

Schemas Theory Overview

Part 2

Overview of the Argument from the Tutorial on Dagger Theory

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Key Words: Schemas Theory, Systems Theory, Form, Pattern, Meta-system, OpenScape, Domain, World, Spacetime, Phenomenology, Structure of a Pattern, Essence of a Form, Nucleus of a System, Locus of a Meta-system, Systems Science, Systemology, Schematology.

Abstract: Narrative of the Evolution of Schemas Theory. Gives an overview of the main argument of Schemas Theory. Mentions Divided Line, WorldSoul, Pascal's Triangle. Schemas, Philosophical Principles, View/Order Hierarchy, Kinds of Being, Orthogonal Centering Dialectic, Worldview Theory, Kantian Meta-episteme, Foundational Mathematical Categories, Special Systems, Notion/CoNotion, Essence/CoEssence, Projective Planes, Emergent Meta-system, Category Theory, Set, Mass, Multiple, Groupoid, Site/Event, Whole, Holon, Holoid, Singular, Singularity, Ipseity in an Aggregate, Swarms and Dagger Theory. The major contribution of this paper is to argue that Schemas Theory based on Pascal's Triangle is an image of the Divided Line. It also mentions that the Dagger Theory elements make up an Emergent Meta-system.

Schemas Theory was conceived in the early 1990s in the book The Fragmentation of Being and the Path beyond the Void published in 1994 on the internet. It was in fragment 36 on Emergent Categories and it had Primitive, Object, System, Meta-system, World, Universe, Multiverse as elements. Then by 1997 I had formulated the S-prime set of schemas when I was invited to talk at an INCOSE conference in Los Angeles about possible Systems Engineering foundations. Slowly I developed the theory up until I decided to do a Ph.D. in Systems Engineering concerning foundations

starting in 2003¹. In 2004 I was invited to CSER to talk about SE foundations with the title “The Foundations of General Schemas Theory as an Extension to Systems Theory to Form a Mathematical and Philosophical Basis for Systems Engineering”. In 2009 I finished my Ph.D. dissertation on Emergent Design: Explorations in Systems Phenomenology in Relation to Ontology, Hermeneutics and the Meta-Dialectics of Design and received my degree. In 2014 I gave a tutorial on Schemas Theory (<http://schematheory.net>) at both INCOSE.org International Symposium and the ISSS.org Conference that year. In 2018 I gave the same tutorial at the ISSS.org conference². Over the years I have written quite a few papers on Schemas Theory that appear in the Bibliography of this paper along with other relevant works. During the writing of a Handbook Article³ recently it became clear that I needed a narrative description of the *Advances in Schemas Theory* that have been made over the years. The story of the evolution of Schemas Theory can be a topic of interest in itself which I hope to relate here along with its accompanying rationale.

The problematic that this research comes out of is the nature and structure of the Western worldview from a nondual perspective. By Nondual I mean looked at from the point of view of spiritual traditions from Buddhism, Taoism, and Sufism. Part of this research resulted in the formulation of Nondual Science (<http://nondual.net>). Certain things can be seen from this “oriental philosophical perspective” that cannot be seen from within the Western worldview itself. My undergraduate degrees were in Sociology and East Asian studies with about half of my credits in East Asian Studies courses where I learned among other things about Buddhist and Taoist philosophy. But from the same teacher I also learned about the philosophies of Husserl and Heidegger so I went on to study at the London School of Economics at the University of London for my Ph.D called “The Structure of Theoretically Systems in relation to Emergence” (LSE 1982). It was on Philosophy of Science from the perspective of Continental Philosophy. After finishing that degree I returned to the USA and took up a career in Software Engineering and Systems Engineering. I first started studying the philosophy of Software and then later the foundations of Systems Engineering. I always had an interesting in Real-time Software and Systems Engineering Architectural Design and its methodological and philosophical underpinnings⁴. And I had a career in that field until being laid off in the recession in 2010. I continued to work until about 2014 and then decided to retire and devote myself to my research. The study of the Western worldview focused on the relation between Modern Science through Philosophy of Science augmented by Continental Philosophy and what I call Traditional Nondual Science⁵ in Islam called Hikma and Classical Chinese Science

¹ http://holonomic.net/KentPalmer_SEEC_research_proposal_016.pdf

https://www.academia.edu/3795590/Foundations_of_GST_General_Schemas_Theory

² https://www.academia.edu/37192095/Practical_Application_of_Schema_and_Category_Theories

https://www.academia.edu/36246647/Workshop_on_Schemas_Theory_Abstract

³ Palmer, K.D., “General Schemas Theory: A New Basis for Systems Engineering Practice”, *Systems Science Handbook*, Springer (unpublished due out 2019)

⁴ <https://independent.academia.edu/KentPalmer/Foundations-of-Systems-Architecture-Design>

⁵ <https://independent.academia.edu/KentPalmer/Discourses-on-Perfect-Ideas>

(Daoji). The point of this study is to look for blindspots that Western science cannot see in itself through developing a model of a completely different science that existed in Traditional societies before Descartes. In Continental Philosophy the philosophers I concentrate on studying⁶ are Descartes, Leibniz, Spinoza, Kant, Husserl, Cassirer, Heidegger, Merleau-Ponty, Bataille, Derrida, Deleuze, Zizek, Badiou. I am also very interested in the philosophy of Peirce. I also study to a certain extent Analytical Philosophy at the points where it breaks off from Continental Philosophy such as Frege, Wittgenstein, Carnap, Gödel, Cantor in Vienna as well as Russell. And this line of research has payed off handsomely with a wonderful intellectual adventure that has filled the years with the hot pursuit of knowledge for its own sake leading to a few innovations such as Schemas Theory along the way. Another key discovery in this research was Special Systems Theory⁷. And recently I discovered the Orthogonal Centering Dialectic⁸. But here we are discussing Schemas Theory within the context of this broader research initiative.

The way I normally explain how Schemas Theory fits into my other research interests is by saying that the Worldview has a shell, core and kernel. The shell is the production of Nihilism with occasionally spurts of Emergence. The Core of the Western worldview is the Divided Line of Plato and Aristotle. The Kernel is the nonduals of existence which are Void, Manifestation and Emptiness. But the Divided Line is really a particular image of the Orthogonal Centering Dialectic that transforms the aspects of Being from Doxa to Ratio producing the nonduals of Being. And just like the Divided Line is a traditional model of the limits of experience the Schemas are another model like that of the Limits of Experience with respect to the comprehension of spacetime. There is a hierarchy in which Worldview Theory encompasses Schemas Theory that in turn encompasses Special Systems Theory. The attempt to understand Special Systems Theory by exploring greater and greater scopes of the context around them. So the various threads of the research initiative do have rationales for how they hang together as part of the same problematic.

We accept Deleuze's characterization of the problematic as an Idea. In our case the problematic is the question of the nature and structure of the Western worldview. We construct models of different scope to attempt to capture that nature and structure and we present these together as the Idea. In the case of this research the Ideal models are of the Worldview, Schemas, and Special Systems which fit together. These tend toward the Perfect Idea of the worldview that is an ideal at infinity. But we approach that in stages named by the philosophers who have championed these various stages of ideas which are Descartes, Spinoza, Leibniz and Hegel. For Descartes the ideas have to be clear and distinct. For Spinoza they have to be Adequate. For Leibniz they need to be Complete. And for Hegel they have to be Notions. We recognize that in our time for something to be understood it needs to be a Theory. And theories in Science have

⁶ [https://www.academia.edu/34810992/Groundless_Grounds --
Continental Philosophy Reading and Study Group](https://www.academia.edu/34810992/Groundless_Grounds_-_Continental_Philosophy_Reading_and_Study_Group)

⁷ <https://osf.io/tw37d/>

⁸ <https://independent.academia.edu/KentPalmer/Foundations-of-Systems-Architecture-Design>

certain criteria one of which is being supported by a mathematical infrastructure. In other words mere conceptual models alone are not enough. Concepts have to be isomorphic to mathematical categories of some sort that orders them. And so that is what we have tried to do which is to have mathematically inspired models of these various levels of the worldview called Worldview Theory, Schemas Theory, and Special Systems Theory.

Part of Worldview theory is identifying the shell, core and kernel of the worldview. The Shell is the production of nihilistic which means extreme artificial duals by the worldview standing opposed to natural opposites that are seen in creation which is the focus of traditional societies prior to modernity that came with Descartes. We oppose Modern Science of Descartes and Galileo with Traditional Nondual Science in Islam called Hikma and also that we find as Chinese Classical Science based on the Daoji tradition in Ancient China. Modern Science along with the Western Scientific tradition have certain blindspots that produce a warped view of the world that we can see clearly if we juxtapose it with Traditional Nondual Science (<http://nondual.net>). The study of the Western worldview must go hand in hand with the study of Modern Science. In order to get a picture of Modern Science we must contrast it with what went before which we call Traditional Science some of which had a nondual basis in contrast with the dualistic basis of Western philosophy and sciences. Traditional Sciences are considered backward and based on superstition and not sufficiently distinct from religion. And this is true in many cases. However, we believe there is a special case of Traditional Nondual Sciences which are based on Special Systems Theory that are inherently nondual and not dualistic in nature. We are interested in picking out this special case and contrasting it with Modern Western Science. We find this special case embodied in the Hikma tradition within Islam and in Classical Chinese Science based on Daoji Chinese Philosophical Tradition based on the I Ching and Tao Te Ching in Ancient China. And in fact, we find a confluence of these two traditions that we have discussed in our Discourses on the Perfect Idea⁹.

