

Mathematical Structure of the Emergent Event

Foundational Mathematical Categories, Emergent Meta-system, Orthogonal Centering Dialectic in a Grand Synthesis specifying the Structure of the Emergent Event

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<http://schematheory.net>

<http://emergentdesign.net>

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Abstract: Exploration of a hypothetical model of the structure of the Emergent Event.

Key Words: Emergent Event, Foundational Mathematical Categories, Emergent Meta-system, Orthogonal Centering Dialectic, Hegel, Sartre, Badiou, Derrida, Deleuze, Philosophy of Science

Occasionally one gets an insight that is utterly unexpected. It has long been known in my papers that the Foundational Mathematical Categories (FMCs) could be seen as the unfolding of the Emergent Event inscribed into the bedrock of existence as the various possible foundations of mathematics that follow the unfolding of the Peirce / Fuller Philosophical Principles.

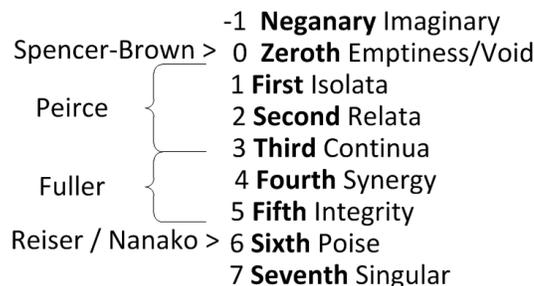


Figure 1. Peirce Fuller Philosophical Principles²

¹ <http://independent.academia.edu/KentPalmer> See also <http://kentpalmer.name>

² For *Poise* see Reiser, Jesse, and Nanako Umemoto. *Atlas of Novel Tectonics*. New York: Princeton Architectural Press, 2006.

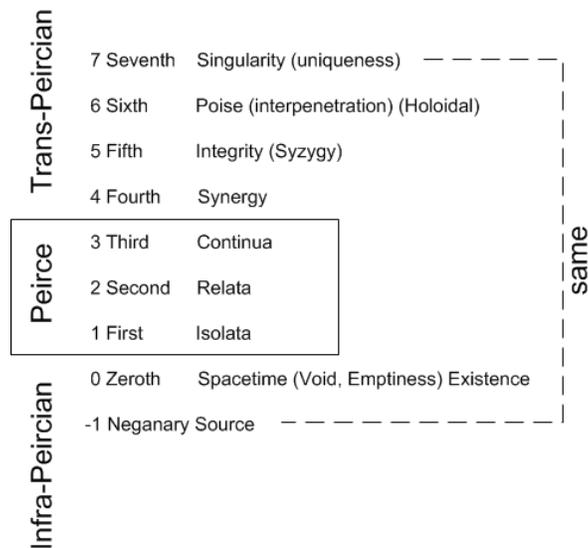


Figure 2. Peirce Fuller Philosophical Principles

The Emergent Event is when a discontinuity occurs within the historicity of the unfolding as a living tradition of the Western worldview. Generally, we see an Emergent Event as a *paradigm* change³, or an *episteme* transformation⁴ or a transmutation in the meaning of Being⁵ (*epochs of ontos*) within our tradition. We have been studying the structure of this phenomena for years starting with a dissertation at University of London (LSE) in 1982 called The Structure of Theoretical Systems in relation to Emergence⁶. What was discovered in the course of that research which looked at discontinuous changes⁷ in the history of science within the scientific tradition seen from the point of view of Continental Philosophy was that when there was an Emergent Event the different meta-levels of Being come together to produce a *face-of-the-world* which is a unique configuration of the different kinds of Being⁸.

³ Kuhn, Thomas S. *The Structure of Scientific Revolutions*. University of Chicago Press, 1970. Kintē, Vasō, and Theodore Arabatzis. *Kuhn's the Structure of Scientific Revolutions Revisited*. London : Routledge, 2015. Fuller, Steve. *Thomas Kuhn: A Philosophical History for Our Times*. Chicago, Ill: University of Chicago Press, 2002. Hoyningen-Huene, Paul. *Reconstructing Scientific Revolutions: Thomas S. Kuhn's Philosophy of Science*. Chicago: The University of Chicago Press, 1993. Kuhn, Thomas S. *What Are Scientific Revolutions?*Cambridge, Mass: Centre for Cognitive Science, Massachusetts Institute of Technology, 1982. Richards, Robert J, and Lorraine Daston. *Kuhn's Structure of Scientific Revolutions at Fifty: Reflections on a Science Classic*. Chicago : University of Chicago Press, 2016.

⁴ Foucault, Michel. *The Order of Things: An Archaeology of the Human Sciences*. New York : Vintage Books, 1973. Iyer, Arun. *Towards an Epistemology of Ruptures: The Case of Heidegger and Foucault*. London ; New York : Bloomsbury Academic, 2015. Words, Things and Beyond: Foucault's Les Mots Et Les Choses at 50. Hoboken, NJ : Published on behalf of Wesleyan University by Wiley Subscription Services, Inc., 2016. Visker, Rudi. Michel Foucault: Genealogy As Critique. London: Verso, 1995.

<https://www.wikiwand.com/en/Episteme> Foucault, Michel, and Sheridan Smith. *The Archeology of Knowledge*. London: Routledge, 1994. https://www.wikiwand.com/en/The_Archaeology_of_Knowledge <http://cahiers.kingston.ac.uk/concepts/archaeology.html>

⁵ Heidegger, Martin, and Joan Stambaugh. *The End of Philosophy*. Chicago: The University of Chicago Press, 2003. Heidegger, Martin. *The Principle of Reason*. Bloomington: Indiana University Press, 1996. Wrathall, Mark A. *Heidegger and Unconcealment: Truth, Language, and History*. Cambridge : Cambridge University Press, 2011. Barash, Jeffrey A, and Paul Ricoeur. *Martin Heidegger and the Problem of Historical Meaning*. New York: Fordham University Press, 2003.

⁶ <http://etheses.lse.ac.uk/3174/> <http://eprints.lse.ac.uk/63498/> https://www.academia.edu/2711376/THE_STRUCTURE_OF_THEORETICAL_SYSTEMS_IN_RELATION_TO_EMERGENCE

⁷ Iyer, Arun. *Towards an Epistemology of Ruptures: The Case of Heidegger and Foucault*. London : Bloomsbury, 2015.

⁸ https://www.academia.edu/13194091/Meta-levels_of_Being

Kinds of Being

Ultra	- no hands	- obliteration	- Being ⁵
Wild	- out-of-hand	- encompassing	- Being ⁴
Hyper	- in-hand	- bearing	- Being ³
Process	- ready-to-hand	- grasping	- Being ²
Pure	- present-at-hand	- pointing	- Being ¹

Schematized Spacetime receives being

Figure 3. Meta-levels of Being

This insight was based on the Ramified Higher Logical Type theory⁹ of Russell which recognized that being was extremely paradoxical, and that when we apply type theory to it in order to reduce the paradox, then we get the meta-levels of Being of different Kinds as a result of attempting to reduce paradox. These appear also in Bateson's Meta-levels of Learning¹⁰. But this attempt to exclude paradox fails. It was in this context of the Ramified Higher Logical Type theory that Gödel produced his incompleteness theorems showing that the division into Classes and Types did not prevent contamination by paradoxes. Essentially paradoxicality cannot be contained or firewalled by any categorical type system. Paradoxicality will contaminate or taint the entire system of categorical types regardless of their configuration or extent of the defenses against subversion. There is always the possibility of infection and defilement by logical paradoxes like the failure to prove the true statement: "this statement is unprovable"¹¹. This leads to logical explosion in which anything can be proven and the descent into non-sense in which the Dionysian Bacchanalia¹² reigns and overthrows the Apollonian rational consciousness of which we are so proud. And it is from this fundamental problem of Paradox in Being, i.e., the class of all classes of everything. That is the source from which discontinuous Emergence arises. In other words, the transformative movement from one (Pure Being) intelligible organization of the world to another at some scope is itself a contradiction (Process Being) and that gets compounded at the various meta-levels of Being as paradox (Hyper Being), absurdity (Wild Being) and Impossibility (Ultra Being) as a cascade of contamination that flows through the Classes and their differentiation into Types which is a tide that is impossible to stem. This is called the univocality of Being, it can speak of everything and thus everything can be contaminated by its paradoxicality.

