtain two squares:

Figure 198:

$$\begin{array}{c} R--i \quad E--I \\ | \quad | \quad + \quad | \quad | \\ k--j \quad K--J \end{array}$$

If this holds, R is time ijk is space, E is nowhere and IJK is past-present-future. Or vice versa. Namely that R is nowhere, ijk is p-p-f, E is Time and IJK is space. I kind of like the latter interpretation because I've earlier contended that R is nowhere. And as we've seen, E creates the experience of Time and maybe also of space (IJK).

<End of Quote from Onar Aam>

I like the former interpretation. But there is a fly in the ointment.

Figure 199:

$$\begin{array}{ccccccc} \text{timespace} & = & \text{past} & - & \text{present} & - & \text{future} & + & \text{nowhere} \\ & & I & - & J & - & K & + & E \\ & & | & & | & & | & & | \\ \text{spacetime} & = & x & + & y & + & z & - & t \\ & & i & + & j & + & k & - & R \end{array}$$

Notice the skew. t is really a continuum that embraces past, present and future but t must be some value and that value is always the present. In vector math the t is replaced by some scalar that has a certain value. This allows for nice manipulations of scalars as forces but excludes time. Seems you either have time or the scalar. Do you know of any way around this? If you have time it is the present and that means whatever was before it or after it are excluded. This exclusion becomes very strong in timespace where causality can be precluded if the light cones do not overlap properly. By this definition there is:

- 1) dimensional exclusion where separate dimensions must be considered in conjunction
- 2) scalar verses time exclusion
- 3) temporal exclusion where the present excludes past and future

- 4) light cone exclusion where there are unreachable areas outside the light cone of a given worldline's present.

Note that the present is in different places in each quaternion. The grouping of IJK as nowhere, past and future as the non-manifest does not line up with the equations. So there is an additional skew between the two equations other than their broken symmetry. I guess I do not understand this skew except that I imagine that this might be the mechanism for creating the distortion we know about at the octonion level. Seems like the distortion is a higher level broken symmetry. A kind of meta-broken symmetry. Broken Broken. I guess that means shattered. This implies that the matrix is shattered. Each point in spacetime denoted by the dance of the spinnor is a locus of showing and hiding and is isolated from all the other points in spacetime by the distortion of the matrix. Now this makes sense of why time is fragmented into separate time streams. The timestreams are local connections between shattered spacetime points. We build up an illusory continuity across local points in the Riemann manifold. The local normal spaces are like the short term memory in relation to the long term memory of the rest of spacetime. Global spacetime is interpenetrating. That is the thing that is not seen in physics because they can only ever see local normal spaces. The local normal spaces are a projection of the observer. Wherever he projects he can create a local illusory continuity. But globally the hidden discontinuities are the Heavens that are interstices in the earths of spacetime. Notice that local illusory continuities are earths and the discontinuities that appear in the global structure are the heavens. Heavens and earths interpenetrate such that each patch of earth mirrors all the other patches through their differences. All the possible localities in Riemann spacetime are earths. It is only the discontinuities that appear globally that are related to the heavens. And then ultimately like Plotnitsky says everywhere there is a mixture of continuity and discontinuity -- the Riemann model is merely a way to preserve our desire for continuity and hide from ourselves the discontinuities. Actually locally there is a WILD chaotic mixture of continuity and discontinuity everywhere and all the local spaces are heterogeneously interactive and interactively heterogeneous. In other words the local spaces are non-dual and described by chiasm.

Now we see how the matrix structure takes hold of the Riemann manifold. A local time stream t within a locally connected space $x + y + z$ has disconnected past, present and nowhere components. The nowhere component is the discontinuity between it and the next local timestream. That discontinuity is a heaven. Via the heaven as difference the two local patches mirror holographically each other -- i.e.

they are the Same (similar but differing) Each moment there is a branching forward and backward in time to create splintered possible worlds of the pluriverse. All the discontinuities between these possible worlds (as rhizome) are further entries of heavens into the earths of spacetime. Each moment of space rotation or showing and hiding by which appearances are rotated into presence is a quaternion that is mirrored in the octonion of the matrix or in the infinite depths of long term memory where the division algebras go on indefinitely deep following the progression of the Pascal triangle. The jeweled net of Indra is the network within which each of the jewels we find is woven. The matrix of timespace/spacetime is merely the global connection through disjunction of all the local spaces that are holographically mirroring. Beyond the matrix is the jeweled net of Indra which is of infinite extent as the fourfold unfolds and infolds producing a circular mirroring which is the eternal return of the same beyond our local and global continuities that we project on the matrix.

This realization of the nature of the Matrix is very significant. I have been worrying about the problem of spacetime/timespace for years. It is only recently that I started calling the combination of the two the MATRIX. Early in my time in England I read Wheeler's book on Relativity theory. It was the first text to start with relativity theory and work back to non-relativistic history. Relativity theory is much easier to understand that way. What you see is that relativity theory is all about the structure of intervals and when you read Merleau-Ponty you see that this is exactly what he has in mind when he talks about the chiasm and flesh. There is a reversibility between two phases instead of the extreme limits of the interval. We usually think in terms of dichotomies which are the representation of the extreme limits of the interval. When we look into the structure of ideation then we see that there is the substructure underlying the dichotomy that has a phase structure. This is what is represented by the chiasm --- an interval with phases and a point of reversibility between them.

It is a short distance between this realization and the structure of the minimal system. The minimal system would consist of six intervals and six reversibilities that interfere with each other in the center. This is the structure of the flaw at the heart of the minimal system. Now each of the complementary view of the Matrix has the structure of a minimal system so my inclination was to view spacetime and timespace as chiasmic minimal systems. With this recent insight it is possible to see that the external dichotomies themselves can be understood using the quaternion as our guide and that the two quaternions together have the octonion

structure which implies that the Matrix is reflexive. This is a gigantic step forward as it tells us that the most basic category spacetime/timespace is of the form of the octonion. Look at Igvar Johannson's ontology and you will see that spacetime is the most fundamental of his categories. Similarly with Kant -- the projection of space and time as absolutes is even prior to the categories. It was Durkheim who had the basic insight that the categories are social. So if the most basic category has the form of the matrix and that has the form of the octonion then we can understand that this fundamental projection is social. It makes spacetime/timespace much more complex -- it implies that it is a showing and hiding regime. It contains the concept of the essence of manifestation (Henry) as the nowhere. So here is the connection. Matrix Logic has the truth structure of showing and hiding and the nowhere-past-future structure of the timespace matrix shows how the showing and hiding structure rotates into the present. NOW we see that Matrix logic IS (crossed out) the Logic of the Matrix. Matrix logic shows us the truth values of the showing and hiding regime whereas the quaternion structure of the paired dichotomies (with broken symmetry ---+ or +++) is the reality of rotation of things in and out of presence. When we consider timestreams within the matrix we see that they are the means by which we deal with the shattered structure of the matrix. By creating local continuities and allowing intertransformablity between them we are able to deal with the shattered nature of the matrix and bridge the inherent distortions within it. The intertransformability across timestreams is the identity relations of the matrix. So all the pieces fit together. Being has four parts:

Figure 200:

Reality	-- Rotations of past-nowhere-future into the present Rotations of spinnors within spacetime
Identity	-- Intertransformability between timestreams (short term memory)
Truth	-- Matrix Logic of showing and hiding
Metaphor	-- Progressive bisection of Qualities

The fourfold that unfolds and infolds exists as the Matrix. When the fourfold bifurcates into positive and negative fourfolds then Being is created with its four parts. Prior to that bifurcation of the fourfold there is only void and things that pop out of the void seen in terms of Chi and Li which break down into quantity-quality-truth-reality with the bifurcation.

This is a grand synthesis that validates many of our intuitions and explains how spacetime/timespace can be social thus making the social the foundation of

everything because everyone agrees it is the most basic category (or is even a pre-category). Spacetime/timespace is itself social because it is shattered and whole at the same time via the octonion structure. It is a perfect whole that is exactly equal to its parts like a perfect number. We can view spacetime/timespace as a lack by seeing it as something that holds and encompasses everything like a meta-system. Or we can see timespace/spacetime as a surplus if we consider the things as merely articulations or warpages of timespace/spacetime itself and thus a system. But both of these views miss the essential point that spacetime/timespace// timespace/spacetime has the structure of the octonion and perfect balance between these extremes.

[END OF WORKING PAPER as of 950822]

14. The Sedenion (Sedecimnion)

Beyond the octonion is an infinite depth of non-division algebras following the differentiation of the triangle of Pascal. The next level down from the octonion is the sedeciminon which has sixteen imaginaries and is the first non-division algebra. We think we need to look at this level if we are to understand the more shallow levels of the special systems. We call this level the recursive system. And we ask what could explain the difference between the division algebras from the non-division algebras? This level represents the unadulterated and pure meta-system. So if we look at our algebraic models we assume that the difference between this level and the other levels must be a loss of a property. But there are not many properties left to loose. The remaining properties are:

Figure 201:

Reflexive $a = a'$
 Symmetric $ab = ab' == ab' = ab$
 Distributive $a(b+c) = ab + ac$
 Transitive $a > b, b > c, a > c$

Of these properties the most reasonable one to loose is the transitive property. I do not know if mathematical theory supports this loss of the transtive property between the division and the non-division algebras but we will develop the consequences of this theory as an exercise.