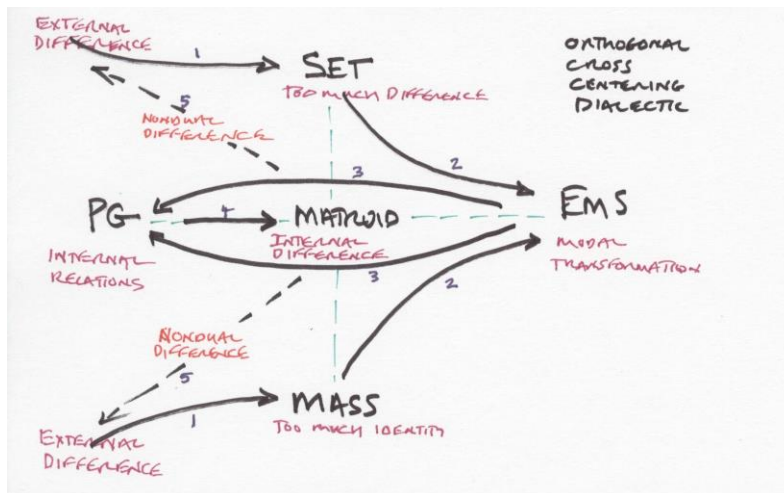
Beyond the shell of the Western worldview characterized by the wild production of nihilistic opposites in every sphere of life, and occasional emergence of the novel which discontinuously segments the tradition historically into periods of various scopes there is the kernel of the Western worldview which is the Divided Line of Plato and Aristotle.

⁹ <https://independent.academia.edu/KentPalmer/Discourses-on-Perfect-Ideas>

- Beyond the Limit
 - Source
 - Root
- Supra-Rational Limit – Nous of the Numinous
 - Non-representable intelligibles – Sophia of Virtues
 - Good
 - Fate
 - Emptiness nondual-----
 - Representable intelligibles -- Episteme of Science – Present-at-hand (Pure Being)
 - Order
 - Right
 - =====Manifestation nondual=====
 - Grounded opinion/appearance – Techné of Poiesis – Ready-to-hand (Process Being)
 - Truth
 - Reality
 - Void nondual-----
 - Ungrounded opinion/appearance – Phronesis of Praxis – Dasein (Monad)
 - Identity
 - Presence
- Mixture Limit – Metis (trickery)
 - Contradiction – Process Being
 - Paradox – Hyper Being
 - Absurdity – Wild Being
 - Impossibility – Ultra Being

Divided Line of Plato and Aristotle

We have explained many times this structure of the core of the Western worldview that combines the insights of Aristotle and Plato and which they agree upon but express in different ways. This structure has defined the limits of experience within the Western worldview since its Greek beginnings. The Worldview consists of two major phases which are Ratio and Doxa. The Ratio part is again divided into representable and non-representable intelligibles. The Doxa part is again divided into ground and non-grounded opinion or appearance. The Doxa part has a content of the Aspects of Being which are identity, truth, presence and reality and what is beyond those are meaning. The Ratio part has a content of the Nonduals of Being which are order, right, good, fate, sources and root. The transform between the Doxa and Ratio is performed by the Orthogonal Centering Dialectic.

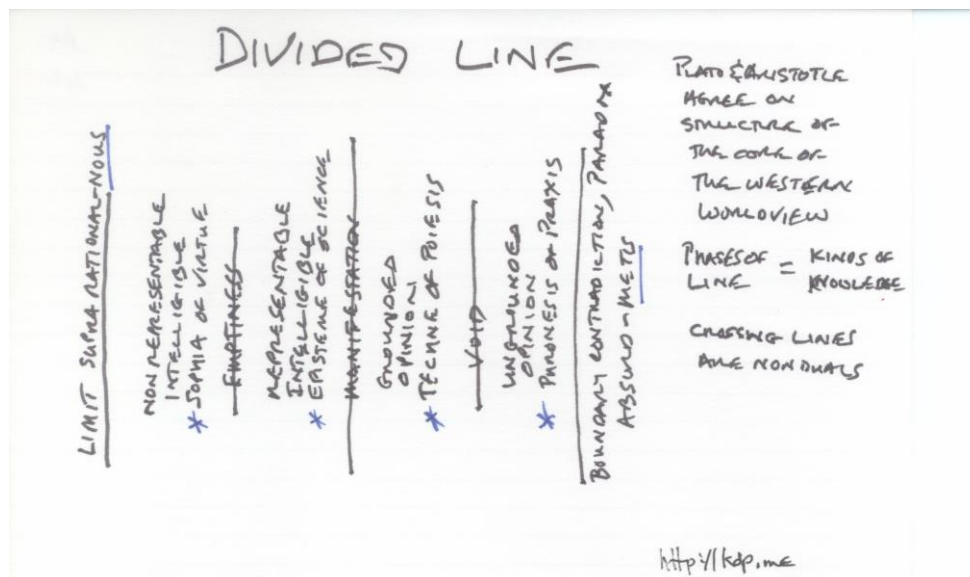


Orthogonal Centering Dialectic

The lower limit is mixture which appears as contradiction, paradox, absurdity and impossibility. The opposite of this is necessity which may be the level above meaning of the aspects. The upper limit is supra-rationality. That is the opposite of mixture.

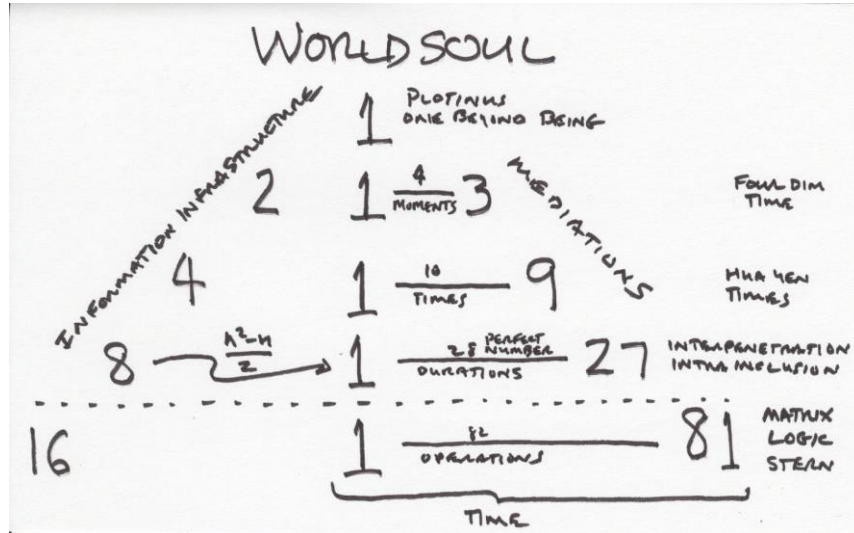
Supra-rationality is when two opposite things can be true at the same time without interfering or cancelling each other out. The whole purpose of the Divided Line is to define the Supra-rational limit. The nonduals of Being below the limit are order/right associated with representable intelligibles and good/fate associated with non-representable intelligibles that are approximated by the dialectic. Representable intelligible are associated with methods of representation and ways of finding solutions that are finite and fully describable. Non-representable intelligibles cannot be captured by methods. They cannot be fully described. And often they are not finite. But beyond the limit of the supra-rational are two further nonduals of being which are sources/root.

The kernel of the Western worldview are the crossing lines of the divided line which are related to void of Taoism and emptiness of Buddhism and these two dual nonduals point toward the possibility of something utterly nondual which is Manifestation the crossing line that divided ratio from doxa. The thing about the crossing lines is that they are neither immanent nor transcendent with respect to the Divided Line itself. They are neither inside the phases of the line nor beyond them on either end. They are three completely different nondual states that differentiate the line discontinuously and are then distinguished and held apart from each other by the line. We call these crossing lines the nonduals of existence that point toward the deeper nondual of manifestation. We take manifestation to be the tajalliat of the Sifat, i.e. the rendering transparent of the attributes of God. Manifestation is contrast to the Amanifest with is the essence of God, what Meister Eckhart calls the Godhead which he likens to an empty desert. It is the incomprehensibility of Gods ultimate nature, because is beyond nature, even human nature and thus a “cloud of unknowing”. This is a sketch of the Core of the dualistic Western worldview with its surprising nondual kernel that lies beyond the shell of nihilism/emergence which are too dark and too light, i.e. hyper-nihilistic in itself beyond all the nihilistic duals that it produces.