⁹ Copi, Irving M. *The Theory of Logical Types (routledge Revivals)*. Hoboken: Taylor & Francis, 2011. Bateson, Gregory, and Mary C. Bateson. *Steps to an Ecology of Mind*. Chicago: University of Chicago Press, 2008. Russell, Bertrand. *The Principles of Mathematics*. Miami, FL : HardPress Publishing, 2013. Nederpelt, R P, and Herman Geuvers. *Type Theory and Formal Proof: An Introduction*. Cambridge : Cambridge University Press, 2014. Whitehead, Alfred N, and Bertrand Russell. *Principia Mathematica*. Taipei, Taiwan: Rainbow Bridge, 1957. Bell, John L, Andre Cantini, Solomon Feferman, Harvey M. Friedman, Sy-David Friedman, Kai Hauser, Tobias Hürter, Gerhard Jäger, Godehard Link, Karl-Georg Niebergall, Dieter Probst, Michael Rathjen, Peter Schuster, Helmut Schwichtenberg, Kai F. Wehmeier, and W H. Woodin. *One Hundred Years of Russell's Paradox: Mathematics, Logic, Philosophy*. Berlin ; Boston : De Gruyter, 2008. Lambek, Joachim, and Philip J. Scott. *Introduction to Higher Order Categorical Logic*. Cambridge : Cambridge Univ. Press, 2010. Landini, Gregory. *Russell's Hidden Substitutional Theory*. New York: Oxford University Press, 2010.

¹⁰ Bateson, Gregory. *Steps to Ecology of Mind*. Chicago: University of Chicago Press, 2000.

¹¹ More precisely, it shows that individual formal axiomatic mathematical theories fail to prove the true numerical statement "This statement is unprovable." <https://www.scientificamerican.com/article/what-is-goulds-proof/> https://www.wikiwand.com/en/G%C3%B6del%27s_incompleteness_theorems <https://plato.stanford.edu/entries/goedel-incompleteness/>

¹² <https://www.wikiwand.com/en/Bacchanalia> https://www.wikiwand.com/en/The_Bacchae Euripides. *The Bacchae*. La Vergne: Neeland Media LLC, 2019. Nietzsche, Friedrich W, Ira J. Allen, and Friedrich Ulfers. *The Dionysian Vision of the World*. Minneapolis, MN : Univocal, 2013. Nietzsche, Friedrich. *Birth of Tragedy*. Dover Publications, 2012.

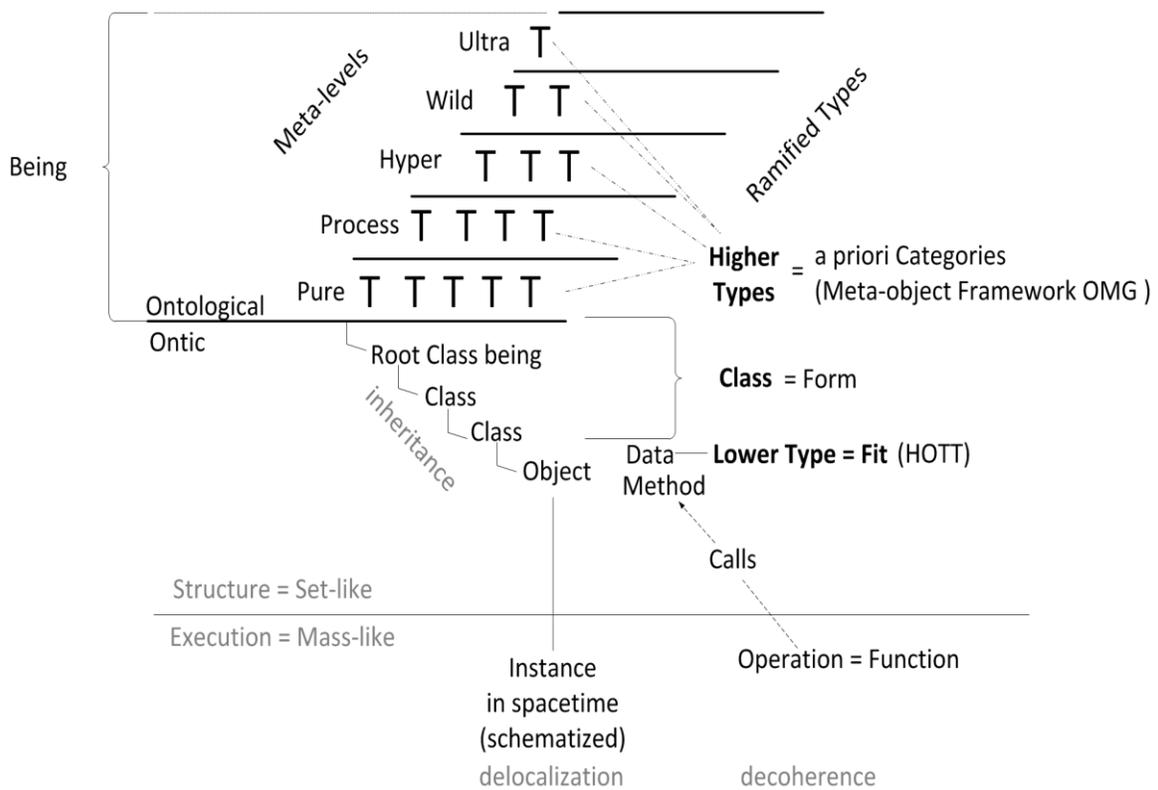


Figure 4. Ramified Higher Logical Type Theory

Notice the nature of Being appears to intensify as it goes up the meta-levels to more and more esoteric levels, but this is merely because the dual of the meta-levels is the 'higher logical types' that are going in the other direction, i.e. down toward the concrete ontic. For instance, natural language is a higher logical type than any formal language. Any given language is at a higher logical type than its truth, i.e. the distinction between truth/false is at a meta-level to the language that expresses a proposition. So, the flow is from higher meta-levels (lower logical types) to more intense contradiction is toward the higher logical types. Note also as we go up the meta-levels the number of types at each meta-level is constrained. This comes from the fact that the more esoteric higher the meta-levels the more difficult it is to think within them until it becomes impossible at the level of Ultra Being. This is despite the fact that Thinking and Being are the same. And when it becomes impossible to think we arrive at the singularity of Ultra Being. Deleuze associates this constriction of thought with the failure of the cognitive passive synthesis. Heidegger says that what is thought provoking is that we are not yet thinking. Deleuze converts this into the impossibility of thought to as synthesis which he gets from Sartre and Adorno. No synthesis is possible in though only constellations of antinomies in Synopses. Note also that these meta-levels of Being are very much like the emergence of different kinds of numbers in number theory.

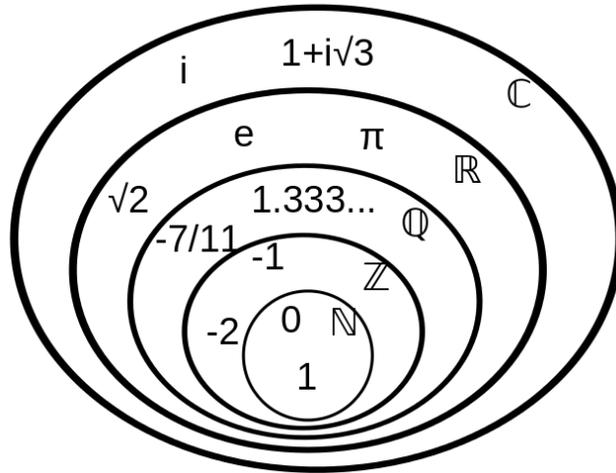


Figure 5. Kinds of Numbers in Number Theory¹³

There is also an analogy between the Surreal Numbers and Beyng. Beyng is when the assumption of Ontological Difference established by Heidegger as the basis for Fundamental Ontology is violated. Beyng is Onefold, Unique and Strange like Calabi-Yau manifolds¹⁴. All the different kinds of Being collapse together forming a mixture and losing the distinctiveness of each kind of Being at each meta-level. The ontological and the ontic become indistinguishable. It should be noted that it is not just the meta-levels of Being that separates the two meta-systems (emergent and de-emergent), but also, we can see two shields of Ultra Being with Beyng between them as another impossible route from one meta-system to another. The two meta-systems from each other are absolutely separated by this uncrossable boundary.