If the transitive property is lost then we can no longer distinguish linear orders and this means that all that is left at the recursive level is the partial ordering of sets. In fact both the linear order without distance and the partial ordering with distance must vanish. When that occurs all we have left is a non-linear metasystemic

landscape.

This also explains why it is possible to multiply two nonzero 16nion numbers and get zero. This is because the timestreams have lost their linearity, they have ineffect broken up into partially ordered sets and so when these sets are broken by non-linear discontinuities it is possible to return to zero through multiplication. This circularity of the timestreams gives us suddenly circular time as opposed to the illusory continuity of linear time. It means that multiplication and division fuse into a single mega-operator in which you do not know if you are multiplying or dividing when you apply it.

What we have is a field of partially ordered quaternions. And we believe that this the case for all further deeper levels of the Pascal triangle. The deeper levels are merely more and more complex partially ordered sets with reflexivity and symmetry but no other properties. This is the structure of Indra's net of interpenetration. It is rhizomatic and holographic. Every quaternion is like a mirrored sphere that is holonic and holographic. Each of the parts contain the whole. And each quaternion is interchangeable with every other quaternion in the net that it mirrors.

The transitive property is the fundamental property of Category Theory. When we loose this property the mathematical system of the non-division algebras are no longer even a category and thus loose most of their interest for mathematicians. They become subject to set theory only. This is probably why the non-division algebras are not treated by mathematicians they have lost all the algebraic properties and do not really deserve to be called an "algebra" any longer. They are the non-algebraic extension of the algebraic numbers which actually end with the octonion which is still very weak. But because they are not of interest to mathematicians does not mean they are not of interest to systems theorists who are interested in the properties of meta-systems. In order to understand systems we must contrast them with meta-systems that are analgous to the non-division algebras and we must have an understanding of the partial systems / partial meta systems we call the special systems that exist between these two extreems.

Now what does this mean for our understanding of the meta-system. What we know of the meta-system is that it has a lack that perfectly compensates for the system. Each special system is a partial meta-system and when we get to the level of the 16nion we enter the utter wildness of Indra's net. The meta-system has what

Bataille calls a global economy as opposed to the restricted economy of the system. Each special system is a half way house between the utter wildness of the meta-system and the utter tameness of the system. The meta-system is inherently complementary. We see this in the annihilation of the multiplication of 16nion numbers. This annihilation by multiplication is the perfect model for the magician meta-systems of Goertzel. In the meta-system the final operator is complementarity. Now the sets of operators we have are as follows:

- 1) Creation by the production of a figure on the ground of illusory continuity. [Real Algebra, Complete and Consistent Systems or Restricted Economies]
- 2) Annihilation arising through the imaginary numbers out of the -1 singularity within the illusory continuity which are globally the same as the reals by the intertransformability through algebraic properties. [Imaginary Algebra, Dissipative Special Systems]
- 3) Mutual action arising through the loss of the commutative property so that actions cannot be reversed to be undone but require a series of compensatory actions. Out of this the side-effects of actions arise. The side effects are equal to the asymmetries in actions. [Quaternion Algebra, Autopoietic Special Systems]
- 4) Gestalt pattern formation arising though the loss of the associative property which makes this level inherently social. Unique patterns are created that cannot be symmetrically reversed. [Octonion Algebra, Reflexive Special System]
- 5) Complementarity arising through the loss of the transitive property. With this loss we are suddenly in a non-linear system where the timestreams are punctuated with discontinuities. Magicians and anti-magicians arise at this level which are the basis for modeling discontinuous processes. These complementary things are created and annihilated as a system of virtual particles. Here we are not talking about the creation and annihilation of a single element but of dual complementary elements from out of the field of virtual particles. When these virtual particles are caught up in more than a partial ordering they become real in the sense that the various properties of algebraic systems act like conservation laws. [Sedenion "Non-algebra", Recursive Special System]

Now arises the problem that perhaps the name of the reflexive system is inappropriate. It is the reflexive and symmetric properties that are left at the Sedenion level when all the other algebraic properties are subtracted. So perhaps this level should be called reflexive and not the octonion level. Onar Aam pointed out in personal correspondence that at the octonion level the reflections when described by hypersets have direction. At the Sedenion level the directionality of intention or the light ray of the reflection gets lost through the loss of the transitive property. So even though things can reflect themselves there is no orientation or directionality of their mutual reflection. Reflex-ion means a reaction back on something by something else. This is lost at the Sedenion level. Reflection at this higher level is only self reflection. Symmetry is self symmetry with respect to the equal sign. At the Sedenion level onward there is complete atomization where every thing is isolated with itself alone. What ever partial orders the thing participate in do not give it any response. Without directionality to intention and the light wave carrying out the reflection there is no sense of who is reflecting who. There is only a distortionless mirroring of all the quaternions in Indra's net of all other quaternions in Indra's net. But what is this isolation than an image of recursion. The self reflection is like the program that calls itself endlessly. Its parameters in each case is the reflection it has of the entire web. So it is recursion without a difference or with every possible difference which are nihilistic opposites. In recursion something gives itself itself infinitely or finitely or it calls itself infinitely or finitely. Infinite recursions are uninteresting. It is only recursions with finite length that are of interest. And in fact every pascal level is finite even though there are infinite levels. They are filled with quaternions which are reflective balls. Like atoms all quaternions are interchangeable. The only difference is the reflection of all the others from its particular position. But you cannot tell which direction the light ray of reflection is traveling so it is as if the reflection process was static. The only difference in these levels of indra's net beyond the octonion is the distortion of the space between the quaternions. Which is to say if octonions are present then they cause the space to be distorted and the reflections to change.

We know that there are 15 octonions within a Sedenion. This agrees with our analysis of the Minimal Methods which shows that there are four dissipative systems among the minimal methods and these produce six virtual autopoietic systems and fifteen virtual reflexive systems. It turns out that three of these are ultra-efficient. So we would expect three of the fifteen octonions in the Sedenion to be ultra-efficient which in this case may mean nondistorting -- or rather distorting but in such a way that all their distortions cancel out. It is still necessary to look for

these ultra-efficient octonions. But the point is that it is the presence of distorting octonions that makes the reflections within the Sedenion interesting. Further it is the mutual action between quaternions and the annihilations between imaginaries which defines the structure of the fourfold itself. All theses distorting, side-effecting, and destructive elements is what gives the Sedenion its interesting qualities. And the same is true of all the other deeper levels of pascals triangle that defines the structure of the jeweled net of Indra.

The fourfold is atomizing until at some level of Pascal's triangle there is a quaternion for every atom in the universe. The inner noumena of each of those atoms is a quaternion holographic structure. So here we see how the jeweled net of Indra can cover every single thing in the universe and enfold them into a single all encompassing hologram where each node reflects all the others and where all nodes are interchangeable. What is occurring in the universe is an illusion created as little patches of linear time arise out of the circular time of the network. Those patches are the octonions where distortions appear within the net. They contain the quaternions that mutually interact with side effects. These contain the imaginaries that annihilate one another to create the form of the fourfold and each of these imaginaries can be seen as an illusory real timestream from some perspective. The real time streams are build up through the accretion of orders. There partial ordering is all that is supported by Indra's net itself. So the linear order without distance and partial order with distance that lead to the complete order appear as dual stages of ordering that under write the creation of timestreams that then are split length wise until at the Sedenion level they are split for the first time crosswise creating circular time. Circular time is dependent on partial ordering and it supports the creation of the raw potential of all possible universes in which the events are partially ordered. So we rise out of the parallel possible universes by creating the duals of linear order without distance and partial order with distance moving to full ordering. On the other end we are adding properties one by one to create the algebraic system. Order of rules of intertransformability and ordering of the timestreams. If we view that the complete algebra actually exists for both the real and imaginary numbers then there are just two special systems on one side and two kinds of order on the other side. Partial order and the Sedenion are equivalent in this case. but the two kinds of order are duals where as the two kinds of special systems (quaternion and octonion) are layered. So we have multiplicity and layering appearing on either side of the full algebraic system. This takes us back to the laws of pattern/form formulation of the elements by G. Spencer Brown.

Figure 202:

Something / Nothing
Multiplicity / Layering

We can add to these the following characteristics:

Figure 203:

Sets / Relations $[N^2]$ {Quantities}

Hypersets / Hyperrelations [See Goertzel CHAOTIC LOGIC]

Interpenetrations $[2^N]$ {Qualities}

Sets are the venn diagrams that we can draw around portions of the quaternions in Indra's web. Relations are the non-directional unintentional connections that incidentally connect quaternions in Indra's net. Sets can be well founded or they can be members of themselves and thus not well founded. In that case they embody paradox produce hypersets and hyperrelations. Each quaternion in the net can be seen as the interpenetrating with all the others and in fact that is what gives the network its qualities as opposed to its quantitative aspect. Each level of pascal's triangle can be seen as the possible interpenetration of some number of things. So in some sense the whole of Indra's network is not well founded as the quantities produced at a level of pascals triangle are just the qualities of the interpenetration of some smaller set of things. Pascal's triangle mediates the reversibility between quality and quantity. A few things exist. They interpenetrate. This gives rise to some smaller granular level of things that themselves interpenetrate. What interpenetrates are holons in the quaternion sense where each part is at the same time the whole. The whole of the fourfold at whatever level of pascal's triangle we are speaking of has external sets and relations between set members. These can be non-well-founded or not. If they are not-well-founded we see the entire fourfold as a hologram. If it is well founded we see it as a fragmented to some level of granularity. These fragments interpenetrate and produce a lower level of granularity to the fourfold which is either again a hologram or fragmented. It is an amazing structure.