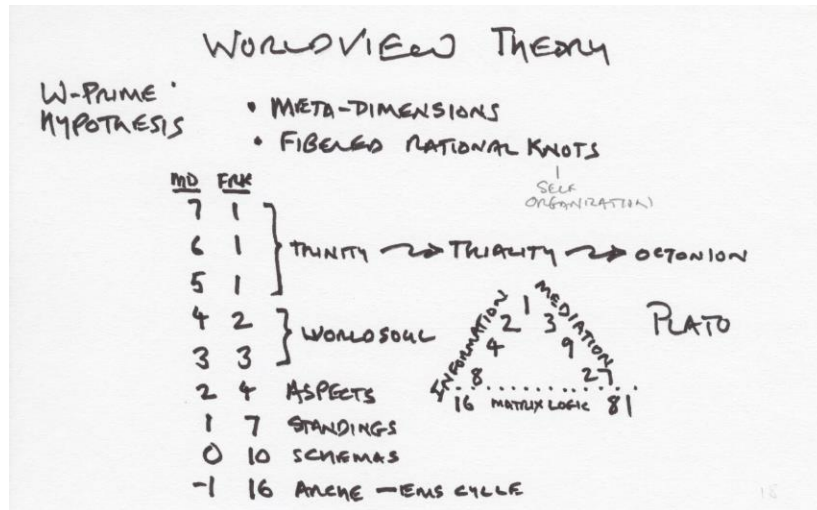
Divided Line Model

For Plato there is also beyond the description of the core of the worldview also the WorldSoul.



Model of the WorldSoul

The WorldSoul is the means by which the worldview produces its distinctions which appears as a progressive bisection on the one hand and a progressive trisection on the other all emanating from the One. It has two legs that descend from the One which are in the 2ⁿ and 3ⁿ series in the form 8-4-2-1-3-9-27. One leg produces the information infrastructure of bits and bytes that is a binary progression. The other leg produces mediation and its powers that mediate the mediation. The progressive bisection is embodied by Pascal's Triangle and the progressive trisection is embodied by Pascal's Tetrahedron. This series shows the means by which we produce more and more complex distinctions within our experience. Just beyond the series that Plato specifies at the level 16-81 there is also August Stern's Matrix Logic as a capstone that connects the WorldSoul to a non-standard logic. When we combine the WorldSoul and the Divided Line then we have a model of the Worldview from traditional sources, i.e. Plato which is then augmented by Aristotle. But this is not the theoretical kind of model of the worldview that we hope to achieve.



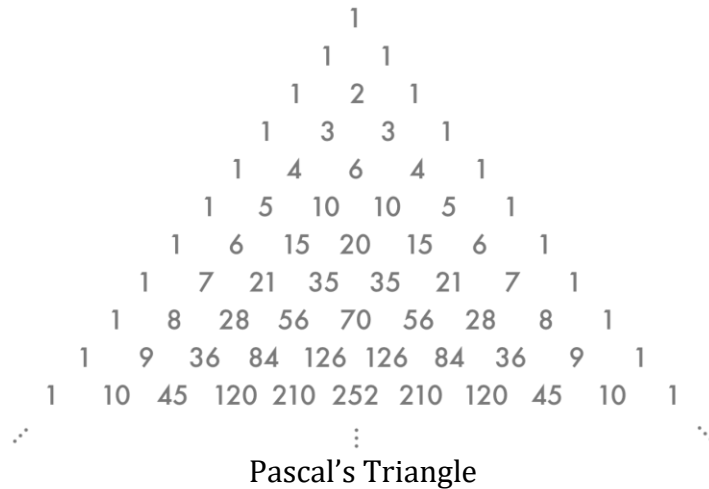
Model of the Worldview

Our mathematically based model of the worldview attempts to explain transcendental structures of the worldview. It is based on the idea of meta-dimensions and combines that with fibered rational knots to get a picture of the worldview as a whole with its transcendental and infra-immanent structures. We want a model that explains the relation between immanent and transcendent as well as infinite and finite within the worldview. Thus we say that each transcendental meta-dimension has elements based on the fibered rational knots. This gives us the series . . . 0, 1, 1, 1, 2, 3, 4, 7, |10|, 16, 25, 40, 101 . . . There are seven positive meta-dimensions above the zeroth meta-dimension where there are 10 schemas that shape our comprehension of spacetime. Below the zeroth meta-dimension there are infinite meta-dimensions which we think of as archetypal tableaux. The positive meta-dimensions relate to specific characteristics of the worldview that are transcendental. At the first meta-dimension there are 7 standings which include the five kinds of Being. At the second meta-dimension are the 4 aspects of Being that are transformed at every standing. Beyond that are the three regions and two polarities. And then we have the three ones which make up a trinity. So at the highest level of the worldview we do find a trinity. Below that are the elements that make possible the worldsoul which are the numbers two and three that are taken to successive powers in the WorldSoul structure. Below the zeroth meta-dimension are the negative dimensional tableaux of archetypes the first of which is explored by Jung in Aion which he associates as a quaternions of quaternions with the Marriage of Moses which has 16 elements. We associate that with Ilm al-Raml a middle eastern oracular method, or what Deleuze calls an Ideal or Divine Game.

STANDINGS



But all this goes to define the arena in which the schemas are expressed which is the zeroth meta-dimension of spacetime. It is n-dimensional and punitively infinite in its dimensionality but we posit that there are finite dimensions that are articulated through schemas which each express a different organization at the various scopes defined by the Pascal Triangle.

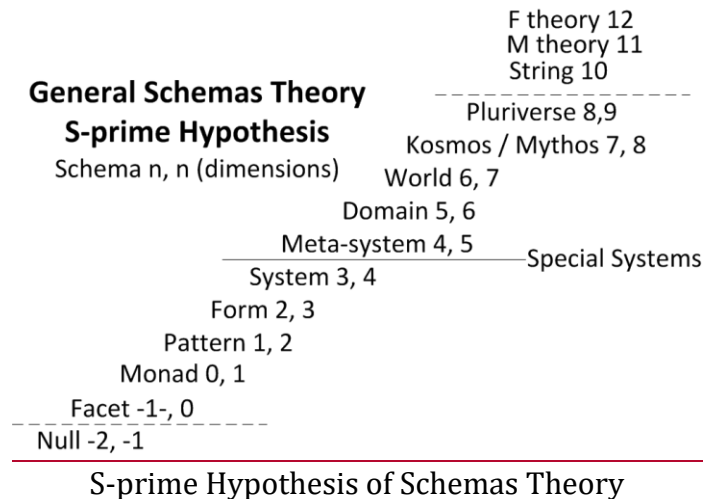


Pascal's Triangle Elements	Geometric Element Type	Number of Dimensions	Progressive Bisection of Information Infrastructure
0	n/a	-2d	
1	n/a	-1d	2 ⁰
1 0 1	point	0d	2 ¹
1 2 1	line	1d	2 ²
1 3 3 1	triangle	2d	2 ³

1 4 6 4 1	tetrahedron	3d	2 ⁴
1 5 10 10 5 1	pentachora	4d	2 ⁵
∞	n-simplex	∞	2 ⁿ

Pascal's Triangle, Simplicies, Dimensions, and Powers of 2

The schemas fit into the structure of Pascal's Triangle as a finite structure at the beginning of its articulation up to the ninth dimension.



Now it is clear that the Schemas fit into the zeroth meta-dimension of the Worldview model based on Meta-dimensions and Fibered Rational Knots. There are infinite dimensions but only a finite number of them up to 9 are schematized. These schemas are janus faced holons that cover two dimensions at a time and follow the S-prime rule: *two dimensions per schema and two schemas per dimension*. The transcendental Meta-dimensions speculate as to the organization of the invisible realm beyond spacetime projected by the worldview. But it also speculates about the immanent realm beneath the worldview that are composed of various archetypal tableaux such as that which Jung explores in Aion. The Transcendental Realm (too light and clear) is the nihilistic opposite of the Immanent Realm (too dark and obscure). These two nihilistic realms like Nihilism and Emergence in the Shell of the worldview frame the Schemas that are Janus like holons looking up and down within the dimensions of spacetime. They are tied to the articulation of Pascal's Triangle which is the simplest possible scheme for producing regular syntheses in each dimension, and the expression of the binary information infrastructure of bits in each dimension. But unlike the levels of the triangles that exist at each dimension the schemas are not infinite. Like each of the Meta-dimensions there are a small finite set of elements that occupy a few places within their infinite expanse. Finitude mediates the stretches of infinitude at each meta-dimension to us. Each meta-dimension is associated with a specific metaphysical structure. The first meta-dimension is associated with Being and Existence as well as Manifestation and the Amanifest which are all metaphysical constructs of different kinds and qualities. The second meta-dimension relates to

Aspects of Being, just like the content of the Divided Line. The third and fourth meta-dimensions relate to the 3 regions and the 2 polarities that generate the WorldSoul. The fifth through seventh meta-dimensions are composed of one element each (Father, Son, Holy Ghost) that can be seen as a trinity, or from a nondual perspective they can be seen as the crossing lines of the Divided Line. This trinity by the way is related to the triality of the Octonion that is in turn related to the Reflexive Special System.