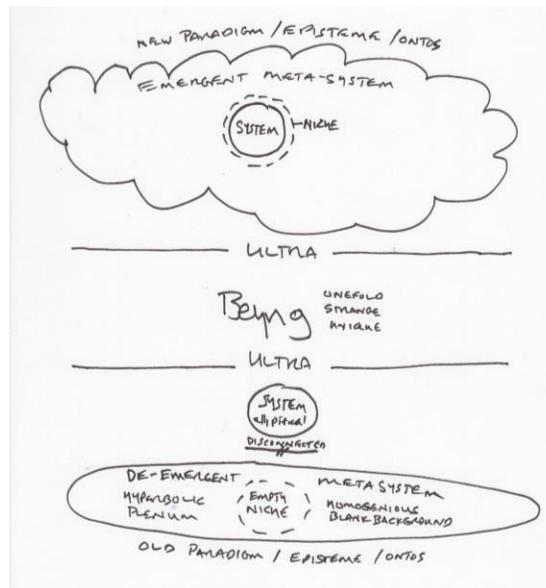


Figure 6. Alternative Impossible Route between the Two Meta-systems through Beyng shielded by Ultra Being

¹³ *A Unknown Quantity: Real and Imaginary History of Algebra*. Joseph Henry Press, 2006.

¹⁴ https://www.wikiwand.com/en/Calabi%E2%80%93Yau_manifold

In other words, there is a very direct analogy between the differentiation of numbers and the kinds of Being in Fundamental Ontology. However, this is seen via the differentiation of the kinds of nothing instead of in the positive form of numbers.

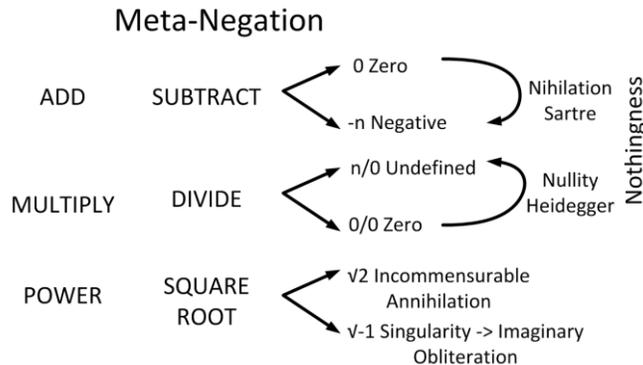


Figure 7. Meta-negation

Meta- Negation	
<u>Being</u>	<u>Non-Being</u>
Pure	Nothing
Process	Nihilation
Hyper	Annihilation
Wild	Obliteration
Ultra	Annulment

Figure 8. Meta-negation

This is an example of a material a priori. It is a limitation in our ability to think such that it produces what Deleuze calls *internal difference*, i.e. differences in a hierarchy with critical points that produce discontinuities in our thinking which is finite. And it is the finitude of our thinking that also produces these discontinuous reorganizations of our thoughts as a cultural phenomena in our history. Part of the reason that there is this analogy between Being and Numbers is that numbers count individuals that are seen as substances which are made substantive through Being in our Indo-European languages. And this relates to Deleuze's claim that *clarity* and *distinction* has a tradeoff like that enforced by Gödel between *completeness* and *consistency*. What is distinct is what is coherent as a substance. So, the tradeoff is between *clarity* (well-formedness) and *coherence*. A similar trade-off exists between verifiability and validation. This is a trade-off, an uncertainty principle, between what can be held absolutely and what must be relinquished to the relativistic, i.e. the difference between Pure and Process Being that is differentiated by Hyper Being. Hyper Being is always encountered as a limit between Pure and Process Being. There is a certain slip-sliding away of distinctions we make. They are ultimately like writing in the sand at the margin of the sea whose traces get repeatedly swept away by the waves and tide.

Aspects of Being

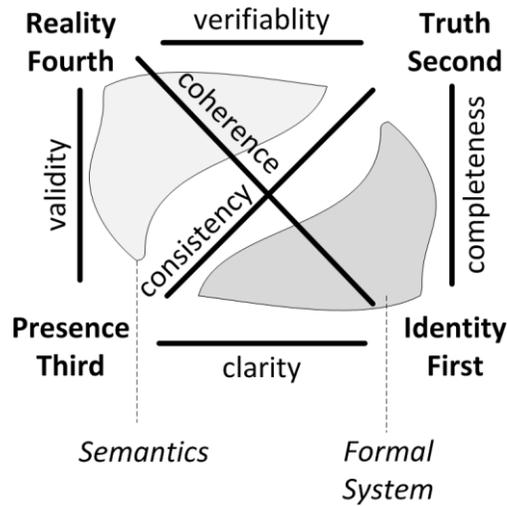


Figure 9. Aspects of Being

We are not saying that this analogy between kinds of number and kinds of Being is a direct isomorphism, but rather it appears though negation with respect to the reversal of operations in Arithmetic, i.e. we get something like the various kinds of Being as intensifications of Nothingness. *Nothingness* is necessary as we can generate it from the Divided Line which is the model of Experience established by Plato and Aristotle for the Western tradition¹⁵. And *Nothingness* seems to be a fixed point in non-being from which the Emergent Event departs in its advent as novum.

Badiou Being & Event

Ontology = Set Theory + Multiple + Event

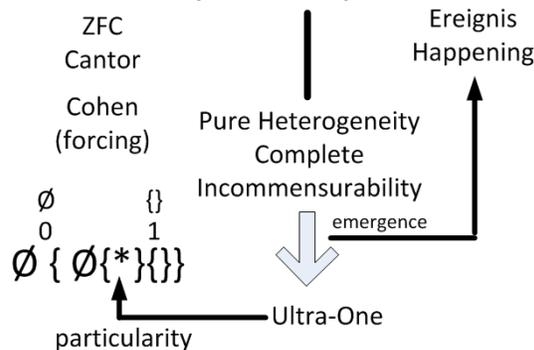


Figure 10. Badiou's Ontology

This shows the limits of Badiou's Ontology. His ontology taken from Sartre is subtractive. But beyond that there are further morphs of mathematical ontologies that are divisive and then related to Hyper Being and Wild Being as possible further intensifications of Nothingness as

¹⁵ See Figure 36

Annihilations, Obliterations and Annulments. If we are going to take Mathematics as our guide we must go all the way, not merely stop when it is convenient as Badiou does stopping with Set theory and not considering the other possible foundations of mathematics, or stopping with subtractive metaphysics and not taking into account divisive and even deeper metaphysical perspectives afforded by the more esoteric kinds of Being. In other words, Badiou does not go far enough in taking seriously the mathematical analogies with which he is playing. For ideological reasons he stops at the level of subtractive ontology and does not recognize the deeper levels that mathematics suggests might exist beyond that superficial level of mathematical interpretation in terms of philosophy.

On the one hand, number theory is shot through with discontinuities between the various kinds of numbers that are discovered by inverse operations in the intensifications of negation as we add successive new operations and then invert them. On the other hand, we have the single definition of Surreal Numbers that gives us all numbers in a single fiat which recognizes that numbers are more like the moves of a game than means of calculation with successive flaws that call forth new numbers into existence from nowhere based on our desire to be able to calculate inverses. Badiou wants to make Surreals the definition of Number itself¹⁶. And he does not seem to recognize that the Surreal numbers are meta-systems because he wants to impose ordinality on them to bring them in line with set theory. But this is a reduction of the full glory of the Surreals that even contain holes that you can calculate with. So, Emergence is the sort of discontinuity that occurs when you invert successive operations in Arithmetic. This is a transformation of the System of numbers which then can be compared back to the Surreal numbers as the meta-system that contains the entire transforming system of emergent numbers. But the mapping is not perfect. For instance you cannot integrate surreals. The surreals as a meta-systemic whole is incommensurate with the normal number system of Number Theory. Numbers like zero, negative integers, imaginary numbers were not accepted at first and then gained slow acceptance as their utility as proven¹⁷. Each time the number system is extended it is like an Emergent Event. It takes time for these new numbers to become established. In the mean time the old numbering system without the emergent novum of a new kind of number is written under erasure and while the practice in the usage of the new numbers is built up as a new organization of mathematical knowledge that includes the use of the new numbers for special cases where the old numbers broke down. To the extent that the Theory of numbers is eventually extended to include these new numbers that is a series of paradigm shifts within mathematics of Arithmetic.

The basic theory of Emergence is that *there is a Clearing of Being within the Clearing in Being*. This means that the old paradigm, episteme, or ontos is erased and a new one grows up in the ruins of the old one. At that time the various transcendent levels of the worldview roll up and become immanent. And this embedding of the Transcendent in the Immanent is how the worldview preserves itself in spite of discontinuous change throughout its history. Emergence has not been explained as yet within our worldview. It can be understood in terms of these various disconnects at various scopes of comprehension that seem to occur

¹⁶ Badiou, Alain. *Number and Numbers*. Cambridge, UK : Polity Press, 2019.