[END OF WORKING PAPER AS OF 951009]

* * *

The 16nions are described in this article:

“Binary and Ternary Sedenions” L. Sorgsepp and J. Lohmus Hadronic Journal 4 327-353 (1981)

There is also a book by the same authors called:

Non-associative Algebras In Physics (Hadronic Press 1994 ISBN 0-911767-71-1)

In the article they define Binary Sedenions through the repetition of the Cayley-Dickson process using Octonions as the starting point. After defining Binary Sedenions with their lost properties they go on to try to develop a ternary algebra which might be similar to creating a jordan algebra by creating a new multiplication. That ternary algebra has no interest for us as it is exactly the weak properties of the sedenions that we wish to study as a model of meta-systems and a context for the special systems and general systems.

Still not clear exactly what property is lost. But it seems it cannot be the transitive property because another book I have says that the transitive property is logical not part of the algebraic axioms. Looks like the transitive property is part of the observers frame of reference not part of the albebra object. Also yet another book says that if you lose the transitive property you do not even have partial order and I know that cannot be right.

Here is the multiplication table of the sedenions.

Figure 204:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	-0	3	-2	5	-4	-7	6	9	-8	-11	10	-13	12	15	-14
2	-3	-0	1	6	7	-4	-5	10	11	-8	-9	-14	-15	12	13
3	2	-1	-0	7	-6	5	-4	11	-10	9	-8	-15	14	-13	12
4	-5	-6	-7	-0	1	2	3	12	13	14	15	-8	-9	-10	-11
5	4	-7	6	-1	-0	-3	2	13	-12	15	-14	9	-8	11	-10
6	7	4	-5	-2	3	-0	-1	14	-15	-12	13	10	-11	-8	9
7	-6	5	4	-3	-2	1	-0	15	14	-13	-12	11	10	-9	-8
8	-9	-10	-11	-12	-13	-14	-15	-0	1	2	3	4	5	6	7
9	8	-11	10	-13	12	15	-14	-1	-0	-3	2	-5	4	7	-6
10	11	8	-9	-14	-15	12	13	-2	3	-0	-1	-6	-7	4	5
11	-10	9	8	-15	14	-13	12	-3	-2	1	-0	-7	6	-5	4
12	13	14	15	8	-9	-10	-11	-4	5	6	7	-0	-1	-2	-3
13	-12	15	-14	9	8	11	-10	-5	-4	7	-6	1	-0	3	-2
14	-15	-12	13	10	-11	8	9	-6	-7	-4	5	2	-3	-0	1
15	14	-13	-12	11	10	-9	8	-7	6	-5	-4	3	2	-1	-0

page 333 ibid [I have not double checked this table after entry]

<begin quote of article>

Some properties of the canonical bases of the preceding algebras have been retained:

1) squares of basic units equal -e(sub 0)

2) basic units are anti-commutative

3) multiplication of basic units is alternative

(NB! It does not mean that the algebra itself is alternative)

The anti-associativity of noncyclic triples of the basic units which we had in the case of the octonions

$(ei ej)ek = -ei(ej ek)$ $ijk = \{ 123, 145, 176, 246, 257, 347, 365$

is now invalid

REMARK

ijk or $ei, ej, ek, ijk = 1, 2, \dots, 15$ form a cyclic triple (cycle) when $ei ej = +- ek$ according to the multiplication table and a non-cyclic triple otherwise, cycles with $ej ej = ek$ are positive cycles; there are at (sic "in") all 35 positive cycles for binary sedenions.)

This fact is directly related to the non-alternativity of binary sedenion in general, i.e. $(AB)B = A(BB)$, $(AA)B = A(AB)$ for general elements.

<something about representation deleted>

Because of the nonalternativity of the BS-algebra L-,R-matrices do not form a basis of regular bimodule representation, as it was in the case of octonions. The later were all anti-commutative and from them a Clifford algebra could be constructed. For binary sedenions these properties also get lost. The

nonanticommutativity does not allow to linearize the quadratic form (as a result of such linearization the Dirac equation was found at (sic) a time).

<end quote>

SO IT APPEARS THE ALTERNATIVE PROPERTY IS LOST

this is clearly a secondary property not a primary algebraic property like the transitions between the other hypercomplex algebras.

However equations such as the Laplace equation does not linearize. So linearity is lost in some crucial sense and this may be equivalent to losing the transitive property except as a property of the object algebra and not as a property of the observer of the object algebra.

The authors go on to talk about ternary sedenions in which they derive their own new multiplication operator that gets back some of the lost properties

<begin quote>

To restore alternativity for general elements, related antiassociativity, and the usual form of Laplace equations [linearity], we must rebuild our binary sedenion algebra into an algebra with a ternary product.

<end quote>

Jordan algebras have a ternary product due to $1/2[ab+ba]$ but I cannot figure out if the sedenion ternary product formulated by the authors gives a jordan type algebra. Probably not or they would have mentioned it.

I think it is very significant that the imaginaries of the sedenion form a tetrahedron.

<quote from Tony (Frank) Smith, personal correspondence>

----- sedenions -----

The sedenion stuff is very interesting. Although I think the full sedenion algebra loses too much structure to be directly useful, now I think that some parts of the

sedenions are very good representatives of some octonion structures involving 2-dim or 2-dim octonion spaces.

There is nice geometry behind the sequence (see the book of Lohmus, Paal and Sorgsepp)

1-quaternion 7-octonion 35-sedenion

Quaternion ijk can be represented as 3 points on a circle (which is, in projective space, a line). There are 3 points. There is 1 (projective) line with 3 points. The line is ijk.

Octonions IJK ijk E can be represented as a triangle: 3 vertices of the triangle; midpoints of 3 edges of the triangle; and the 1 center of the triangle. There are $3+3+1 = 7$ points. There are 7 (projective) lines each with 3 points. The lines are ijk, IkJ, JiK, KjI, JEj, KEk, IEi.

Sedenions can be represented as a tetrahedron: 4 vertices v of the tetrahedron; midpoints e of 6 edges of the tetrahedron; centers f of 4 faces of the tetrahedron; and center T of the 1 entire tetrahedron. There are $4+6+4+1 = 15$ points. There are 35 (projective) lines each with 3 points. You have already written them down. Geometrically, they are of the form: 4 like eee (where eee are all on the same face); 6 like vev (these are the edges); 12 like vfe (where v is opposite e on face f); 3 like eTe (where e is opposite e on the whole tetrahedron T); 4 like vTf (where v is opposite f on T); and 6 likefef (where the edge of e is not on f or f, that is, f and f are opposite to e).

In my model, I use 3x3 octonion matrices. They seem to be related to an octonion triple product that is related to triality. The sedenions (with their ternary or triple product) can be represented as a map from 16x16 (real) matrices plus 16 (real) dim column vectors into 16 (real) dim column vectors.

The 16x16 real matrices are the Clifford algebra of Spin(8), the 28-dim Lie algebra of 8x8 antisymmetric matrices.

The symmetric 8x8 matrices have $64 - 28 = 36 = 35 + 1$ dimensions, which I think may be represented by your 35 quaternion triples plus an identity (for the real axis).

So it DOES NOW seem to me that the sedenions might be yet another useful representation algebra for the structures that I use in my model.

<end quote>

There are two other articles by these authors in the MathAbstracts CDrom from 1987 on but I think they might be in russian. There are no other articles on sedenions mentioned on the CDROM.

In the references they list 8 articles on 16 element algebras including Sylvester, J.J. On quaternions, nonions, sedenions, etc (Johns Hopkins Univ. Circular 3, 7-9 (1884).

Non-alternating algebras of the Cayley Dickson process of degree four or higher seems to be the most correct designation for these algebras. There does not seem to be a name for these algebras.

15. Sameness/Difference and Static/Dynamic Couples

In this section we wish to explore an alternative way of looking at the four kinds of Being. We have already mentioned the difference between Homeostasis that appears in the Autopoietic special system and Heterodynamics that appears in the Reflexive special system. In this section we will look at the other cross relation between Sameness/Difference and Static/Dynamic in order to create another model of the four kinds of Being. To be precise we will create a quadrature based on these two dichotomies as follows:

HomeoDynamic Global = Continuity > Dissipative > Pure Presence

HomeoDynamic Local = Embeddings of Information in Spacetime -- (Determinate)

Take the information embeddings and place them in a time stream. The timestream can bifurcate without losing the algebraic properties of intertransformation between timestreams. Continuity of the timestreams is the background that makes the pure presence of what is embedded in the timestream possible. The bifurcated time stream has the form of an Escher waterfall and is therefore a model of a dissipative system. The soliton is an example of an ultra-efficient system modeled on this level of special system. Notice by this analysis both the real and the dissipative system exist together as duals that produce the creation and annihilation operators.

HeteroStasis Global = Maintain Organization > Autopoietic > Process Being
HeteroStasis Local = Maintain Variables with feedback -- (probability)

When we move up to HeteroStasis then what is local is the structure of the variables that are maintained with feedback. These nodes in the autopoietic network are probabilistic in that different nodes can substitute for each other without changing the overall organization. That overall organization is maintained homeostatically at a higher logical type than the maintenance of the values in the variables that make up the autopoietic network. The difference between organization and structure is a global/local distinction. The maintenance of the organization is autopoietic. We loose the algebraic property of commutativity so asymmetric mutual actions become the operator at this level. Superconductivity is a physical example of this kind of special system. This is related to Process Being because we see the process of the continual remanifesting of the Same within the timestreams. The self-organization is a model of Ontological Monism. The autopoietic system is its own ground because it is applying its own patterning to itself relentlessly.