We have postulated that the Schemas within this context are in fact a different image of the Divided Line. So our goal here is to try to show that this is true. If it is true we should be able to find the various aspects of the Divided Line in Schemas Theory based on Pascal's Triangle as it exists in the context of Worldview Theory. We note that we can see the Divided Line itself as a progressive bisection as seen in the diagram in the Appendix. The key is that both the Schemas Theory within Worldview Theory sets limits to experience but as directly related to the experience of spacetime. We can think of unoccupied Space as Void (Wuji) and we can think of eventless Time as Empty (Sunyata). So spacetime which is unoccupied and eventless is VoidEmpty. However, Pascal's Triangle arises out of the Void prior to the 1 at the top of the pyramid, i.e. Plotinus' One. We can think of emptiness as being the spaces between the numbers on each line in Pascal's triangle specified by the alignment of numbers below and above the numbers of any given line. Emptiness is inward existence and Void is outward existence. Pascal's triangle is representable and thus produced through finite reason by counting in a particular configuration. But the simplicities that it produces at the level of the third dimension gives rise to the Platonic solids by positing the tetrahedron. The Pascal Tetrahedron is the basis for the Cube and Cross Polytopes. And then these are extended to produce the Dodecahedron and Icosahedron in Euclid's Geometry. After Descartes found the mapping between Geometry and Algebra then it was possible to project all the higher dimensions and their simplicities. Euclid's Geometry is the prototype of all Rationality by rendering concrete the idea of proof that establishes a result of reasoning as holding indefinitely going forward from the time it is first proved geometrically. Thus Euclid's geometry is the model for Ratio that is representable. But the ratio establishes a criteria for discerning what is Appearance, i.e. what cannot be proven to be the case and remains conjecture and opinion but cannot be established. The Data represents grounded opinion in which given certain information other information can be deduced as givens¹⁰. By extracting what is implied in the given we can ground out opinions within what is given. Opinion and Appearance, i.e. Doxa, is what we are given as the basis of our reasoning. We look at what we are given through the aspects of Being: identity, truth, presence and reality. Establishing these positive aspects and differentiating them from the negative aspects are part of the grounding process we go through to try to establish the given as genuine, original, and as a basis for thought. Once we have established the given and determined what is implied in it then we are ready to reason about it through making representations of it that are finite and determinate.

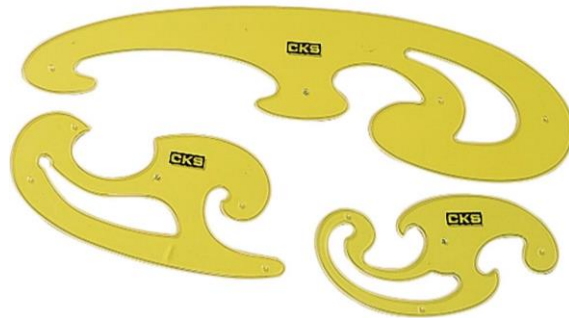
¹⁰ "given some item or property, then other items or properties are also "given"—that is, they can be determined." <https://www.britannica.com/biography/Euclid-Greek-mathematician#ref710394>

But we find that some things that thought pursues the understanding of cannot be wholly represented and thus we enter into non-representable intelligibles to which Plato's Dialogues are dedicated to approaching and trying to understand. We know that the Pascal Triangle is an example of a representation by ratio that is determinate and comprehensible but of infinite extent. Geometrically we can only understand this sequence up to the Platonic Solids in the third dimension. But once Descartes related algebra and geometry then we could postulate the infinite geometries related to Euclid's that go up higher and higher dimensions. But we cannot represent these higher dimensions geometrically. And that is how we begin to approach the non-representable. Distortion enters the picture as we try to represent higher dimensional figures in three or two dimensions that we can grasp fully. At a certain point in the ninth-dimension higher dimensional hyperspheres fail to distinguish inside and outside and thus we fail to be able to understand the figures in those spaces. This failure is topological and has to do with the lattices of spheres that fill these dimensions in relation to each other. When we lose the distinction in extension between inside and outside then we are really unable to comprehend fully what is happening in these higher dimensions. So Pascal's triangle in its scaling of the higher dimensions introduces forms of problematic non-representability into the discussion that we need to deal with and have no easy answers to. So we can see how Doxa and Ratio are both represented in the expansion of Pascal's triangle in its relation to Euclid and his geometry and data.

How about the limits in Mixture and in non-mixture? We can argue that the background on which we draw our geometrical proof is the representative of mixture if we see it as a palimpsest. We can also argue that superimposition used in a few proofs is supra-rational. From this point of view the proofs of Euclid do represent exactly the space between mixture and supra-rationality. It should be noted that Origami based on folding the paper can solve more problems than straight edge and compass can solve, and that the computational system of Euclid has severe limitations in relation to other methods for solution. It is ironic that many of the famous problems that Euclidian Geometry could not solve were in fact solvable if they had taken up the paper (papyrus, parchment) that was being drawn upon and folded that to try to find a solution. The mixture in this case of the background is a potentiality of being drawn on to represent any figure. Actual mixture is rigorously excluded by the rule that only straight edge and compass may be used to make drawings. There are only the means of drawing straight lines and circles and not the mixture between them of curves that change as they are executed as we see in various templates.

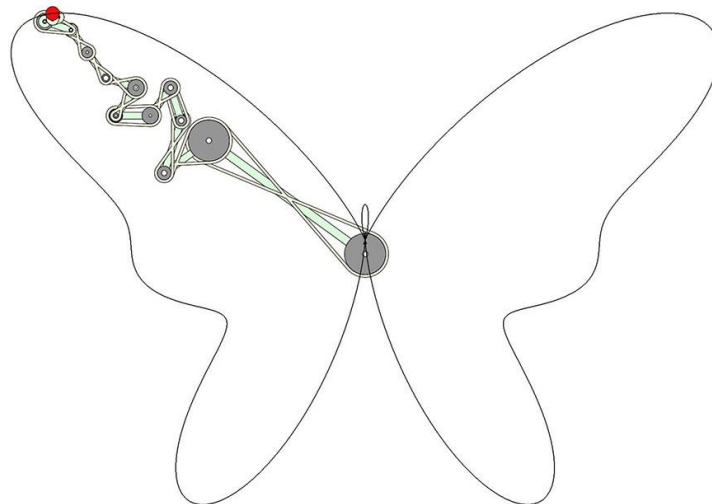


One Template for Standard Curves



Another Template for Standard Curves

The mechanization of describing transformative curves came later that mixed straight and circular¹¹.



Mechanical Means of Producing Butterfly Curve

So, Euclid is based on an exclusion of mixture between straight and circular to produce different freely changing curves which ultimately was described rigorously

¹¹ <https://mechanicaldesign101.com/2016/10/20/design-of-drawing-mechanisms/> Taimina , Daina, Historical Mechanisms for Drawing Curves January 2007 DOI: 10.5948/UPO9780883859766.011

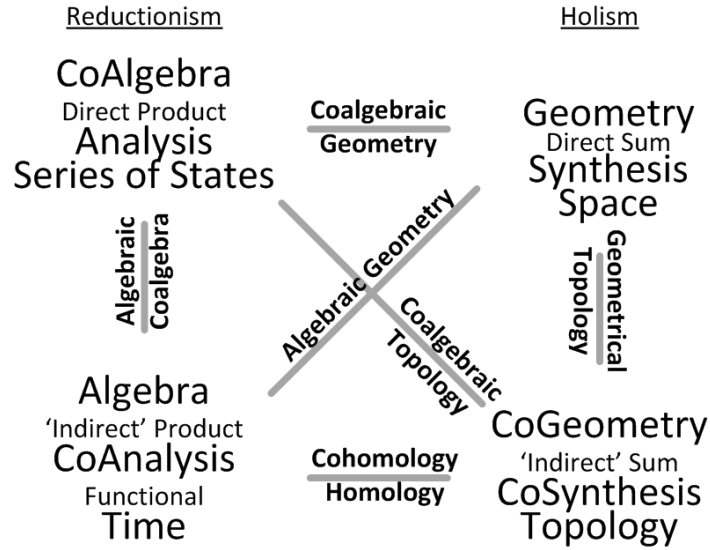
be means of Algebra through polynomials. But in a Proof the circles and straight lines get combined in such a way as to preform a proof that once formulated stands for all eternity. It is the goal of geometry to get to rational proofs. And this is done by combining circles and straight lines through a methodical step by step procedure that can be replicated by anyone. And this becomes the basic model for reasoning within the Western tradition. But this reasoning is based on assumptions, common notions and definitions as well as the axioms of pure geometry plus the fifth axiom of parallels. The axiom of parallel lines cannot be reduced to the axioms of pure geometry although there are many attempts. Through those attempts it was found that the parallel axiom has many different forms. But ultimately this breakdown of the fifth axiom and its inability to be derived leads to the discovery of non-Euclidian geometry, which are completely different forms of geometry that are elliptical or hyperbolic. It turns out that algebra also has two other types like Lie and Jordan. The study of Algebras lead to Group Theory and ultimately to the discovery of Hypercomplex Algebras by Hamilton and Graves that extend the algebra of the imaginary (complex) numbers. And in those algebras we find the basis for Special Systems Theory. The move from Algebra to Group theory and Geometry to Topology extends the power of Mathematics to deeper and deeper levels. And also the move from algebra to co-algebra brings up the relation of computation to mathematics. By a Category Theory analysis of Kant's Episteme we formulate the Kantian Meta-episteme that contains Algebra and Co-Algebra as well as Geometry and Topology as categories that articulate the differences between Set and Mass approaches to attaining Mathematical knowledge.