¹⁷ John Derbyshire. *An Unknown Quantity: Real and Imaginary History of Algebra*. Joseph Henry Press, 2006.

randomly. Basically, we are held hostage in our tradition to radical discontinuous change we cannot control. That can happen any time. It is a fundamental way that contingency intrudes into our experience of history within our tradition. Emergence is the dual of Nihilism. Emergence causes meaning to be lost in the face of radically discontinuous change that brings new organization to our world and new meaning. The question is what this tells us about the nature of the worldview itself. We understand that the worldview has a shell made up of the meta-nihilistic duality between emergence and nihilism. Nihilism builds up in the background through artificial emergence until a genuine emergence occurs which wipes the slate clean and starts over with a new organization of some particular scope of comprehension within the worldview. We see a genuine emergence when all the different kinds of Being are involved in the Emergent Event. Anything less than that is an artificial emergence that merely makes the nihilism worse contributing to the intensification of nihilism as the background that is necessary for recognizing the Emergent Event when it occurs. This whole area of research is very murky and difficult to make progress in. Insights are few and far between in this topic. So, when one happens by it is a good idea to try to capture it while it is still fresh in our mind.

Now for a somewhat comic interlude: One could imagine that there was a detective agency attuned detecting emergent events rather than crimes. Or we might call these crimes of destiny instead of crimes of passion. They are happenings that just occur unmotivated with no doer. Emergences are like conceptual viruses (memes) that spread as a plague. No amount of contact tracing will stem this tide of infestation. Such a detective agency would attempt to detect the emergent event as close to its novum as possible which is like looking for patient zero in a pandemic. And thus, mixing metaphors acting like an earthquake warning system for emergent events. A fundamental problem is how would one detect them, because as Badiou says these events can only be recognized in retrospect. They cannot be predicted. And this non-predictability and in fact the possibilities are impossible to state prior to their occurrence which is due to the explosion of possible new connections in the adjacent possible of any situation where there are myriad inter-related entities within the world¹⁸. And, many times we do not even realize that the change has occurred until well after the event. The key problem is that the emergent event transforms us, the ones trying to detect it. G.H. Mead who coins the term Emergence in this regard says that the emergent event rewrites history and offers a new future as well as making different things possible now that were not possible before, i.e. making new affordances available. It also offers a new possible future and a new sustaining mythology as CoNow. But we inhabit that world which has changed and begin to attempt to adapt to it sometimes better or sometimes not so well. But it is very difficult to notice these changes because of their discontinuous nature and because their effects at first might be extremely minor and almost indiscernible within the background of our lives¹⁹. Somehow we would have to notice the adaptations that we begin to make to take into account the emergent situation in which we find ourselves dwelling all of a sudden that is new in relation to myriad other nihilistic changes that are continually happening but which are not emergent. We call this the nihilistic background on which the

¹⁸ Kauffman, Stuart A. *A World Beyond Physics: The Emergence and Evolution of Life*. New York, NY Oxford University Press, 2019.

¹⁹ Dreyfus, Hubert, and Sean D. Kelly. *All Things Shining: Reading the Western Classics to Find Meaning in a Secular Age*. Place of publication not identified: Free Press, 2014.

Emergent Event as novum is seen which is like a change of gestalt. The emergent event can be seen to be like the paradoxical figure/ground illusions that are common in psychology textbooks such as *the rabbit and the duck*²⁰ or *the old woman and the young girl*²¹. There is a moment of switch over between the two gestalts and that is apparently when the emergent event is occurring segmenting history. But gestalts as systems appear on background proto-gestalts as meta-systems. And the Emergent Event is even more like a change between proto-gestalts than a change in gestalts and that is less common and harder to discern. There is a figure and at one moment there is a given background for it and then suddenly there is a different background against which that figure is seen. Like the Gorilla that passes through a scene unnoticed²² since we are not looking for the unexpected change in background, we miss it entirely. This is a deeper kind of gestalt switch than that of oscillating figures. That gestalt switch between meta-systems occurs on the deeper background of the domain. At that moment of switch over the iridescence of the gestalt switch occurs because the figure is transformed when its background transmutes.

If we were to try to set up such a detective agency, what would we do to try to detect these subtle changes that indicate the presence of a genuine Emergent Event that goes beyond transformation of figures and instead transmogrifies backgrounds. One way would be to watch for new adaptive behaviors. Our assumption is that the habitus in changes unconsciously in response to the Emergent Event. And we can track those changes at each of the meta-levels of Being. If we get adaptive changes at every meta-level of Being then that must be a genuine Emergent Event that is being reacted to. Habitus of Bourdieu is at the Wild Being level so it would be a bellwether, or canary in the coal mine. The habitus is related to the structural changes in the Logic of Practice²³. Then we would look at affects at the level of Hyper Being in which differance as differing and deferring were occurring. Little pools of non-Being would appear as seeds of the Emergent Event. It seems the Emergent Event would depart from Nothingness in the philosophy of Sartre. Then we would see changes in processes and systems in terms of dynamics at the Process Being level. And finally, we would see changes at the level of Knowledge at the Pure Being level. Large parts of the knowledge base would shorten in its half-life all of a sudden. Once there is knowledge related to the Emergent Event then we can reflect on that knowledge and through self-consciousness become conscious of the Emergent Event as a phenomena that is recognizable by different people. At this point it might be recognized as a trend and there might be articles written about the new phenomena in newspapers or magazines or even academic article and books.

A good example of this kind of detection is what goes into the prediction of the path of a Hurricane in the Atlantic. Emergent Events are like Hurricanes except they are invisible for the most part because they are conceptual rather than physical changes at first. But they are in fact like an organizing rather than a dis-organizing phenomena. The object in the world are left in place but become written under erasure as this new organizing storm appears and gets bigger and bigger until it envelops our world at some scope of comprehension of our

²⁰ <https://www.illusionsindex.org/i/duck-rabbit>

²¹ <https://www.illusionsindex.org/i/young-woman-or-old-woman>

²² http://www.theinvisiblegorilla.com/gorilla_experiment.html

²³ Bourdieu, Pierre. *The Logic of Practice*. Cambridge : Polity Press, 2014. Certeau, Michel, and Steven Rendall. *The Practice of Everyday Life*. Berkeley, Calif: University of Califo Banks, Iain M. Excession. London: Orbit, 2012. Press, 2011.

world by us. Eventually things actually change in the world based on the invisible transmutation of ideas as problematics that then render new solutions as practical possibilities that were impossible for the gap that intrudes into history called an Emergent Event. We might offer that Emergent Events are far more devastating to our lifeworld than localized Hurricanes because they can change everything within the worldview. These Emergent Events radically reorganize our view of ourselves and our world. You would think that people would like to know that they are forming and creating a new incipient organization to replace the old organization if it were possible. But in fact, Emergent Events are Unknown Unknowns which is a version of the *outside-context problem* as in Excession²⁴. It is unknown when they will strike, and it is unknown what they will change and in what scope within our worldview. Our detective agency would have to establish baselines of culture and then search for deviations from those baselines looking for unforeseen new events that begin to build into a trend. One would have to study the microgenesis of the Emergent Event as a new gestalt at the level of paradigm, episteme or ontos. We would track these storms of new organization and new meaning as they progress across our cultural milieu transforming the zeitgeist. Once they appear as a trend, we would try to predict how that trend will develop by a change impact assessment. And part of that detection process would be to try to recognize faces-of-the-world in which the kinds of Being configure into constellations that indicates that this is an Emergent Event and not merely an addition to the background nihilism within the worldview.