HeteroDynamic Global = Distortion and Discontinuity > Reflexive -- Hyper Being
HeteroDynamic Local = Distributed Autonomous Parallel Agents -- (Possibility)

When we move to the next level there are two autopoietic systems and discontinuity (the mirror) and distortion appear between them. This is because we lose the associative property. The operator that appears is gestalt pattern formation because associations of elements in groups become important due to the loss of association. At the local level there is the action of the essence of manifestation as Difference (Derrida's differing and deferring). At the global level there is annihilation(physis) and cancellation (logos) that appears with Hyper Being. There are eight time streams with two autopoietic systems or four dissipative systems.

The example of this kind of system is the ultra-efficiency I found in the nesting of the minimal design methods.

HeteroStasis Global = Granular circular spaces > Recursive > Wild Being
HeteroStasis Local = Fractal Variety -- (propensity)

Finally we move beyond the special systems out into the pure wildness of the meta-system itself. The special systems are partial meta-systems and partial systems. The meta-system has inherent duality. It is both origin and arena for systems. But its form is essentially that of chaos and strange attractors. At the local level there are

recursive cells that call themselves producing fractals which give endless self-similar variety. At the global level there is the folding of the phase space. I think this folding is related to the non-division algebras giving circularity to the timestreams because multiplication can lead to zero for two non-zero numbers. When you take the local fractals and embed them into the folded phasespace then you get the form of chaos. Chaos give us the underlying propensities which will in each unique situation influence the conversion of possibilities into probabilities. These recursions in the meta-system underlies the reflexiveness. In other words in the reflexive system we live on the edge of chaos between too much and too little positive feedback that we add to the negative feedback that forms the autopoietic system. But when we move the the reflexive level the instability of the edge of chaos is replaced by the circularity that creates granular spacetime that comes from recursiveness.

What is beyond the recursive meta-system? Finer grained recursiveness of further layers of non-division algebras that each have a finer grained interpenetrating structure to endless levels of depth.

So this represents a change in my thinking. Wild Being is the interface between the recursive and the reflective. Just as Hyper Being is the interface between the reflective and the autopoietic, Process Being is the interface between the autopoietic and the dissipative, and Pure Presence is the interface between the dissipative and the real restricted economy of the greater than the sum of its parts system.

Each kind of Being acts as the interface between two specific kinds of system, special system , or meta-system. Thus they have aspects related to both and this is what causes them to be indeterminate and undecidable in their essence and that is what causes them to transform in different contexts. This is why they can combine in different ways to give us various forms of synergetic synthetic jewels.

But what is different in my thinking is that I have always seen Wild Being as within the purview of the special systems. But I have at times felt it was necessary to project the social onto the void itself. This solves that problem. Wild Being is partially within and partially outside in the emptiness. That is what makes it so wild. It has an aspect of no-form and this is why it can act as a partial model of non-duality.

Homeostasis is orthogonal to heterodynamics.

But also, homeodynamics is also orthogonal to heterostasis.

And all four impinge on each other to form the synergetic jewels that combine the four types of Being and reflect the synthetic property of the world.

16. Kinds of Being in relation to the Noumena.

The different kinds of Being can now be seen as permutations of Static/Dynamic and Stasis/Dynamism. These combine synergetically to give us a complete model of Manifestation. But as we know within Manifestation is the unmanifest represented by Henry's Essence of Manifestation. We can identify the part of manifestation that is purely immanent, i.e. that never appears) with the Kantian Noumena. When we do this we come to ask ourselves what is the relation between the Noumena and Manifestation. An answer to this question that recently occurred to me after talking with my son about a class assignment that asked what was the nature of "truth" and "reality" is as follows. We know that in the Greek truth, reality and identity are all parts of Being. In my book The Fragmentation Of Being And The Path Beyond The Void these parts of manifestation are permuted to form what is called the trigrams of Being (named after the trigrams in the Chinese I Ching oracle). The trigrams of Being are as follows

Chang's Types of Interpenetration

<i>Figure 205:</i>		
Interpenetration	HOLOID = identity, truth, reality	
Mutual Support	HOLON (Koestler)	INTEGRA
Mutual Interaction	NOVUM	EPOCH
Logical Connection	ESSENCING	EVENTITY
None	EPHEMERON = difference, falsehood, unreality	

The Holoid is the image of Wholeness which represents the ideal of interpenetration. This concept is due to George Leonard.

The Holon is a the idea of the Janus faced thing that is both whole and part at the same time. This idea is due to Arthur Koestler.

The Integra is the uniqueness of the combination of quantity and quality in a thing beyond the essence of its kindness. It is a specific combination of LI and

CHI. This idea is due to George Leonard but he does not call it the integra.

The Novum is the the emergent event.

The Epoch is the interval between emergent events when things are relatively stable.

Essencing is the unfolding of the essence of the thing.

Eventity is the Event (Verb) and Entity (Noun) non-dual representation of the thing.

Ephemeron is the state of war and illusion that is Hollow which is opposite Wholeness.

Between the Holoid and the Ephemeron there are various combinations of Truth, Reality, and Identity and their opposites.

In The Fragmentation Of Being And The Path Beyond The Void these are taken as the three sub-concepts of Being. But in the conversation with my son, Aiyub, it occurred to us that perhaps these three concepts referred to the noumena and not to Being and that they were quaternionic.

If this is true then we have the following constructs:

Figure 206:

truth reality identity = singularity (= noumena)
truth reality = identity
identity reality = truth
identity truth = reality
reality truth = - identity (non-identity)
reality identity = - truth (falsehood)
truth identity = - reality (dream, unreality)
truth reality - reality truth = 2 identity = singularity
truth reality + (unreality) truth = 2 identities
truth identity - identity truth = 2 reality = singularity
truth identity + (non-identity) truth = 2 realities
identity reality - reality identity = 2 truth = singularity
identity reality + (dream) identity = 2 truths
reality identity + (non-identity) reality = 2 truths

What these equations are telling us is something very fundamental. It is that there is a relation between truth, reality and identity such that each of them contains the others as its parts. They are all holons with respect to each other and form a holographic Holoid. The quaternionic structure of their relation is in this case the integra. That integrity is described best by the Hyperset theory of Non-well-founded sets (i.e. sets that can be members of themselves. Notice that in the case of quaternions they are all members of each other but not members of themselves. Thus the quaternionic construction is precisely half way between set theory and hyperset theory. It is a theory of perfect sets that are all members of each other but not members of themselves. This goes along with the perfect balance between surplus and deficit that we find in the special systems.

What the three holons combine into is the singularity or noumena that is hidden within manifestation and is purely immanent and never appears (i.e. the essence of manifestation). They do not combine to form the subparts of Being as I supposed in my earlier work. Thus they tell us about the relation between manifestation and the non-manifest. As such they posit that the unmanifest noumena is indicated when ever there are two truths, two realities, or two identities. Two truths is equivalent to para-consistency of Graham Priest and thus indicate undecidability. Two realities are equivalent to para-completeness and thus indicate indeterminateness. This is equivalent to the theory of parallel worlds or universes. Two identities are equivalent to para-identicalness or Sameness (in Heidegger's sense) and thus indicate distinguishability. The noumena is undecidable, indeterminate, and indistinguishable. We enter its arena every time there are two competing truths, realities, or identities. But also the noumena itself is the same as truth, reality and identity combined. In other words you cannot know the truth, reality and identity of something at the same time. So instead you can only know either truth and reality as identity OR identity and truth as reality OR reality and identity as truth. The unknowable heart of this trade-off is called RTA (cosmic harmony) in the Indo-european tradition.

But the formulas also tell us that these holonic components are not commutative and so that when we reverse them we turn one of the holonic parts into its opposite (falsehood, illusion or difference). When we subtract the results of two such reversals for any pair we get a duplication of the third element. So for instance "truth reality - reality truth = double identity = noumena." This really tells us that "truth reality plus dream truth" throws us into an identity crisis. In other words if there is a truth in reality and a truth in a dream then we are confounded over the

identity if the truths. Similarly, "identity reality - reality identity = two truths = noumena." This really tells us that when there are two identities separated by reality and a dream then we have a crisis of truth. Or finally "identity truth - truth identity = two realities = noumena." This says that when you have two identities mediated by the difference between truth and falsehood that this throws you into two realities and thus the noumena.

If this is true about the truth, reality and identity in the Greek language relating to the noumena and not to Being as a whole then this is a deep theorem about the nature of existence. Truth is about language statements. Reality is about the actuality of what appears. Identity mediates between these two allowing verification between statements and the actuality of what appears. The three together form the basis of verification which is the lowest kind of truth related to pure presence. There are actually four kinds of truths related to each meta-level of Being. These are as follows:

Figure 207:

- Pure Presence = verification which is the truth of science since Descartes.
- Process Being = the truth of manifestation itself (if it appears it has a certain fundamental level of truth because it has appeared in the clearing of Being).
- Hyper Being = unconscious or deep truth such as that which we see being revealed in the Oedipus play.
- Wild Being = collective unconscious deepest possible truth which is that mystery projected by the intersubjective cohort working together. For instance the primal scene of The Well and The Tree projected by Indo-europeans is this kind of deepest truth. An other example is the enigma of the Sphinx, of the plague, of the fate of the king for the city of Thebes.