Kantian Meta-Episteme

CoAlgebra Analysis Series of States	Geometry Synthesis Space
Algebra CoAnalysis Functional Time	CoGeometry CoSynthesis Topology

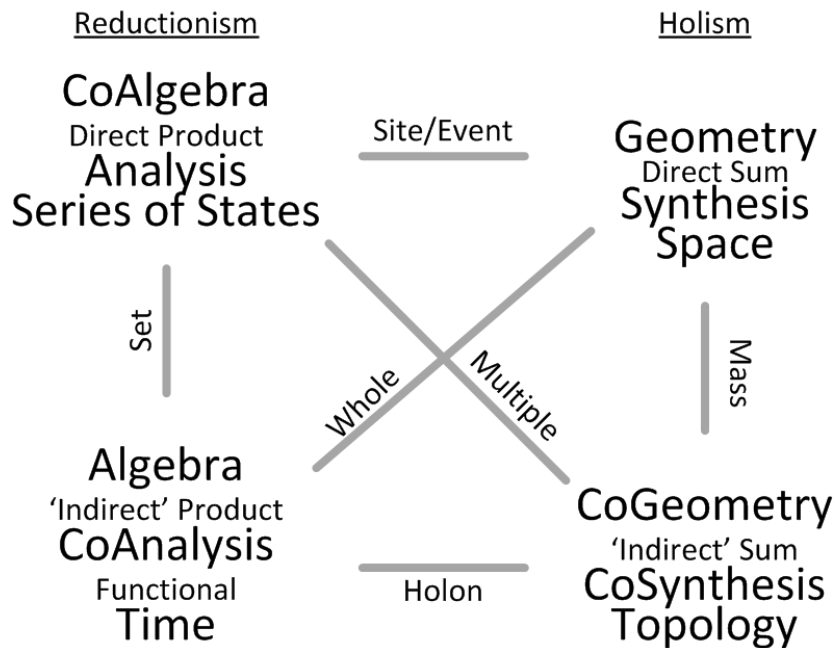
And we discover in the articulation of these Foundational Mathematical Categories that they are implied in the Assumptions, Common Notions and Definitions that underly the Axiomatic Platform of Euclidian Geometry. And so contrary to Badiou we specify a whole set of possible foundations for Mathematics rather than just Set Theory. And then we array these in relation to the Philosophical Principles of Peirce and Fuller.

Kantian Meta-Episteme

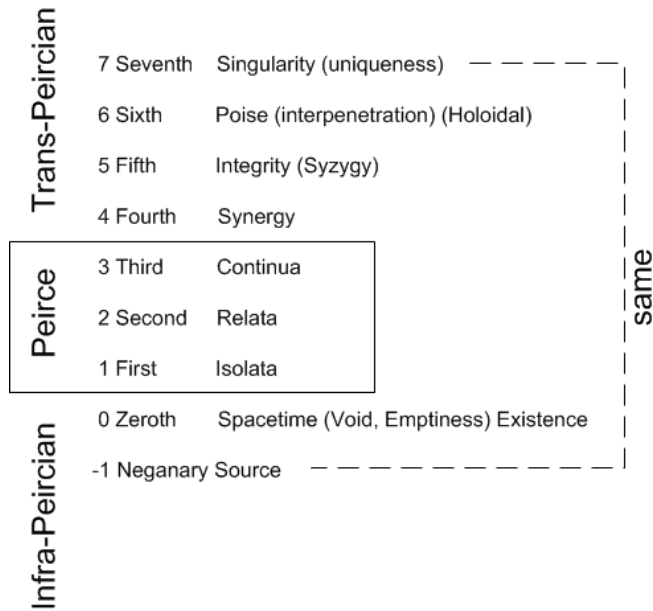


There are various kinds of Mathematics that come from the combination of the different elements of the Kantian Meta-Episteme.

Kantian Meta-Episteme



But we can also see their relations in terms of the core FMCs. But the FMCs have to be seen as expressions of the Philosophical Principles of Peirce and Fuller.



Trans-Piercian and Infra-Piercian Philosophical Principles

Peirce thought there were only three Philosophical Principles. But we can see that there are rationally more that go beyond those three. Two are added by Fuller related to Synergy and Integrity. Poise is added by Reiser and Nanako. And the Zeroth by G. Spencer-Brown. I add the 'Neganary' and the Singular to these to get a complete set. An eighth might exist as the least or most action principle.

Peirce / Fuller Philosophical Principles

- 1 **Neganary** Imaginary
- Spencer-Brown > 0 **Zeroth** Emptiness/Void
- Peirce { 1 **First** Isolata
- { 2 **Second** Relata
- { 3 **Third** Continua
- Fuller { 4 **Fourth** Synergy
- { 5 **Fifth** Integrity
- Reiser / Nanako > 6 **Sixth** Poise
- 7 **Seventh** Singular

Foundational Mathematical Categories include Set and Mass. On the Set side are the Multiple/Groupoid and the Site/Event which then ends in the Singularity of the Neganary. On the Mass Side there is the Whole and then the Holon and finally the Holoidal which concerns Interpenetration. The Singular is balanced by the Null FMC on the other side beyond the Singularity.

Foundational Mathematical Categories

	-	0	+
One	SET		MASS
Countable	MULTIPLE		WHOLE
Uncountable	SITE/EVENT		HOLON/INTEGRA
Infinite	SINGULARITY		HOLOIDAL
Unbounded Finite	SINGULAR		

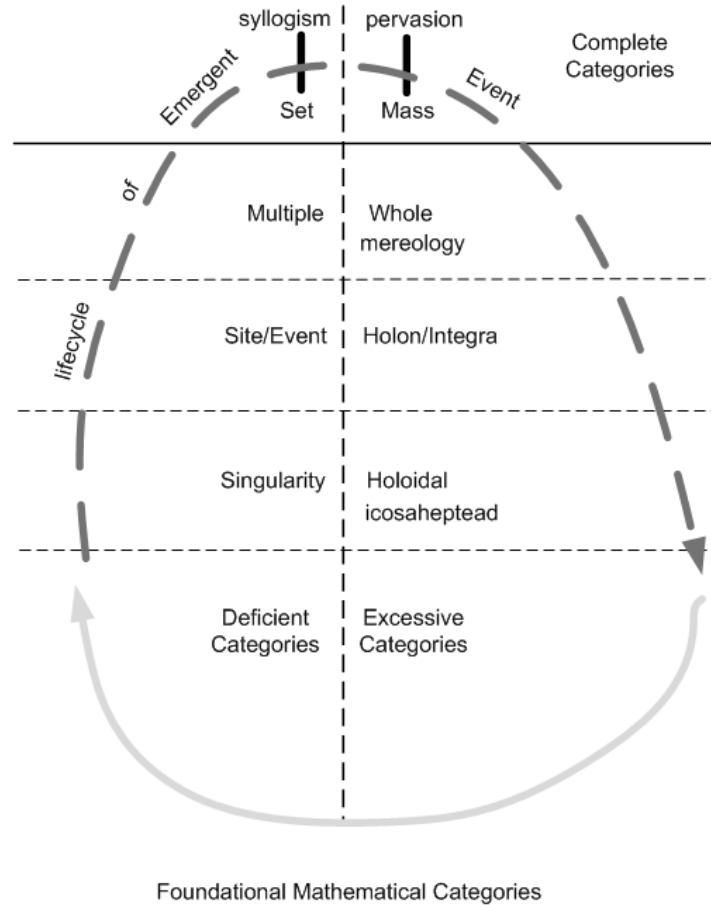
These FMCs are connected to specific Mathematical Categories that could be the Foundations of Mathematics besides the Set. And they are arranged based on the Philosophical Principles.