If you can think of having your own Emergent Event Detective Agency, then how would you proceed to try to recognize Emergent Events in order to give early warning of them within your own field of expertise? I think you will agree with me after giving it a try, that it is an exceedingly difficult problem to recognize genuine emergent events. Our ability to recognize them is all in hindsight. But it is one phenomenological area in which our worldview is speaking directly to us if we have the ears to hear. And that is because whatever changes are occurring at this deeper level of the unfolding of phenomena these changes are going to change us profoundly. The stakes are very high because what is at stake is who we *are*, within our dynamically transmuting worldview. But the fact that these transformations are so radical occur gives us some hope because we need profound structural changes in our world to attempt to deal with Climate Change. [End Interlude]

The first thing to remember is Dagger Theory²⁵ (<http://schematheory.net>) which is composed of Philosophical Principles (PP), Foundational Mathematical Categories (FMCs), Schemas Theory (ST), and View-Order Hierarchy (VOH) that are the elements of our theory of Emergent Design along with the idea of Quadralectics and Pentalectics that appears²⁶ in the Dissertation (UniSA 2009) on Emergent Design²⁷ that was summarize in a tutorial in 2014 and 2018 (<http://schematheory.net>). Foundational Mathematical Categories is just one part of the Emergent Meta-system of Dagger Theory. It comes out of a study of the philosophy of Badiou who said that Set Theory was the only basis of Ontology which is

²⁴ Banks, Iain M. *Excession*. London: Orbit, 2012. <https://tvtropes.org/pmwiki/pmwiki.php/Main/OutsideContextProblem>

²⁵ https://www.academia.edu/36065265/Essential_Schemas_Theory_The_Supra-rational_Dagger
https://www.academia.edu/9868340/Exploring_the_Dagger_or

²⁶ See Figure 39

²⁷ https://www.academia.edu/34831961/EMERGENT_DESIGN

obviously a wrong idea. There are many possible foundations of Mathematics and what we have done in response is to combine all the possible foundations and order them according to the Philosophical Principles of Peirce and Fuller. It was later that I realized that this structure could be a model of the Emergent Event inscribed in the bedrock of Existence. Mathematics as Nomos in the interspace between Logos and Physis is that bedrock between the fundamental duality of Being within our worldview. But it was difficult to know what to do with this hypothesis. However, it turns out that this model is very useful for understanding the relations between various philosophical concepts and it has been used very successfully as an explanatory mechanism for the unfolding of complexity in Design. However, now I think I have discovered a way to make progress in understanding it further by relating it to the Emergent Meta-system in terms of a process of microgenesis and also by relating it to the Orthogonal Centering Dialectic in a 'grand synthesis'. Such speculative grand syntheses are always dangerous but it is sometimes necessary to take a risk of being very wrong in order to have a sliver of a possibility of being right, perhaps just this time.

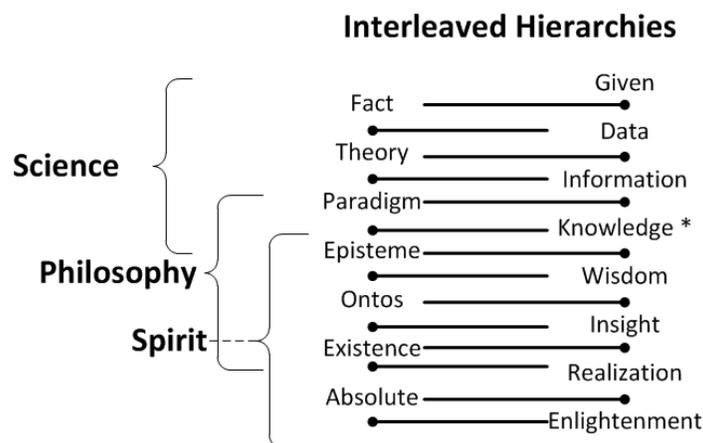


Figure 11. Scopes of Comprehension within the Western worldview

The idea that occurred to me while writing another paper²⁸ is that each stage of the FMC arc is related to a different part of the Emergent Meta-system structure and that the arc itself mediates between the Emergent Meta-system and the De-emergent Meta-system, that is to say between the new paradigm/episteme/ontos and the old one which has been deactivated and deflated while the new one reorganizes the conceptual space in an Emergent Event. Thus, suddenly it places the old order under erasure as a ~~Clearing of Being~~ Clearing in Being, and then it establishes the seeds of a new order at some particular scope. This could also happen at the highest level at which an Emergent Event could occur which is the level of Existence which is what occurred in the transformation from the Mythopoetic to the Metaphysical Eras²⁹ and may be happening to us now with the transition to the Heterochronic Era³⁰. We know that the new epoch will be organized differently and therefore will call upon the various kinds of order that appear in Mathematics as the basis of that reordering. The fact that the Foundational Mathematical Categories are in mathematics

²⁸ https://www.academia.edu/40362450/On_the_Field_of_Fundamental_Ontology

²⁹ Hatab, Lawrence J. *Myth and Philosophy: A Contest of Truths*. Chicago: Open Court, 1992.

³⁰ <https://independent.academia.edu/KentPalmer/Heterochronic-Era>

means that they cannot be changed regardless of the changes brought about by Historicity within the metamorphosis of the Worldview. Thus, this set of archetypal orders that are the possible foundations for mathematics can serve as a template for any given Emergent Event that seeks to reorder elements within the worldview at some scope. Thus although the content of the Emergent Event will be different in each case the actual structure of the Emergent Event would be roughly the same in terms of its transition among various ordering principles. The ordering follows the meta-order of the Philosophical Principles of Peirce and Fuller.

Peirce / Fuller Philosophical Principles

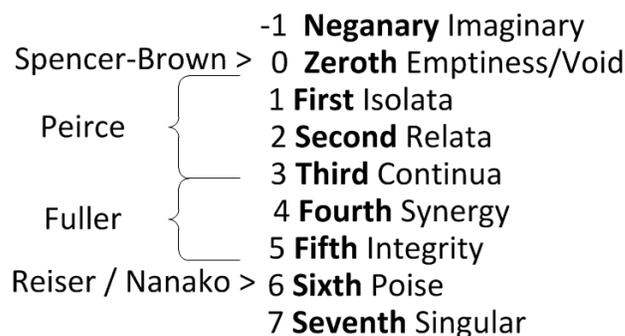


Figure 12. Philosophical Principles

By using the FMCs in their emergent order based on the Philosophical Principles to specify the structure of the Emergent Event we move through the levels of complexity in an orderly emergent series. But then we can see the pairs of FMCs that appear at each level when we fold the series as relating to the various phases of a micro-genesis of the Emergent Meta-system moving from one organization to the next within a given scope. And this means that the Special Systems are involved at each of these levels as they exist in the interstices between the Kinds of Being. By making the FMCs relate to the stages of microgenesis of the EMS out of the de-emergent Meta-system we find that this structure can mediate between the Before and After of the Emergent Event. But it also means we get a Face of the World through the buildup of the configuration of the Kinds of Being. And interestingly we can see this also as a way of relating to the Emergent Event the Orthogonal Centering Dialectic as a method for approximating nondual distinctions³¹. It suffices to explain why it is that Orthogonal Nihilistic Duals can be used to approximate nondual distinctions. In effect this model of the Emergent Event contains several disparate structures that have been discovered in research into other subjects, but which may be brought together here in order to give an in-depth and very precise model of the Emergent Event. We offer this, as all our models, as a hypothesis for testing. We need to strive to understand the Western worldview before it kills all of us on this planet Earth. This is just one more small step in the exploration of a very large problematic concerning the nature and structure of the Western worldview. Understanding the Emergent Event by having quasi-mathematical philosophical model of it is just a single step in this direction. Anything that helps us understand the dynamics of

³¹ See Figure 38

discontinuous change in the tradition is welcome at this point. I have been working on this for 40 some years making very slow progress. This is at least a step in the right direction. Even if it is wrong, it contains many elements of what a good solution might look like. However, we recognize that Grand Syntheses are usually wrong one way or another. But this one has many features of interest, none the less.

We begin with a review of the Foundational Mathematical Categories (FMCs). But they are in fact based on the Peirce/Fuller Philosophical Principles for their ordering. These Philosophical Principles are based on the Pascal Triangle and seek to isolate its generative ideas based on the unfolding of the key undefinable geometrical concepts (point, line, surface, solid, hunk, etc.) as seen by C.S. Peirce and B. Fuller. Then, the Foundational Mathematical Categories are selected based on their being possible foundations for Mathematics and aligned with these Philosophical 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

Figure 13. Philosophical Principles and Foundational Mathematical Categories

Once these FMCs have been selected and aligned with the Philosophical Principles then a model of a possible Arc of the Emergent Event has been posited.