As you can see each kind of truth gets deeper first being only a correspondence within manifestation then becoming equal to manifestation itself then becoming the unmanifest for one individual and finally becoming the unmanifest for all individuals together.

Similarly we can talk about levels of reality and identity related to the meta-levels.

Figure 208:

- Pure Presence = complete identity such as a = a
- Process Being = Sameness = Belonging Together
- Heidegger points out in IDENTITY AND DIFFERENCE that pure identity needs difference to reaffirm itself and shows that Sameness as belonging together is a deeper form of identity which is not so fragile.
- Hyper Being = Eternal Return
- But we can also see that at the level of the Essence Manifestation there is also a kind of identity in

which something must pass through not just difference but a non-manifest state to become the Same with itself. This is captured very well by Nietzsche in his idea of the Eternal Return of the Same. This says we must lose what belongs with us in order to realize it fully. Absence makes the heart grow fonder captures this idea.

Wild Being = Dialectical Identity

Dialectical Identity must not just stand up to difference, and absence but also contradiction. As Hegel tells us we must allow contradictions to be integrated into a thing before it can really be the same with itself through its experience of the Other. Dialectical identity is the furthest reaches of what we can comprehend before we fall into the complementarities of the Meta-system (global economy).

Figure 209:

Pure Presence = Reality is what appears oppressively. This is the force of dualism which posits the oppressive and colonizing other.

Process Being = Master Slave Dialectic. As Hegel tells us the Master becomes the Slave and vice versa. Dualities exchange places so that no oppression lasts but is only replaced by another.

Hyper Being = The oppressor does not manifest. Instead we oppress ourselves in the Name of the absent one. Lacan talks about this as the Symbolic oppression of the Name of the Father.

Wild Being = We realize the awful truth that we are the oppressors ourselves and we are oppressing ourselves.

Each meta-level of truth, reality and identity operates as a quaternionic holon combined into a holoid with a specific integrity. With their opposites they form a three dimensional space with a specific combination of the three pairs of the characteristics of the noumena. These are the ways the noumena that does not appear itself appears. The noumena appears in the distortions of truth, reality and identity within manifestation. The combination of the noumena of all the things and the manifestation is the world. Within the world one of the most basic noumena are the intersubjective cohort. Each one of them are like monads seemingly trapped in a solipsistic universe. But we know that they share identities, truths and realities. This occurs at the octonionic reflexive level where these autopoietic dissipative special systems form symbiotic relations based on not just reciprocity but synergistic harmony.

The deep theorem of the Greeks which relates truth, reality and identity to the noumena within manifestation shows that there is an intrinsic relation between language within which active contradictions (para-consistency) can be expressed, the pluriverse of parallel universes, and the uncertainty relations of observers to quantum experimental results. In other words, parallel universes is the dual of the

concept of uncertainty as David Deutsch has pointed out. But the dual of each of these is the expression of active contradictions in language which is the basis of Hegelian Philosophy. We can solve the conundrum of the parallel universes by applying Magicians theory of Goertzel. What we say is that there are not infinite universes created but these created universes that go in opposite tacts due to undecidability annihilate each other in the same way that Magicians and Anti-magicians annihilate each other. What is left is the intersubjectively designated as real world since magicians must work together to nominate and vote on who will exist in the next cycle of their life-cycle. Similarly the uncertainty between the life and death of Schrodinger's cat takes us into the noumena, or the language of contradictions. These manifest themselves in the Magicians model as the inability of the magicians to last over time by themselves since we are assuming discontinuity not continuity. It manifests as the chaotic basis of language which can support active contradictions. The language is what the magicians write and writing as Derrida has shown contains an infection of DifferAnce.

17. Return to the Quantum Model of Consciousness

The quantum model of consciousness was borrowed from Jahn and Dunne Margins Of Reality toward the beginning of this series of Essays. We have learned that this model is not a sphere but instead an ellipsoid with two foci. One foci (1) hides the symmetries of consciousness spoken of by Matte Blanco. The other foci (-1) hides the differentiating imaginaries and the genesis of the special systems. We have spent most of our time exploring the differentiation of the imaginaries in this series of essays. However, we now return to look at the ellipse of quantum consciousness again. Consciousness is of course only another word for manifestation. And we use the tunneling that Jahn and Dunne speak of to establish relations between consciousness that would otherwise be solipsistic. We note that the combined consciousnesses have their own qualities just like the difference in qualities between two hydrogen atoms and a helium atom. The two hydrogen atoms may experience quantum tunneling when in proximity. But when there is actual synthesis of elements we get a different quality thing, for instance the helium which is produced by the fusion of helium atoms in the sun. The helium atoms have their own properties and continue to fuse as long as the heat is high enough to higher and higher atoms on the atomic scale each with their particular qualities. No one has ever known where those quality differences arise from. But it is the differences in qualities between different kinds of atoms that is the basis for variety in our world. So it is that social consciousness is not just monads that quantum tunnel into each

other but there are different qualities of social consciousness that arise when different people are together under pressure which do not arise otherwise.

Now since the overlapping quantal models of consciousness which form a social consciousness are manifestation itself we can apply the relations of sameness/difference and static/dynamic to the interpenetrated ellipses of consciousness. So social consciousness has the aspects of homeodynamics, homeostasis, heterodynamics and heterostasis as the different consciousnesses interact. There is the quantal interaction that gives us the N^2 relations between people and there are the qualitative relations that give us 2^N qualities of the system that appear when the quantal models of consciousness overlap and form higher elements of social consciousness. As we have seen these different qualities can be related to any of Goodman's type of worldmaking and can be combined in the way Husserl and Johannson suggest to create combinations of sliceable and non-sliceable qualities or extensible and non-extensible qualities. The combinations of the sliceable and non-sliceable create temporal gestalts according to Johannson and the combination of two temporal gestalts create temporal gestalts *sui generis*. We posit that temporal gestalts are models of dissipation and that temporal gestalts *causa sui* are autopoietic so there are further combinations of pairs of temporal gestalts *causa sui* that must be reflexive. Thus the qualities of the world combine in ultra-efficient ways to produce the things that are broken up and recognized as quanta within consciousness.

Now what we notice when we realize that social consciousness is nothing other than manifestation to the intersubjective cohort (as individual consciousness is the manifestation to the individual which must be derivative because all individuals arise from the social cohort) is that the kinds of Being describe this social manifestation. So we can see that the ellipse of consciousness is a synergy of the kinds of Being in every instance and that is what makes these ontological concepts relevant for understanding the nature of consciousness. For the individual we discover the different kinds of being slowly and through the philosophical exploration of the world but these ontological concepts are always working on the social level which is the level where emergences appear. Pure presence is the illusory continuity through which we communicate in language and through our senses. Process Being is the underlying temporality of the different agents in the matrix of spacetime/timespace. That matrix as we have seen is also structured on the octonion breaking up into the quaternion of $x+y+z-t$ and the other quaternion of past-present-future+nowhere. Hyper Being is the discontinuities that exist between

the monads in the intersubjective cohorts and their experiences. Because of these discontinuities we wonder whether if a tree falls in the forest with no one to hear will it make a sound. Berkeley says yes because God is there to hear it. The answer of phenomenology is no. There is no tree that is not phenomenalized to someone. And this is why we have an essential relation to the noumena within in manifestation because that allows us to construct a world that does not have such gaps through the quaternionic interplay of truth, reality and identity. Wild Being is the socius itself as the social field that negates the individuals and merely is composed of tendencies of desiring machines. The social is written directly on the face of the void. Wild Being is partially immersed within the void. It shades into formlessness.

Onar Aam (onar@hsr.no) presents the following analysis of the kinds of Being:

<Begin Quote>

Rotating in and out of existence (Nowhere) has a very particular structure it seems. Process being can be seen as the following:

past [present] future

That is, the present is always in the process of showing itself (future rotating into present) and always in the process of hiding itself (present rotating into past). But by crossing out either future or past we obtain rotation in and out of nowhere, i.e. hyper being! Watch this:

past [present] -future- (crossed out)

If we cross out the future of a process then we get disappearance into nowhere. In other words, the process comes to a point where it has no future. This may be seen as a string of falling dominos where the fallen dominos are the past and the standing dominos are the future and the falling dominoes are the present.

fallen [falling] standing

If there are no more standing dominos left than the present (falling) will disappear into nowhere. Similarly, something may discontinuously come into existence. This is -past- crossed out:

Reflexive Autopoietic Systems Theory

-past- [present] future

The process then has no past, it rotates into the world from nowhere. In other words, I think hyper being may be seen as -past- OR -future-. Similarly I think -past- AND -future- may be seen as pure presence:

-past- [present] -future-

The purely present has no past and no future, it is *timeless* (frozen in time). Process being is past, present and future. (nothing crossed out). If we're really lucky then this can be stated in terms of the quaternion as you suggested:

i	-1	j	k

past [present] future -nowhere-Process being			
-past- [present] future nowhereHyper being (emergence)			
past [present] -future- nowhereHyper being (annihilation)			
-past- [present] -future- -nowhere-Pure presence (singularity)			
past -present- future nowhereWild being (phase space)			

Let me explain the notation here. $ij = k$ reads: "together i and j hides k" and $k = ij$ reads "when k is hidden i and j are present". Another notation to indicate this hiding relation would be:

$i \ j = k$

ij is "on top" of k and therefore hides it.

Process Being ($ij=k$): past and future hides Nothing

In process being we realize that both past and future must be present(!) This is being-in-the-world. We have illusory continuity and the discontinuity of hyper being is always already hidden.