Matching up foundations with principles

Negany	Imaginary	Singularity	Hypercomplex
Zeroth	Emptiness/Void	Site/Event	Topology
First	Isolata	Multiple	Groupoids
Second	Relata	Set	Algebra
Third	Continua	Mass	Geometry
Fourth	Synergy	Whole	Mereology
Fifth	Integrity	Holon	Category Theory
Sixth	Poise	Holoid	Type Theory
Seventh	Singular	Singular	N-Category Theory

We can see the FMCs as the path of the Emergent Event into and back out of Existence through increasingly deficient and then excessive categories. They represent different types of ordering that are possible. The central categories are those toward the center which are the Multiple/Groupoid, Set, Mass and Whole. The Multiple is from Badiou an extreme of Heterogeneity and Incommensurability which is not univocal. This is an extreme of difference and divergence. It is balanced by the Groupoid by which syntheses are made. We can see the Groupoid as operative in the Introduction to the Phenomenology of Mind by Hegel. Then there is the Set with its Syllogistic Logic and its Russellian paradox. Opposite Sets is Mass that is not developed in the Western tradition except as Geometry and Topology within the

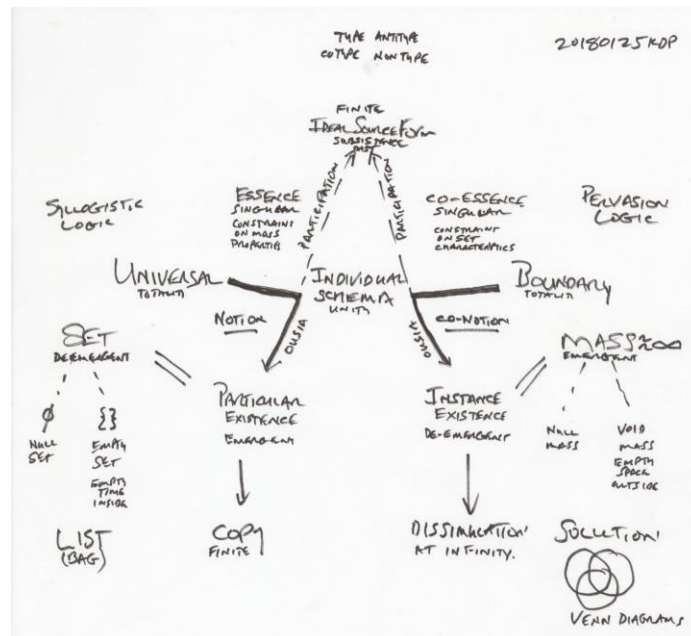
Kantian Meta-episteme. Sets lead to groups that then lead to Algebras and their opposites which are Co-Algebras related to computing and possibilities of combinatorics. We consider Set and Mass that mirror the difference between the sides of the Kantian Meta-episteme as complete categories while the others are either excessive or deficient.



The Foundational Mathematical Categories (FMC) unfold from the presumptions of Euclidian Geometry that indicate all the other possible foundations for mathematics beyond Set Theory advocated by Badiou in *Being and Event*¹². And we have developed these along organized by the Philosophical Principles of Peirce and Fuller that we have elaborated in order to give depth to Schemas Theory. And that is because the Schemas themselves are transparent and their organization comes from the FMCs based on the Philosophical Principles. So in order to have an in depth knowledge of the Schemas one must also have some knowledge of the Principles and the Categories that expand on the difference between Set and Mass which are in turn summaries of the difference between the two sides of the Kantian Episteme related to algebra and co-algebra on the one hand and geometry and topology on the other hand.

¹² Badiou, Alain, and Oliver Feltham. *Being and Event*. London [etc.: Bloomsbury Academic, an imprint of Bloomsbury, 2015.

But the question to which we are addressed in this paper is whether the Schemas based on Pascal's Triangle is a representation or image of the Divided Line but in relation to Spacetime as the basis of experience. Spacetime is seen as a homogeneous plenum and the Schemas gives that plenum different organizations at different dimensional scopes. And because the Schemas are related to Pascal's triangle there is a specific formation that we see spacetime organized into at the various dimensional thresholds. The Divided Line has limits of Supra-rationality and Mixture. We can see the Holoïdal as interpretation as the representation of the supra-rational. And we can see the move down through the FMCs backward along the timeline of emergence as moving toward mixture which is represented by the singularity. This singularity is also the representative of Ultra Being. As we go backward there is less and less order assumed at each FMC layer. So the difference between Supra-rationality and Mixture is embodied by the layers of the FMCs which we get from the presumptions of Euclidian Geometry. The relations between givens (data) and proofs (geometry) can be seen as standing in for the relation of Doxa and Ratio. Mere givens are seen as ungrounded, but givens that imply other derived values indicate grounding. In Proof we work with discrete finite representations in all of these proofs which is representable intelligibles. But when we extend this through algebra into higher dimensions we begin to see that there are also non-representable intelligibles implied within geometry and these become clearer as we begin to deal with group theory, algebra, co-algebra and topology. We have seen the difference between emptiness and void in the difference between the situation before the arising of the One of Plotinus and the empty spaces in the lattices that make up the Pascal Triangle. Emptiness is internal existence and Void is external existence which is a Zeroth background with respect to the expanding form of the Pascal Triangle and the Pascal Tetrahedron. When we place Emptiness and Void into juxtaposition then they indicate utterly nondual Manifestation indirectly.



Notion and Co-notion in relation to Essence and Co-essence

Once we have the schemas then at their center is the System and Meta-system schemas and between these exist the Special Systems which are partial Systems and partial Meta-system fused together in an unexpected way.

Special Systems

- Meta-system
 - Reflexive Social Special System
 - Autopoietic Symbiotic Special System
 - Dissipative Ordering Special System
- System

The Special Systems then are a model for interpenetration at the level of the Holoidal FMC. There are various mathematical and physical analogies for the Special Systems. And taken together the Special Systems and a Normal System produces a cycle called the Emergent Meta-system. Systems are wholes that are greater than the sum of their parts while Meta-systems are wholes less than the sum of their parts, like Sponges which are wholes full of holes. Special Systems are perfectly supervenient as wholes exactly equal to the sum of their parts.

Special Systems

- System – Whole greater than the sum of parts
 - Special System – Whole exactly equal to sum of parts
- Meta-system – Whole less than sum of parts

These different types of wholeness seen in the Special Systems are best understood in terms of the Aliquot numbers which are perfect, amicable and sociable and are in contrast to excessive and deficient numbers.

	Aliquot sequences	Examples
Meta-system	lacking	Divisors add up to less than the original number
Reflexive Social	sociable	12496 1264460 14288 1547860 Mostly four but 15472 1727636 also 5, 28, 9 14536 1305184 and other sets 14264
Autopoietic Symbiotic	perfect	6, 28, 496 rare
Dissipative Ordering	amicable	(220,284) fairly common
System	excessive	Divisors add up to more than the original number

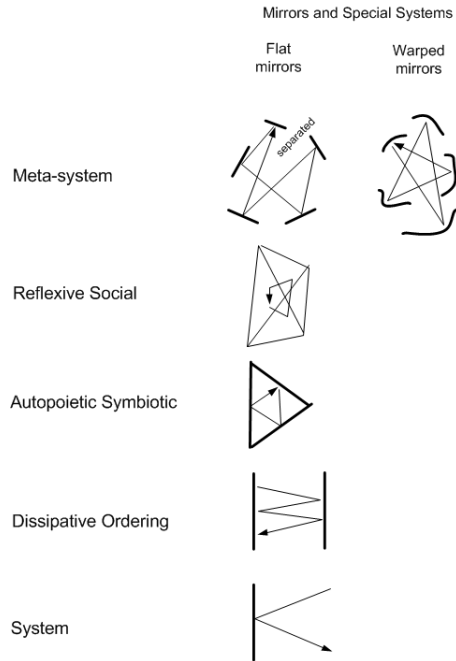
Aliquot Numbers in as examples of the Special Systems

But there are also other types of mathematical and physical relations that are anomalous that can be used to define the difference between the Special Systems. What is interesting is that these various mathematical and physical analogies can be combined together to give a very precise model of the Special Systems.

	<u>Number</u>	<u>Imaginary</u>	<u>Surface</u>	<u>Wave</u>
Meta-System	Deficient	Sedenion	Projective Plane	Medium
Reflexive Social	Sociable	Octonion	Hyper-Kleinian	Super-breather
Autopoietic Symbiotic	Perfect	Quaternion	Kleinian Bottle	Breather
Dissipative Ordering	Amicable	Complex	Mobius Strip	Soliton
System	Excessive	Real	Orientable	Normal Wave

Various Mathematical and Physical Anomalies that are Analogies for the Special Systems

Another way in which the Special Systems can be seen as related to each other is through the relations of different regular mirrorings. This analogy was discovered by Omar Aam.