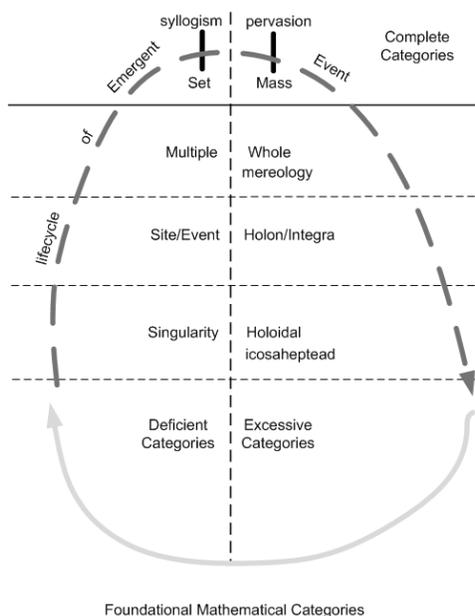
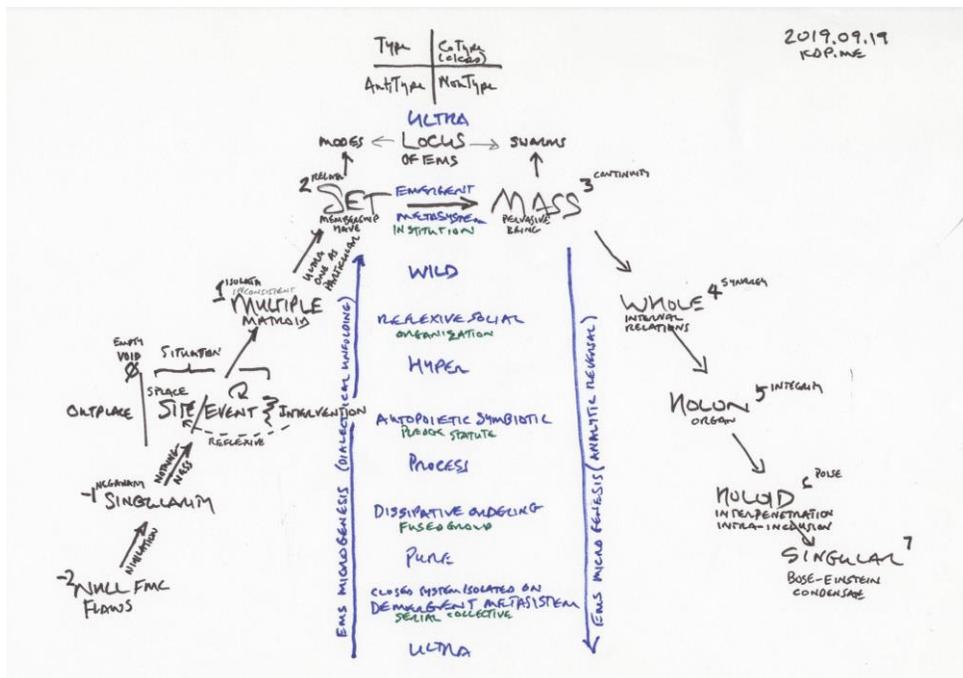


Figure 14. Arc of Emergent Event in FMCs

What this model allows us to do is to understand the deep background of the Set/Mass distinction with their attendant logics of Syllogistic/Pervasion approaches. Mass is a blindspot in the Western worldview that emphasizes Set Theory and its attendant Syllogistic Logic. Mass Theory and its Pervasion logic was developed in India and China and is almost completely ignored in the Western tradition. So, we are pointing out a blindspot in the Western tradition and establishing a duality for understanding the transformation back and forth between Set and Mass duals. Similarly, we have done the same thing in Schemas Theory with the Meta-system verses the System. The Meta-system is also a blindspot in our tradition. We use Bataille as the basis of our theory of the Meta-system who distinguishes the General Economy in the Accursed Share³² from the Restricted Economy of the System. We call it a 'Meta-system' because there is really no good name for it, but in Old English a 'Scape', so we also call it an *OpenScape*. Normally in our tradition the Mass approach and the Meta-system are conflated to produce a Taboo conglomerate that is normally referred to in scatological or other equally repulsive terms. The two together are normally referred to as a monstrosity like 'The Blob'³³ and made the stuff of Horror movies like the undead of Zombie movies³⁴. But we separate the two blindspots and attempt to develop theories around them to explicate them as best we can. Schemas Theory (<http://schematheory.net>) is the explication of the Meta-system in its duality with the System. Foundational Mathematical Categories (FMCs) is the explication of the Mass Theory that is the dual of Set Theory which is emphasized by Badiou in Being and Event³⁵ as the foundation of Mathematics.



³² Bataille, Georges, and Robert Hurley. *Accursed Share*. Zone Bks., U.S, 1992. Bataille, Georges, and Georges Bataille. *The Accursed Share: 2/3*. New York: Zone Books, 1991.

³³ https://www.wikiwand.com/en/The_Blob

³⁴ https://www.wikiwand.com/en/List_of_zombie_films

³⁵ Badiou, Alain, and Oliver Feltham. *Being and Event: [I]* / Alain Badiou ; Transl. by Oliver Feltham. London: Continuum, 2006.

Figure 15. Emergent Meta-system Embedded in FMC hierarchy

We link the FMCs to the Emergent Event through the idea that the Emergent Event is the imposition of a new order on the world in a particular scope. The FMCs are the various sources of Order that we have identified in our Mathematical tradition. So, we would expect them to be drawn upon for the basis of whatever new order is imposed upon the content of the world in a particular scope. But when we align them with the Philosophical Principles we discover that there is a certain evolution of ordering that is suggested that might be applicable to all new dissipative institutions of order in existence. And thus, we come to see the Emergent Event as phased evolution of ordering principles based on specific categories of Mathematics. And this is extremely useful as a way to understand how ordering progresses by an emergent series of mathematical categories that follows the Philosophical Principles.

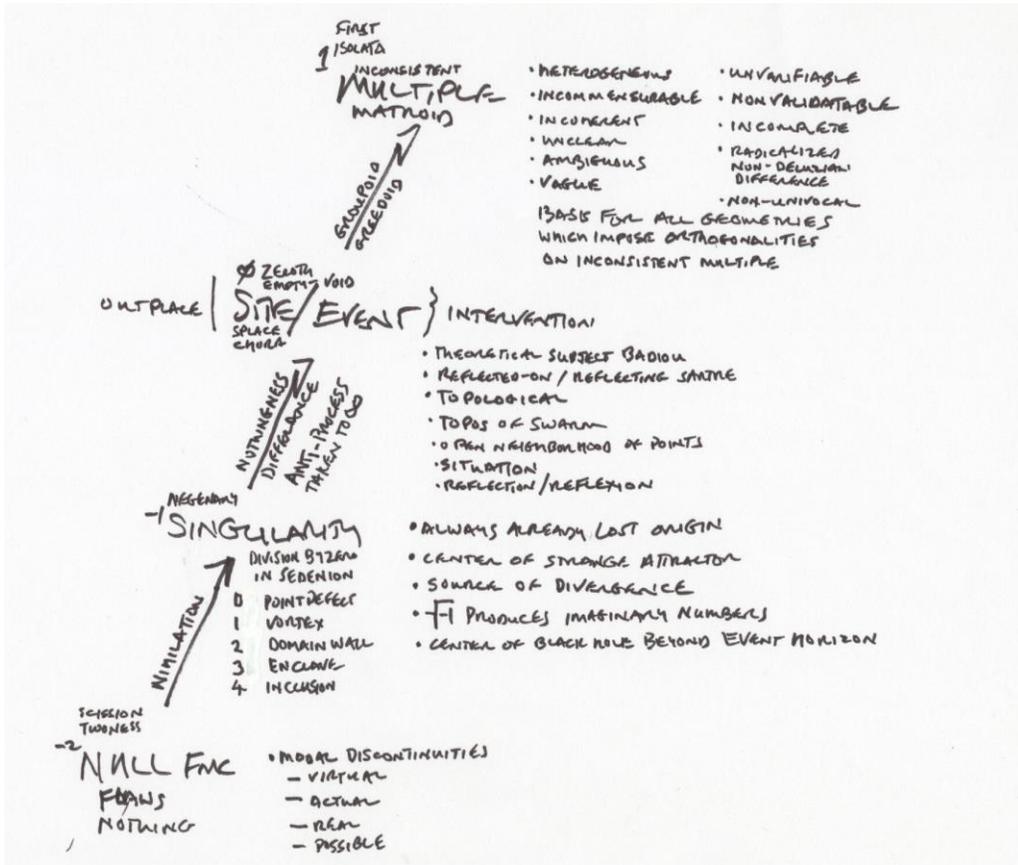


Figure 16. Ascending Limb of FMC Arc

Another connection that needs to be mentioned is the relation of Multiple to Matroid that generates Geometries which then appears as Topologies at the level of the Site Event. These are the mass-like underpinnings of the Set on the upward limb of the arc of the FMCs. On the other hand, expanding from the Mass we find the Whole related to Co-Algebras and the Holons related to Algebras. The Holons of the Special Systems are modeled best by Hyper-

complex Algebras. Rutten³⁶ has proposed the model of Co-Algebras for the System as a whole. These are the elements of the Kantian Meta-Episteme³⁷ that was uncovered by applying Category Theory to the Kantian Episteme and discovering that it is not Algebra that is the dual of Geometry but rather Co-Algebra. And this meant that there must be a Co-Geometry which was obviously Topology. But what is important³⁸ here is that it is the Mass-like Geometry related to Matroids that appear as the Multiple and Topology of the Site/Event that underlies Set Theory used by Badiou as the basis for Ontology. On the other hand it is Algebra and Co-Algebra that underly the Mass Theory that is the dual of Set Theory which appears associated with the Whole (Mereotopology) and the Holons that appear as the weakening of Algebra with the Hyper-Complex Algebras that are produced by the Cayley-Dickson process.