Hyper being ($jk=i$): future and Nothing hides past

This is the emergence side of hyper being, i.e. the rotation of something into existence from nothing. The emergence has no past.

It comes from nowhere, but it has a future.

Hyper being ($ki=j$): Nothing and past hides future

This is the annihilation side of hyper being, i.e. the rotation of something out of existence into nothing. The annihilated has no future. It turns into nothing, but still has a past.

In hyper being we catch a glimpse of the always already hidden. When something discontinuously rotates in or out of existence we see that it comes from Nowhere. So at this flash in time we can actually see that nowhere actually exists.

Pure presence ($-1=i^2=j^2=k^2$):singularity

The purely present hides nothing and it has no future and no past.

Wild Being ($ijk=-1$): phase space

In phase space we hide the present, by only showing the differences *between* the moments, not the actual moments themselves. When we show the entire past and future we also see the nowhere (strange attractor) which orders the chaotic phenomenon.

<End Quote>

18. Emergent Systems

Goertzel's Magicians are just an example of a self-generating system. And as I read about component systems and magicians I realized that there is something crucial missing. I want to call this crucial missing concept "emergent systems". Goertzel's concept of what is emergent is I think flawed. Component systems are like LEGOs that form a molecular soup and put themselves together. Goertzel brilliantly shows how they are stochastically computable. But his self generating systems create each other out of nothing. He holds this up as a kind of creativity where things create each other using raw possibilities and selecting down. He is a lot more mathematically precise about this in the real book.

But what is missing is where a self generating system creates something genuinely new. Not calling or creating something that has already been named but giving a new name and giving it new properties. Notice that Gelertner says that a

programming language is a naming space. We create names and then give those names properties when we program. But magicians do not do this. They call into existence whole things that already exist. And this is true of component systems too. We start with certain components that are basic and it is their combinations that give us something new.

So what is missing is something that creates a new kind and a new individual of that kind and then gives it new properties such that the individual is a First that is its newness is orthogonal to everything that already exists. I do not believe that creativity is rules plus randomness as Goertzel says.

So an emergent rewrite rule should say something like this:

This statement, called MakeNew, takes an indefinite number of magicians that exist as a context along with their hyper-relations and creates a new magician, X, of new kind Y with new hyper-relations H to the selected context and with new properties P.

True emergence is a synthesis not just a combination of random events and rules.

What this says is that an emergent system is partially between self-generating and other generating. Its otherness is its newness contrasted with what is old. Its self generating aspect is its entry into the context of what already exists. The new thing is a synthesis of the different kinds of Being when it comes into existence. Magicians theory combines the different kinds of Being but perhaps does not synthesize them. Emergent systems provide new syntheses (jewels).

Now that I have realized this flaw in Goertzel's reasoning about what is new (He clearly did not read Mead and get his message) I think I am in a better position to define emergent systems. You see self-generating systems describe the meta-systems (goertzel at one place talks about hyper systems ?????). But emergent systems provide a synthesis.

So when a new individual of a new kind is created we have $(N+1)^2 - N^2$ new relations and $2^N + 1 - 2^N$ new interpenetratings. The number of interpenetrations tell us how many qualities a system has. The original N is the number of things in the old context. So this figure tells us how much the context has expanded with the introduction of the new thing.

Let's take a crazy tact. Let us calculate the new qualities and then internalize them in the new thing as its new coherence. If we do that then we can say that the new thing is the integra of the new qualities that it calls into existence and so we have a way abstractly of creating new kinds and relating them to a new individual. See my book and the trigrams of Being for the concept of the Integra. It is the uniqueness of the individual instead of its essence. It is the specific combination of Chi and Li.

Notice this. The Laws of Form/Pattern give us

Figure 210:

something
nothing
multiplicity
leveling

Hypersets give us a peculiar relation between multiplicity and leveling that accepts paradox (para-consistency). There is nothing in here about relations and we cannot construct hyper-relations without adding something to the model. But notice that the leveling and multiplicity of nothing can be seen as projecting higher logical types and ramified types at each metalevel. Multiplicity and leveling of things give us the hierarchies of sets or if we consider them rhizomatic then we have a hyperset with hyper-relations. But we must add in the relations. Also even though hypersets can be members of themselves this model does not cover the interpenetratings of the somethings and the nothings. Do interpenetrated nothings give different qualities. Certainly interpenetrated somethings of different kinds give different qualities. Also kindness is missing from this model.

Figure 211:

something
nothing
multiplicity
levels
sets and relations N^2
hypersets and hyper-relations
interpenetrations 2^n

Now this extends the model of the fourfold.

It allows the things in the fourfold to be holographic.

It allows things in the fourfold to have relations and participate in sets.

It allows things in the fourfold to have qualities.

Now a new thing is a particular synthesis of qualities that come from its orthogonality of the other things in the context set.

Igvar Johannson tells us how this works in Ontological Investigations. He basically says that there are qualities that change when we expand things and qualities that change when we slice things. Goodman in Ways Of Worldmaking gives other examples. Husserl liked to expand things and Johannson likes to slice things. Johannson says that something you can slice together with something you cannot slice gives you what he calls a Temporal Gestalt. When you combine two temporal gestalts you get a Temporal Gestalt causa sui. That is something that has autopoietic like qualities. Probably if you combine two Temporal Gestalts Causa Sui you get something reflective. (This is a speculation.)

So the 2^N+1 gives the analytic addition of qualities that are orthogonal from the interpenetrating. But these qualities themselves have the nature of being Sliceable, Expandable, and the other Ways of worldmaking so that combinations of opposite qualities give conjunctive results.

Perhaps we can randomly assign the different kinds of qualities from the ways of world making in order to make the qualities abstractly describable without knowing what the qualities actually are. No one knows how the difference between a hydrogen and helium atom comes into existence let alone all the others and the myriad qualities that come form molecular combinations. But we only need to create abstractly new kinds in order to have a new kind of a new existent individual. Once the new kinds exist as dimensions then we can randomly assign features of a particular individual.

Anyway this is a beginning for thinking through how a new individual of a new kind might be described in an emergent system.

19. The minimal system in consciousness

When we look at consciousness and note that it contains the two foci we can begin to characterize those foci. One hides symmetries and the other hides the differentiation of the imaginaries. We can characterize the symmetries that lie below the asymmetrical field of consciousness as global sameness dominating local

difference. The local differences are the operations on the symmetrical object that remains the same before and after the operation. We can characterize the differentiation of the imaginaries as global difference dominating local sameness. This is because the imaginaries are different only in conjunction. When the conjunction vanishes so does the difference yielding sameness. So we have just characterized the two foci in terms of the sameness/difference dichotomy which is one of the dichotomies we used to differentiate the kind of Being.

When we look at the other dichotomy of Stasis and Dynamics we can see that Stasis can be seen to dominate dynamics in the Grammar of language. Grammar is more or less static compared to speech. We cannot talk without grammar as the basis for what we say. On the other hand Dynamics dominates stasis in the phenomena of standing waves. Dynamics is the interference of the waves which cancel out to give us standing waves in some special conditions.

We can also associate the standing waves and their cancellation with the symmetries, but in this case the symmetries are manifest not hidden. Similarly we can associate the stasis of grammar with speech that arises in consciousness between individuals and in social consciousness as language languaging (what Heidegger calls *rede* or talk). Speech is our way of bridging between time streams of different individual agents within the intersubjective cohort.

We can readily see that these different manifestations of same/difference or stasis/dynamics can be associated with the representations of the minimal system.

Figure 212:

Dynamic over static: Interference and standing waves = knot

Sameness over Difference: Symmetries underlying consciousness = tetrahedron has symmetries

Difference over Sameness: Differentiation of imaginaries = mobius strip because imaginaries are globally the same via algebra but locally different time streams.

Static over Dynamic: Grammar over speech = torus where a circle provides the circling of another circle.

So these are the four manifestations of the minimal system each with the 720 degrees angular momentum of the spinnor which isolates a point in spacetime. You have to be moving to stand still in spacetime. Each of these manifestations of the

minimal system appears within consciousness in a specific way. The standing waves like in the Schrodinger equation give the probabilistic differentiation of the quanatal consciousness at different energy levels. Schrodinger's equation shows us all the different standing wave patterns on a planet wide ocean. So quantal consciousness would be differentiated according to the standing wave energy patterns. It would hide below the surface the symmetries of the unconscious as the field of consciousness is made up of asymmetries of perception and cognition, or memory and recognition (?). It is made up of languaging that is based on grammar. The voices of that languaging appear from nowhere which is out of the singularity. The singularity differentiates itself into different timestreams held together by the special systems.

Within consciousness all four representations of the minimal system work together to provide the statics and dynamics or sameness or differences within the integration of the kinds of Being which are the permutations of these same stases and dynamics or sameness or differences. This is a unification of the representations of the minimal system and the world as seen in terms of the meta-levels of Being. This unification occurs through the quantal elliptical model of consciousness that forms the interface between the minimal system and the world.