Discovered by Onar Aam

Mirror configurations related to the Special Systems

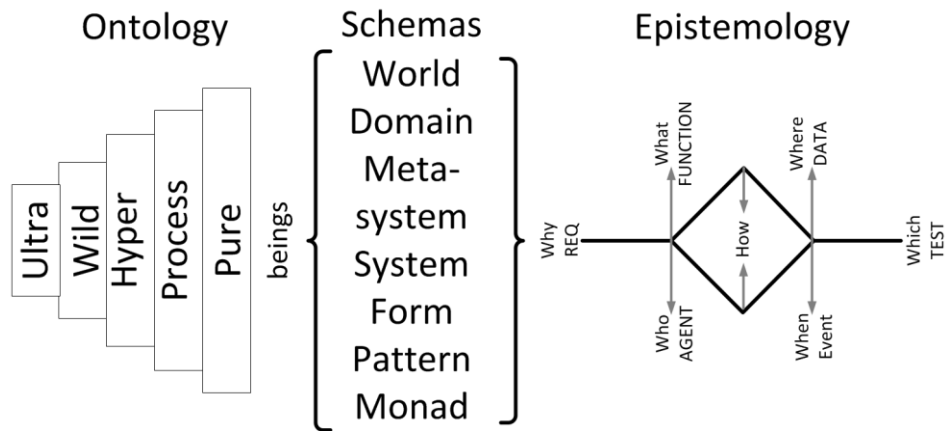
Also, the Kinds of Being and the Special Systems can be seen to interleave with each other.

Intertwining

- **Ultra Being**
 - Meta-System
- **Wild Being**
 - Reflexive Social Special System
- **Hyper Being**
 - Autopoietic Symbiotic Special System
- **Process Being**
 - Dissipative Ordering Special System
- **Pure Being**
 - System
- **Ultra Being**

This then gives us the connection between Existence and Being. Existence is based on Interpenetration and its various forms lies between the different kinds of Being within the interstices of their hierarchy. The opposite of the Ontological Hierarchy of the Kinds of Being is the Epistemological Hierarchy of Questions that appear as Why, What, Who, How, Where, When and Which-one. The Ontological and Epistemological

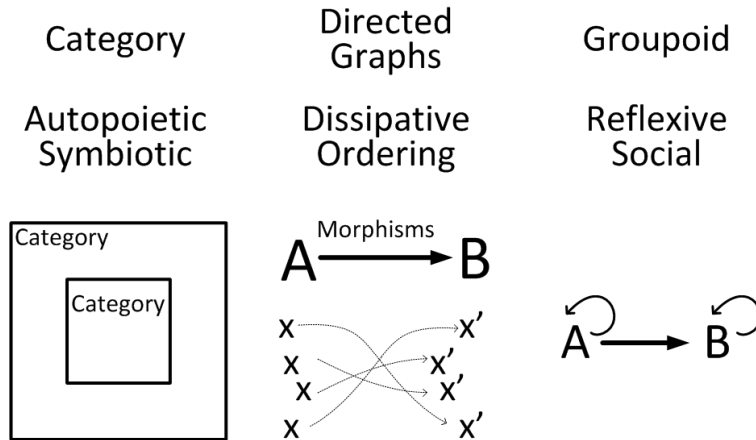
Questions define the Schemas. The Schemas are Ontological Projections of Being that make a place for the Epistemological Questions to be asked.



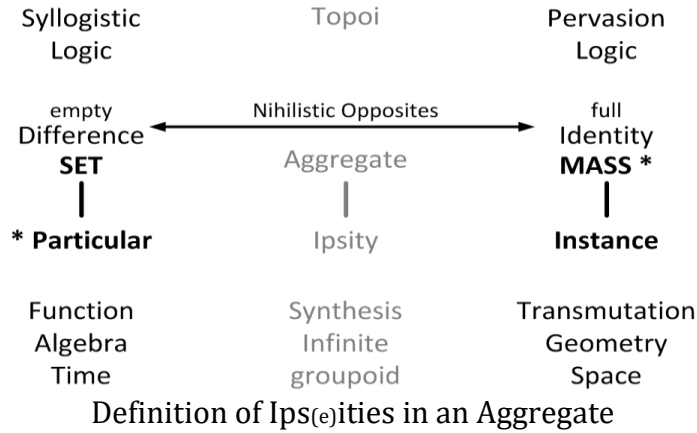
Ontological and Epistemological Extensions to the Schemas

Category theory itself can be seen as having representations that are related to the Special Systems. Category theory is a fundamental alternative to both Set and Mass by which structural order of Mathematical Categories can be defined. They can be a basis for the Mathematical Modeling of the schematized phenomena.

Category Theory

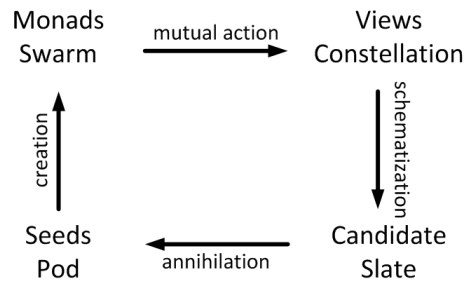


They model transformative Morphisms that are necessary to describe the Emergent Meta-system. They also give rise to N-Category Theory of Baez and his collaborators.

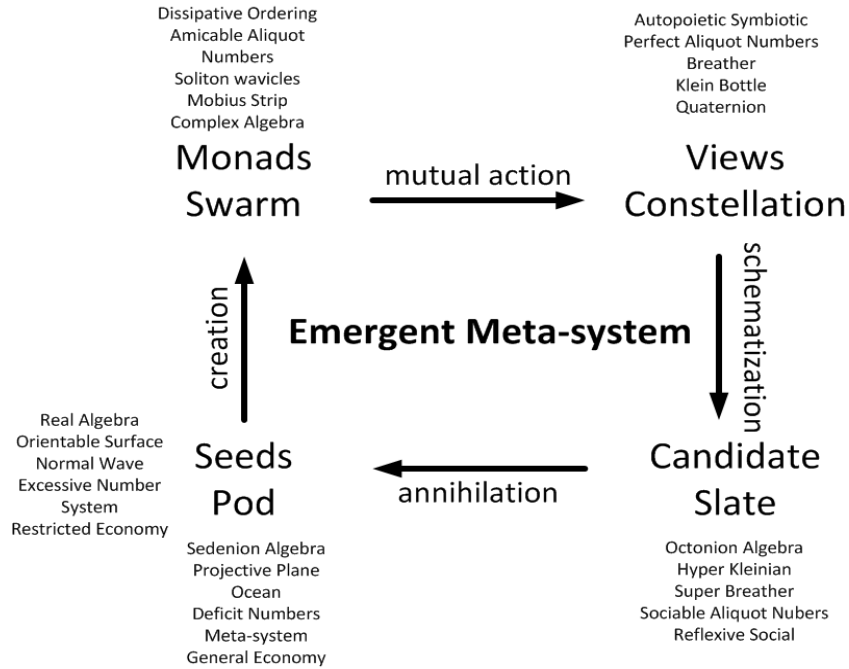


Between the nihilistic extremes of Set as too much difference and Masses as too much identity there is the middle which is ipseities in an aggregate which turn out to be swarms that are embodied in the transformational structure of Tattvas or Dharmas what we know as the Emergent Meta-system (EMS). The EMS is best modeled by the game of Wei Chi or Go from China.

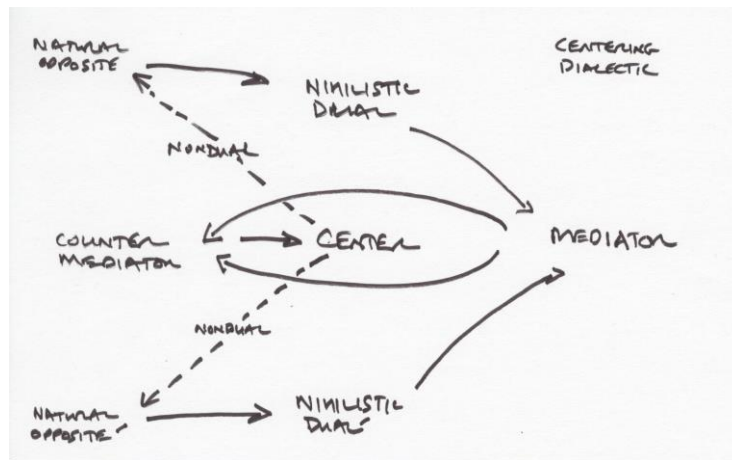
Emergent Meta-system



The EMS is like a Genetic Algorithm. It takes the Special Systems and a Normal System and produces an Emergent Meta-system rather than a de-emergent Meta-system which is the usual case. We can see in it the various Mathematical and Physical sets of Anomalies that describe the Special Systems working together to define this larger cycle which is moves from high energy to low but has the side effect of creating another high energy center which then needs to dissipate again so that the cycle keeps going. The Special Systems are the building blocks along with the System schema of the Emergent Meta-system formation that is a natural cycle.