And this is particularly apropos in the light of the work of Alain Badiou which has posited that Set Theory is the basis of Ontology in his work *Being and Event*³⁹, and the second volume of this work explores the *Logics of Worlds*⁴⁰ as well. These ideas have been extremely influential because it represents a Continental Philosopher attempting to beat Analytic Philosophy at its own game, i.e. lure it into an exploration of Ontology and Metaphysics. Puntel's *Structure and Being*⁴¹ is the first major move in this direction by an Analytical Philosopher. And we welcome that engagement. However, we do not concede that Set Theory is the only basis for Mathematics. And thus, we developed the FMCs as a set of possible foundations for mathematics to show that the idea of a single foundation of any kind is just wrong headed. We call this 'afoundationalism' in contra-distinction to both Foundationalism⁴² and its post-modern dual which is Anti-Foundationalism⁴³. It was a happy side effect of developing this set of possible foundations that it could also be seen as a model of the evolution of the Emergent Event as a flourishing of various kinds of ordering in sequence aligned with the unfolding of Pascal's Triangle. We concede that there are myriad ways of identifying the possible foundations of mathematics and then aligning them with

³⁶ Rutten, Jan J. M. M. "Universal Coalgebra: a Theory of Systems". Amsterdam: CWI. Department of Computer Science CS, 1996. Theoretical Computer Science 249 (2000) 3–80 <https://fdit-www.cs.uni-dortmund.de/~peter/Rutten/UniversalCoalgebra.pdf>

³⁷ See Figures 41-43

³⁸ See Figure 38

³⁹ Norris, Christopher. *Badiou's Being and Event: A Reader's Guide*. London: Continuum, 2009. Baki, Burhanuddin. *Badiou's Being and Event and the Mathematics of Set Theory*. London ; New York : Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc, 2016. Watkin, William. *Badiou and Indifferent Being: A Critical Introduction to Being and Event*. London Bloomsbury Academic, 2017. Coombs, Nathan. *History and Event: From Marxism to Contemporary French Theory*. Edinburgh: Edinburgh University Press, 2015.

⁴⁰ Badiou, Alain. *Logics of Worlds: Being and Event II*. Bloomsbury Publishing Plc, 2019.

⁴¹ Puntel, Lorenz B, and Alan R. White. *Structure and Being: A Theoretical Framework for a Systematic Philosophy*. Pennsylvania: The Pennsylvania State University Press, 2008.

⁴² DePaul, Michael R. *Resurrecting Old-Fashioned Foundationalism*. Lanham, Md: Rowman & Littlefield, 2010. Rockmore, Tom. *On Foundationalism: A Strategy for Metaphysical Realism*. Lanham, MD: Rowman & Littlefield, 2004.

⁴³ Simpson, Evan. *Anti-foundationalism and Practical Reasoning: Conversations between Hermeneutics and Analysis*. Edmonton: Academic Printing, 1987. Crook, Stephen. *Modernist Radicalism and Its Aftermath: Foundationalism and Anti-Foundationalism in Radical Social Theory*. London: Routledge, 1991. Bernard-Donals, Michael F, and Richard R. Glejzer. *Rhetoric in an Antifoundational World: Language, Culture, and Pedagogy*. New Haven : Yale University Press, 1998. Rockmore, Tom. *Antifoundationalism: Old and New*. Temple Univ. Press: Philadelphia, 1992. Lyotard, Jean-François, and Geoff Bennington. *The Postmodern Condition: A Report on Knowledge*. Minneapolis, Minn: Univ. of Minnesota Press, 2010. Best, Steven. *Postmodern Theory*. London : Macmillan 1998. Natoli, Joseph P, and Linda Hutcheon. *A Postmodern Reader*. Albany: State University of New York Press, 1993. Lyotard, Jean F, Robert Harvey, and Mark S. Roberts. *Toward the Postmodern*. Amherst, N.Y: Humanity Books, 1999. Bertens, Hans. *The Idea of the Postmodern: A History*. London: Routledge, 2005. Baker, Keith M, and Peter H. Reill. *What's Left of Enlightenment?: A Postmodern Question*. Stanford, Calif: Stanford University Press, 2001. Smart, Barry. *Modern Conditions: Postmodern Controversies*. London, Angletterre: Routledge, 1992. Sokal, Alan D, and J Bricmont. *Intellectual Impostures: Postmodern Philosophers' Abuse of Science*. London: Profile Books, 2004. Tyler, Stephen A. *The Unspeakable: Discourse, Dialogue, and Rhetoric in the Postmodern World*. Madison, Wis: University of Wisconsin Press, 1987. Barker, Stephen. *Signs of Change: Premodern, Modern, Postmodern*. Albany: State University of New York Press, 1996.

each other to form a sequence that might be of some philosophical interest. This one example attempts to show why it is a good idea to extend Badiou's emphasis on Set Theory to cover other possible foundations. We do not want to go deeply into our disagreements with Badiou here, but merely try to show how by linking the FMCs with Badiou we get a picture of why such a sequence might be of philosophical interest.

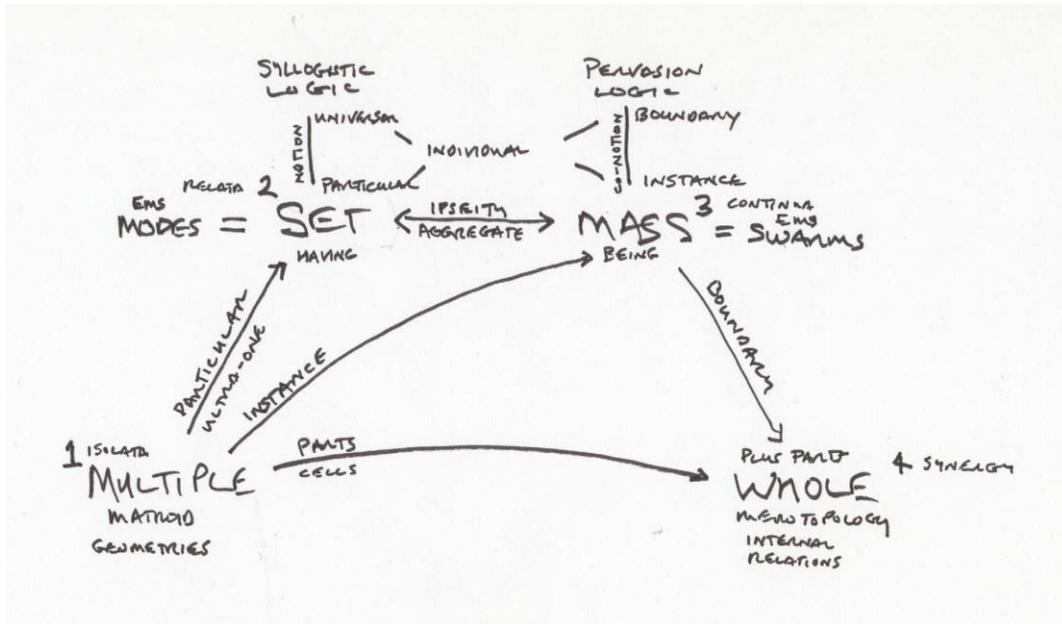


Figure 17. Apex of FMC Arc

Our own work on this was to compare it with Euclid's Geometry and its common notions, axioms and definitions to see that the various possible foundations identified here were also implicitly present there. We take Euclid's Geometry as fundamental in terms of establishing the mathematical basis of the Western tradition over 2000 years. Its connection historically is much better established than Set Theory⁴⁴ which is a relatively recent development and mired in paradox. And we see Euclid as an explicit formulation of rationality within the Western tradition that institutes a particular concept of Being. That concept of Being is 'Pure Being' based on proofs that establish geometrical knowledge as unchanging⁴⁵. And so, Euclid has always been central to our tradition as its mathematical underpinning. And the fact that we can see traces of the FMCs in the common notions, definitions and axioms of Euclidean Geometry is some evidence that these foundations we have identified are indeed mutually foundational to our tradition and relevant to Ontology as the primary example of the establishment of Pure Being based on Proof in our tradition. However, producing a proof is

⁴⁴ Hintikka, Jaakko. From Dedekind to Gödel: Essays on the Development of the Foundations of Mathematics. Dordrecht: Kluwer Academic Publishers, 2010.