20. Matrix Logic and the Social

Now we integrate the picture of the quaternion of truth, identity and reality with the concept of the minimal system in the world. Each minimal system within consciousness or manifestation is associated with a noumena. We know this because of Henry's work on the Essence of Manifestation. So we say the following:

The minimal system within consciousness contains a noumena. That noumena is defined in terms of the quaternion of truth reality and identity. We will use Matrix logic to not only define the truth dimension but also the identity and reality dimensions of the minimal system. Thus there are three truth vectors associated with each manifest minimal system along each of the dimensions of Being (truth, reality, and identity dimensions). Each of these truth vectors has two elements and can appear in bra or ket format. Each one sports four meta-truth values that encompass all the aspects of showing and hiding (1, 0, -1, i). We have already shown that the imaginary value allows us to apply the structure of the Greimas square to the Matrix Logic. But now we note that each vector associated with truth, reality or identity has an imaginary extension value. These we posit form a

quaternion. Now we have a quaternion of dimensions described by the trigrams of Being within which there is a minimal system that has within it a quaternion of meta-imaginary truth values for each of its identity, reality and truth vectors.

Now we see that there is a space of truth reality and identity dimensions. They contain the minimal system which relates to its own noumena via the matrix logic along each dimension. It has four showing and hiding truth values one of which is imaginary along each dimension and the four together create a quaternion at the heart of the minimal system. So this is how every thing in the universe has a noumena that is a quaternon at its heart. At some level of the Pascal's triangle there is a non-division (non-divisible) system in the progression past octonions that has enough quaternions to model all the things that are part of the interpenetrating Indra's net.

We note that the minimal system is seen in the world via its four representations. But inwardly it is mirrored and forms an octonion that has a community of quaternions that are the reflections of the original quaternion. So the consciousness of each minimal system is inherently social. Outwardly the individual takes part in the field of the *socius* in which his inward quaternion enters into symbiotic relations with those of others. So the ultra-efficiency of consciousness is balanced outwardly by the ultra-efficiency of love. And we see that the very dimensions of the space that the minimal system appears within are quaternionic. So the minimal system appears within the matrix of spacetime/timespace and the that outward quaternion participates with the quaternion of the different kinds of Being to produce a matrix that includes both manifestation and the noumena as a single octononic system adrift within the ocean of interpenetration.

[END OF WORKING PAPER ON 951012]

21. Magician Construction

Now we are in a better position to understand the structure of magicians. We find that they do not exist like minimal systems in spacetime but in the "quasi-space" or the permutation of truth, reality and identity that we see in the trigrams of Being. This quasi-space also forms an octonion as the three dimensions of the space are quaternionic and the interior of the noumena is quaternionic. So that the combination of the two is an octonion. So this allows us to realize why it is that the magicians are the dual of General Systems Theory as posited in our paper Software Engineering Design Methods And General Systems Theory (impress IJGS). What

we see is that Spacetime/Timespace form a Matrix that is octonionic. And the inward and outward of the minimal system exists in a "quasi-space" of the identity, truth and reality that appears within Being which also forms an Octonion. These two octonions form a sedenion (16nion). The Sedenion encompasses both the manifestation of the thing in terms of identity, truth and identity and in terms of its embedding in the Matrix. The Sedenion is the form of the Minimal system and exhibits pure complementarity of the kind Plotnitsky talks about. The Sedenion is the first level of non-division algebras that extend infinitely down through all the layers of Pascal's triangle. These infinite levels of the mirroring of interpenetration.

So now that we know that magicians as meta-systemic embodiments do not exist within spacetime but it is only there systemic embodiments that exist in spacetime it is easier for us to understand how to build magician Artificial Intersubjectivity systems. Up till now we imagined magician meta-systems as being in spacetime. But now we realize that they exist in the nether world of the identity, truth and identity "quasi-space." This is the space we have been calling the Akkashic record. So it is the potential space for the embodied magicians. Now we understand that embodies magicians die out in a spacetime interval but like instantiations flip over into the akkashic record and move through that "quasi-potential space" to then pop back out into space time again. So what we were calling meta-system magicians before that died when their moment was over are really those that move through a channel in the akkashic record "quasi-potential-space" and pop into and out of the Matrix seemingly inexplicably. Now we know that that "quasi-potential-space" is the space of identity, truth and reality which is within manifestation and functions as the connections between the manifest and the unmanifest (always already lost) noumena. These were call the seeds in the tatagata gharba. But the seeds themselves have a life of a magician within the akkashic "quasi-potential-space." So we can say that the difference between magician meta-systems and systems is that the meta-systems have a dual life inside and outside the akkashic record space whereas magician systems only exist in the Matrix of spacetime and do not go in and out of the potential space. So this implies that magician systems are like solitons and magician meta-systems are like instantatons.

Each magician has its vector pinpointing it in the Matrix and another vector pinpointing it in the quasi-potential-space of manifestation. Each magician has its truth, reality, and identity vectors that work according to Matrix Logic except they have the extension of a proto-imaginary additional "truth" value which between the vectors forms a quaternion. In addition each magician may have other force vectors

depending on its actions. And each magician may have a number of attributes and relations or hyper relations as well as interpenetrations with other magicians. Each magician has its anti-magician and within the akkashic space there is a constant creation of magicians and their opposites. In the akkashic quasi-potential-space the magicians have the opposite problem they have in real spacetime. In the quasi-potential-space there is a continual creation and destruction of magicians and the REAL ones are those slated to exist in the next moment in the MATRIX. So instead of nominating potential magicians and voting which ones are real, the problem is to preserve the seed magicians that are actual within the sea of virtual magicians. So conservation is the problem not destruction. Seeds drop into the potential space and then become magicians within that space. They must be preserved in spite of the fact that there are myriads of magicians being created and destroyed at every moment. Notice here we have the opposite problem than we had in the Matrix. We must still assume discontinuity and get conservation by collusion. But we need to specify a mechanism by which that might happen. One thing we know is that the seeded magicians are odd with respect to the continual creation and destruction of pairs of magicians. Thus even if one of them is destroyed in annihilation another one like it will be preserved. So it is oddness that preserves in the akkashic space and in the potential nomination space. Thus we can see that the akkashic space and the nomination space are intimately related.

It has already been explained how propensities turn potentialities into probabilities upon which we project determinate causal relations. Now we see that it is not just the kinds of Being that define how this transformation takes place because this does not take into account the noumena. If we use the trigrams of Being to consider the relations to the noumena then we get a double pronged attack on the transformation. And this makes all the difference when we realize that the nomination space is related to the akkashic record space. These are spaces of potential. The MATRIX is the space of actualization. There is a transformation that takes place that allows magicians to become actualized through both of these quasi-potential-spaces. The actualizations are opposite each other in the sense that in one case the magician is inside the MATRIX and must go through the nomination and annihilation voting process. In the other case the actualization is the reappearance out of the quasi-potential akkashic space after that space has been seeded by the magician disappearing into it like an instanton. In one case nominations are projected as potentials and then annihilation occurs in potential space and then those candidates that survive become seeded into the akkashic record. In the other case the individual magicians that are seeded in the akkashic record space are odd within the sea of

continuous annihilation and destruction of magician and anti-magician virtual pairs. That oddness allows them to survive, or if they are annihilated some widowed singleton of a pair stands in for the seeded magician. So that at the end of the potential period the individuals that are conserved pop out the other end to become actualized magicians within the Matrix again. Conservation in both the nomination and voting process and in the quasi-potential-space is based on oddness. But this preservation may be disturbed by disruptions in either space. In the nomination space the social group may randomly add and subtract magicians in order to sway the balance. And there may also be distortions in the quasi-potential-akkashic-space that would cause different magicians to appear from the proto-gestalt than were seeded into it. We know these distortions exist because they come out of the nature of the octonion. The proto-gestalt may be creative and produce completely new magicians. We might not just nominate magicians from a menu of those that already exist but may nominate new ones of different kinds from those that have existed before. So what this tends toward is the definition of emergent systems. Emergent systems are more than self-generating but are quasi-other generating. That is to say it generates orthogonally new kinds that either come from outside (the proto-gestalt) or the inside (designed new things). These emergent systems go beyond what appears in the magician systems to provide some insight into the arising of the radically new out of the meta-systemic global economy. These radically new things can be recognized because they go through each of the stages of manifestation by participating in each meta-level of Being. As G.H. Mead has pointed out already. The emergent is the highest definition of the social.

Emergent systems appear when we apply Greimas square to the relation between self and other in order to find the truly monstrous which is both self and other. The emergent is orthogonal to every other existent thing but still is in the realm of possibilities defined by other existent things. So we see it comes out of the space of possibilities. It is in fact a point in the space of possibilities defined by multiple constraints of what exists that has been left open but has not been occupied before that is discovered and occupied. So emergences are not radical departures from the realm of possibilities but instead are discoveries of niches in the real of possibilities that have not been seen before. Emergences look like otherness but since they are only occupations of these niches that were always there that we were unaware of before they are still part of our own most possibilities and thus part of our self. So the key point about emergences is that they appear to be utterly other but they are secretly part of our own most possibilities. That is why we can recognize them. If they were utterly other we could not recognize them. Now we see why the realm of

possibility is so important. It allows our worlds to expand. And after they expand then they contract because we encompass the emergent things and make it part of our world. This process of expansion, contraction, expansion, contraction of our being-in-the-world underwritten by Hyper Being and Wild Being is what allows us to accept emergences and make them part of our world. They are fundamental alterations in our human essence which has as its own most possibility the projection of the world.