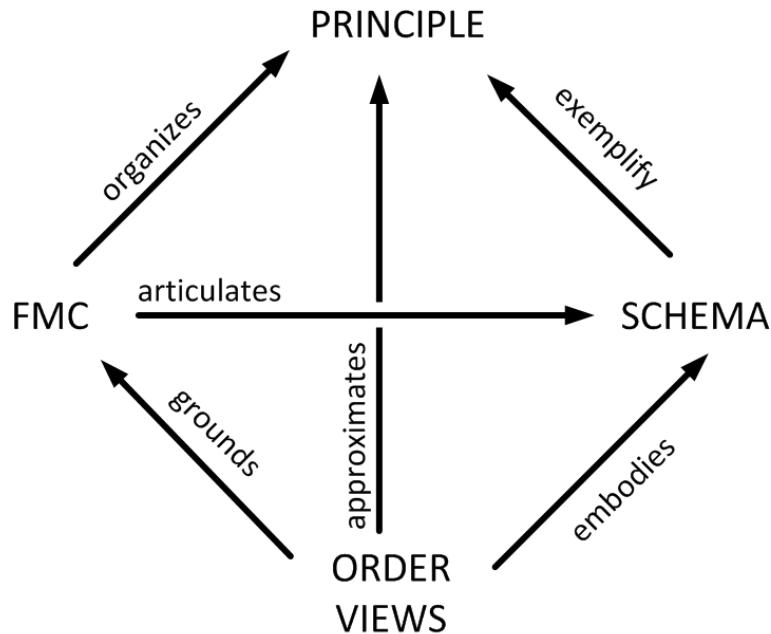


If Set and Mass stand for the First set of Nihilistic Opposites processing External Difference in the Orthogonal Centering Dialectic then the second set of nihilistic opposites at the meta-level above Set and Mass is the EMS on the one hand as an open transformational meta-system. But the opposite of that is the Essence which is modeled by a Projective Geometry which is a closed nondual system that is perfectly Diacritical. The Projective Geometry of the Essence is the dual of the EMS cycle that is an open transformation between ipseities in a cycle. On the basis of these two meta-levels of Nihilistic duality that are orthogonal to each other we can locate what Deleuze calls Internal Difference which is a first in relation to the Second of Internal Relations of Hegel which is the mass-like relations between the properties in a Substance. Once we have located Internal Difference we can then attempt to locate Nondual difference between it and External Difference taken as a spectrum. This gives the Tableau of the Orthogonal Centering Dialectic.



Orthogonal Centering Dialectic

We call the elements of this argument together Dagger Theory. It is composed of the Principles, Schemas, FMCs and the Epistemological Questions in the form of the View/Order hierarchies that are the basis for Architectural Design that uses Schemas Theory as its basis.



Dagger Theory Elements (as EMS)

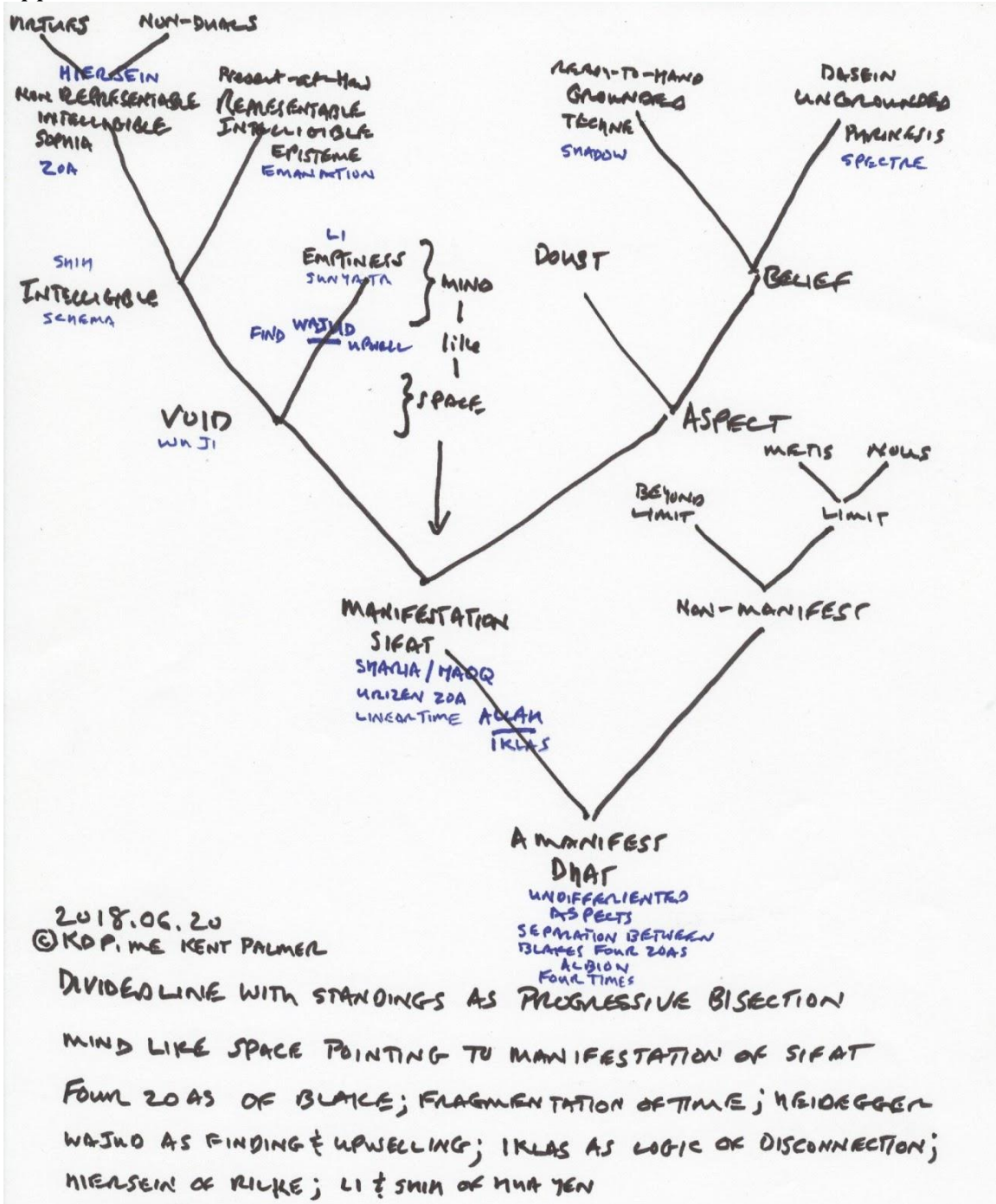
This is a basic overview of the Argument presented in the Tutorial on Schemas Theory that is available on the web at <http://schematheory.net>. Many of its elements are developed in the Emergent Design Dissertation at <http://emergentdesign.net> and in the other papers in the bibliography written over the years. Here we only meant to skim the surface giving an overview of the whole argument relying for the most part on diagrams from the Tutorial to get across the main points. The tutorial has an audio that goes with it that explains the various slides ad nauseum within the context of the entire tutorial. If we are going to present advances then we should first remember the original argument in an overview. We have noted recently that Dagger Theory is an Emergent Meta-system. Why this took so long as a realization to come to me is mystifying because it is quite clear. Order/Views are the Views. So that means that the Schemas are then the Candidates, the Principles are the Seeds and the FMCs are the Monads.

Our major contribution here is to argue that the Schemas Theory based on the Divided Line in this paper which I have not argued before. But this is fairly clear even though they are much more complex than the representation of the Divided Line. Divided Line sets the limits of Experience. Schemas Theory expresses these limits with respect to spacetime breaking up its plenum in experience.

This is definitely a very complex argument for the foundation of Architectural Design in general based on Schemas Theory. It proposes a foundation also for Systems Engineering Architecture and also Software Engineering Design. This is further explored in the working papers on the Foundations of Systems Architecture Design¹³. See the dissertation on Emergent Design (UniSA, 2009) for more detail on the various elements of this argument except the Orthogonal Centering Dialectic that was discovered more recently. We argue that the complexity is needed because the subject itself is complex and that a simpler theory would not do the subject justice. However, we realize that there are many innovations in this argument that need further explanation and for that we direct the reader to the papers in the bibliography and other unpublished papers that will hopefully eventually be released when time permits. The purpose of this paper is to give a narrative of what is in the tutorial and to prepare for the discussion of innovations and advances to the theory that will come in the next part of this series of papers.

¹³ <https://independent.academia.edu/KentPalmer/Foundations-of-Systems-Architecture-Design>

Appendix:



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