22. Artificial Intersubjective Simulation

Once we know that what needs to be simulated are two intertwined realms -- the MATRIX and the MANIFESTATION of the Noumena via truth, reality, and identity -- then it becomes much clearer what the simulation of an Artificial Intersubjectivity must be like. We must realize that the MATRIX is not all that exists. But within the SEDENION there is another octonion of manifestation which includes the possibility of the noemena. That other octonion relates to the inside and outside of each minimal system. Inside there is a quaternion of imaginaries from the truth, reality, and identity vectors. Outside there is the quaternion of the truth, reality and identity dimensions. These two fuse into an octonion that surrounds the minimal system from the inside and the outside. Distortions may appear inwardly or outwardly just as predicted by Freud and other psychoanalysts. These are the distortions of manifestation by the non-manifest predicted from a philosophical point of view by Derrida who called it differAnce of differing and deferring. The distortions appear in the (hyper-)relations between the inward and outward. Out of those distortions the utterly new can arise as an emergent eventity. This distortion of the inward and outward forms an octonion that is balanced by the octonion of the MATRIX. This creates distortions between views of events in spacetime or timespace by observers in different inertial frames. Those distortions can be displacements of the reversibility between space and time or as discontinuities. Together there are four different sources of distortion as each quaternionic component relates to the octonions and these in turn relate to the sedenion within in which they are embedded.

23. The best of all possible worlds.

An analysis has been done of the minimal design methods and the ultra-efficiencies within that field has been found. There are four dissipative methods which combine into six virtual autopoietic formations and fifteen virtual reflexive systems. When these were analyzed three stuck out as being ultra-efficient. Now it has been found

by Onar Aam that there are fifteen octonions within the sedenion. That being the case there is the possibility that three of the octonions within the sedenion have some special properties that are ultra-efficient. If this turns out to be the case then it will be true that there is such a thing as the best of all possible worlds and Voltaire's character Candide will have been vindicated and an Elderodo such as that Onar Aam describes will be said to exist, just not in this world defined by the Western worldview. It makes sense that if there are ultra-efficiencies nested within the world like solitons or superconductivity then perhaps some worlds might themselves be ultra-efficient. We postulate that it is these ultra-efficient worlds that allow the pluriverse to cohere. If as we have said there is a constant cancellation of possible worlds into the socially designated as real world then this cancellation probably occurs around the ultra-efficient worlds. We can think of these ultra-efficient worlds as those without any essence of manifestation -- where all manifestation is apparent and there is nothing hidden. This is hard for us to imagine. But it means that the ultra-efficiency of consciousness and the ultra-efficiency of the social world would merge. This is the ideal of the Hindu sat-chit-ananda. In these worlds there is pure holoid with no ephemeron. We find them spoken about as the golden age at the time of Kronos. These myths may have some basis in the fact that ultra-efficiencies exist in the world and not only that but can encompass worlds themselves. How we gain access to the ultra-efficient worlds or the ultra-efficiencies within worlds is another matter. That is a question that needs further exploration.

One way to think about this is to notice that Being is about presencing and that the opposite of always oppressively presented is never ever presented. Thus we might definid "existence" as what is not oppressively presented nor always hidden. As such "existence" would strike a perfect balance between the presentation and hiddenness that could be the characterization of the ultra-efficient worlds. These worlds do not have Being as defined by the nihilistic opposites that revolve around the different kinds of Being

Figure 213:

Pure Presence -- Oppressively Manifest verses Noumena that is always hidden.

Process Being -- Dynamic as opposed to the stasis of pure presence.

Hyper Being -- Discontinuous as opposed to the continuity of process and illusory continuity of pure presence. The essence of Manifestation that is never present arises here behind the discontinuities and is seen in the distortion of what is manifest.

Wild Being -- Mixed as opposed to a plenum of unmixed elements of static or dynamic, continuous or discontinuous.

Being is all about presentation in all its forms. What is never manifest is merely

the nihilistic opposite of presentation. Existence can be defined as that which is not presented nor hidden. Existence would achieve ultra-efficiency by the very fact it does not alternate between over manifest or over hidden. We posit that the three worlds that are ultra-efficient have existence that is not nihilistic. We posit that these three worlds have a quaternionic relations between each other. By that they mediate each other's non-well-foundedness and define a singularity that is beyond all worlds. That singularity is the single cause beyond the void.

24. The articulation of ultra-efficient consciousness.

We have defined five levels of algebra related to systems theory and given them analogies to different kinds of systems. We have claimed that the real algebra is related to the system as gestalt and that the sedenion algebra is related to the meta-system as proto-gestalt. And we have identified three special systems that mediate perfectly between these called the dissipative, autopoietic, and reflexive systems that are analogous to the complexnion, quaternion, and octonion. We have claimed that these three hinge algebras give us a general model of ultra-efficient systems. And we understand that the soliton is a phenomena at the dissipative special system level, super-conductivity is a phenomena at the autopoietic special system level, and the ultra-efficiency in the design methods of software engineering is at the reflexive special system level. We have also stated that besides the ultra-efficient systems there is a possibility that there are possibly three ultra-efficient worlds among the fifteen virtual worlds at the sedenion level. And we have also stated that consciousness itself is ultra-efficient and that love is the social ultra-efficiency.

But it remains for us to see how consciousness could be structured by ultra-efficiencies. And we propose the following structuring of the senses as the primary means by which this occurs.

		Figure 214:		
		SEDENION	BASE	
Hands	Present-at-Hand Ready To Hand In Hand Out of Hand Touching		Kinds of Being Substrate to Presentation Ideational Mechanism	
Chin	Touched		EARTH	
Mouth	Taste	REAL	WATER	
Nose	Smell	COMPLEXNION	AIR	Presented

				Face
Eyes	Sight	QUATERNION	FIRE	
Ears	Hearing	OCTONION	ETHER	

Notice the structure of human finitude that we are positing here.

We start with the Mouth and Nose which form a single system. Food/Water and Air chiasmically cross in the adual but remain separate passage ways in the baby. Smell influences taste and Taste influences smell intimately. And the cavity of the mouth and nose along with the tongue are the basis for the production of speech and thus the logocentric view of existence is rooted here in this pair of senses. The duality of the smell and taste reminds us of the single algebra that connects the two timestreams of the reals and complex numbers. And we understand that the continuity of air and the continuity of food are necessary for the organism to function on its most basic level. And the continuity of speech also issues from this cavity. There is in fact a segmentation between food intake, air intake and speech as they are all using the same part of our body to establish themselves. So there is a kind of a queing problem associated with the support of all these continuities via chiasmically single channel. The breaks in these three competing continuities show us how creation and annihilation magician operators can interplay at this level to produce discontinuities.

When we move to sight we have opened another channel in Huntun (the chinese primordial holoidal form) for the experience of the world. Sight is completely different from the senses of taste and smell. It introduces distance and observers differences of kinds through light. We associate this with the quaternionic algebraic level. Most of the analogies of this level have to do with the reflectivity of light in mirrors. At this level we see behavior. Behavior arises from the non-commutative property of the quaternion alternating algebra. With vision we can focus our two eyes on a figure within a gestalt to perceive the behavior of one dynamic system within the environment. Then we focus on another and so we attempt to understand our environment serially. Here too there is a chiasm that underlies the distribution of visual stimuli to the two halves of brain.

When we move to hearing the major difference is that we can hear the blending of simultaneous sounds. Thus we can understand parallel distributed resonating

behavior of multiple individuals at this naturally social level of manifestation. The sounds cause us to turn our vision to the different places where we are alerted by sounds of their relevancy. Most of the analogies at the octonion level are auditory. At this level non-associativeness allows us to listen to the interweaving of multiple sounds without concentrating on a single figure at a time as Vision would have us do. Instead we can mimic auditory depth with stereo or disassociated sources.

Beyond or underlying all this presentation in the face that corresponds to the different algebraic levels there is the touch within the hands. This corresponds to the sedenion that gives the embodied sensory background for all this presentation of the face. We note that the kinds of Being refer to handedness. Thus the kinds of Being are the substrate or mechanism underlying the presentation of the face and its continuities. Touch relates to heterogeneous textures which can be felt separately by hands and feet. Thus the touch mirrors the discontinuity of the field of the senses represented by the sedenion very well. If we touch the face we usually would touch the chin. The chin is the place that is touched on the face and represents the Earth. The *Earth, Water, Air* and *Fire* pattern is also mirrored in the parts of the body. So the hands interface with the face through the chin establishing a link between the handedness or technology underlying the presentation of the face. The hand can also touch most of the body. But there are some parts of the body that are very difficult to touch. Thus there is a natural hiddenness to the body which we accentuate by covering ourselves with clothes. But we tend not to cover the face which we present uncovered on the background of our covered bodies. If our bodies are mostly uncovered we still tend to cover our private parts which represent the hiddenness that is the dual of the presentation of the face. The hands and body generate the behavior that is sensed by our selves and others but also it controls what the senses can perceive. Our bodies together form the body politic and together we project the world as autonomous parallel distributed organisms. The higher senses encompass the scene of mutual action and mutual communication of the embodied social organism that inhabits many bodies that belong together.

So by this analogy we can see how our perceptual structure is similar to that we find in the algebras and we see how the sedenions serve as the context for the alternating algebras of presentation that are linear while the sedenion has lost its linearity. Touch and embodiment forms the technological substrate that underlies presentation and gives us a reversibility between perception and behavior and their shadows imagination and mimicry. This unifies our concept of the algebras in a very concrete way because it ties them to something we know very well which is

the human perceptual articulation of consciousness.

[END OF PAPER AS OF 951018]

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Apeiron Press

PO Box 1632
Orange, California 92856
714-633-9508

palmer@netcom.com
palmer@exo.com
palmer@think.net
palmer@dialog.net

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