⁴⁵ Husserl, Edmund, and David Carr. The Crisis of European Sciences and Transcendental Phenomenology: An Introduction to Phenomenological Philosophy. Evanston: Northwestern Univ. Press, 2006. Dodd, James. Crisis and Reflection: An Essay on Husserl's Crisis of the European Sciences. Dordrecht: Springer Science + Business Media, Inc, 2005. Hyder, David J, and Hans-Jrg Rheinberger. Science and the Life-World: Essays on Husserl's Crisis of European Sciences. Palo Alto: Stanford University Press, 2010. Husserl, Edmund, and Joseph Q. LAUER. Phenomenology and the Crisis of Philosophy. Philosophy As Rigorous Science and Philosophy and the Crisis of European Man. Translated with Notes and an Introduction by Quentin Lauer. New York: Harper & Row, 1965. Banham, Gary. Husserl and the Logic of Experience. Houndmills, Basingstoke, Hampshire: Palgrave Macmillan, 2005. Derrida, Jacques, and John P. Leavey. Edmund Husserl's Origin of Geometry: An Introduction. Lincoln, Neb: University of Nebraska Press, 1989.

a Process and it has some limitations within Euclidian Geometry which only uses the straight edge and compass.

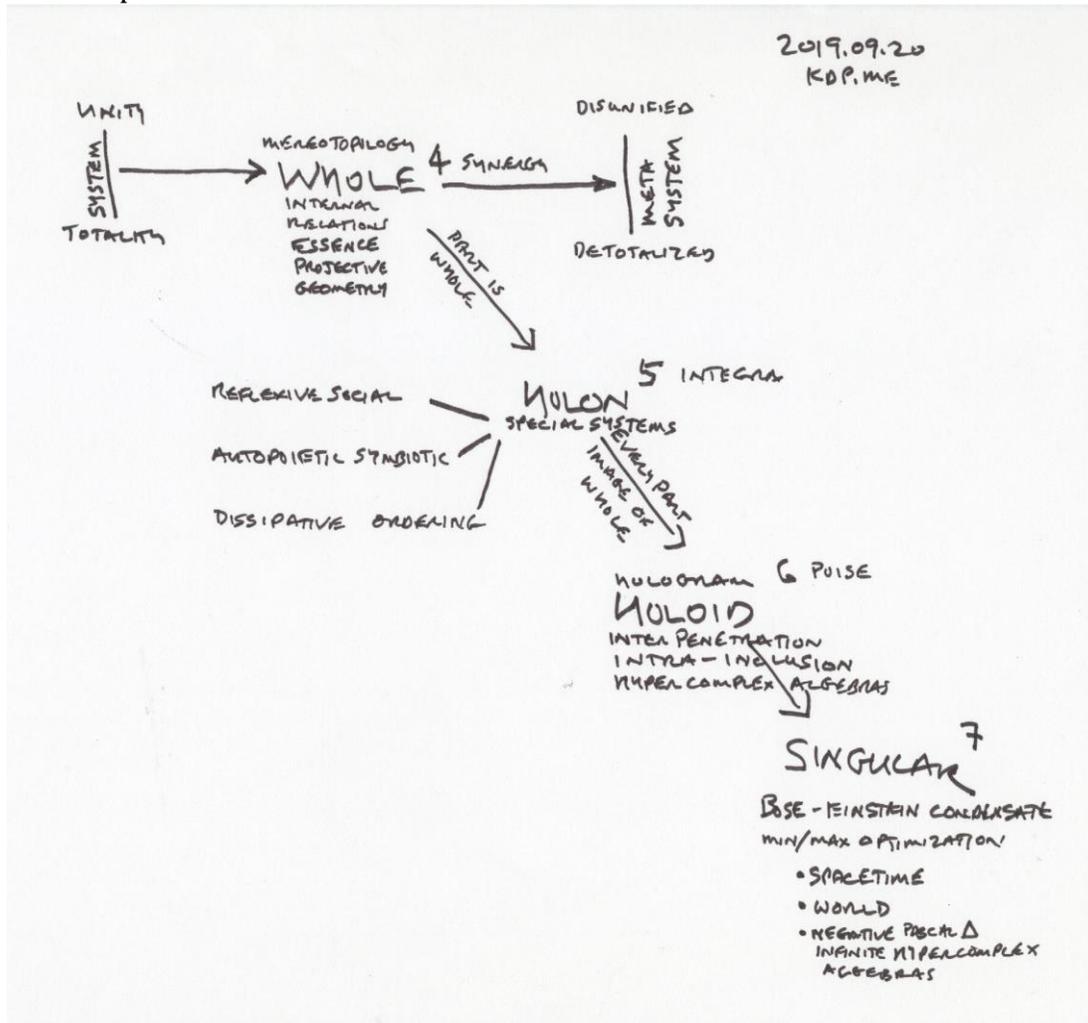


Figure 18. Descending Edge of FMC Arc

Euclid's Geometry is based on and demonstrates the efficacy of both Pure Being (result of proof) and Process Being (process of proving). Reference should be made to Husserl's Origin of Geometry⁴⁶ and Derrida's *Introduction*⁴⁷ to it in order to understand better the implications of this. And most significant for us is the understanding that if the paper (or

⁴⁶ Husserl, Edmund, Maurice Merleau-Ponty, Leonard Lawlor, and Bettina Bergo. *Husserl at the Limits of Phenomenology: Including Texts by Edmund Husserl, Maurice Merleau-Ponty*. Evanston, Ill: Northwestern University Press, 2002. Husserl, Edmund, Peter McCormick, and Frederick Elliston. *Husserl, Shorter Works*. Notre Dame, Ind: University of Notre Dame Press, 1981. Feist, Richard A. *Husserl and the Sciences: Selected Perspectives*. Ottawa: University of Ottawa Press, 2004. Biagioli, Francesca. *Space, Number, and Geometry from Helmholtz to Cassirer*. Cham, Switzerland : Springer, 2016. Mohanty, J N. *Edmund Husserl's Freiburg Years, 1916-1938*. New Haven: Yale University Press, 2011.

⁴⁷ Derrida, Jacques, and John P. Leavey. *Edmund Husserl's Origin of Geometry: An Introduction*. Lincoln, Neb: University of Nebraska Press, 1989. Depp, Wallace D. *An Examination of Derrida's Introduction to Husserl's Essay on the Origin of Geometry*. Ph. D. Florida State University, 1985. Lawlor, Leonard. *Derrida and Husserl: The Basic Problem of Phenomenology*. Bloomington: Indiana University Press, 2002. Kates, Joshua. *Essential History: Jacques Derrida and the Development of Deconstruction*. Evanston, Ill: Northwestern University Press, 2005.

velum) that the proof was written on was taken up and folded through origami⁴⁸ then problems that could not be solved with Euclidian theoretical means based on logos and diagrams⁴⁹ could have been solved by other physically pragmatic means. This shows that the *traces* of the folds in the paper medium are significant even though that medium is ignored by Euclidian Geometry. These *traces* of the folds in the paper made by Origami manipulations are what Derrida calls difference seen in terms of hinges⁵⁰. Thus by contrasting Euclid's Geometry to Origami we can get an excellent view of the relation of Pure and Process Being to Hyper Being of Differance which Plato calls the *third kind of being* in the Timaeus associated with the Chora or Receptacle which would be the philosophical equivalent of the paper to the writing of Geometry proofs. Wild Being appears with the production of various mechanisms for making tracs beyond the compass and straight edge that appeared in the time of Descartes and were all the rage as mathematical gadgets solving geometrical problems mechanically. Eventually these were developed by Babbage⁵¹ into designs for mechanical computers⁵² which were the precursor to electronic computers.

Kinds of Being

Ultra	- no hands	- obliteration	- Being ⁵
Wild	- out-of-hand	- encompassing	- Being ⁴
Hyper	- in-hand	- bearing	- Being ³
Process	- ready-to-hand	- grasping	- Being ²
Pure	- present-at-hand	- pointing	- Being ¹

Schematized Spacetime receives being

Figure 19. Kinds of Being seen in terms of Meta-levels

The key ideas to be added to the FMCs is that embedded in their arc is a microgenesis of the Emergent Meta-system (EMS). And this microgenesis also relates to a version of the Orthogonal Centering Dialectic inscribed within the hierarchy of the folded FMC arc. And also, we appeal to the Cantor Diagonalization Theorem to explain the structure of both the upward and downward limbs of the Arc. This encapsulates the key insight that will be described in this paper. What is necessary to understand is that this transition is between the de-emergent Meta-system and the Emergent Meta-system which represent the old and new emergent ordering respectively.

⁴⁸ Lang, Robert J. *Twists, Tilings, and Tessellations: Mathematical Methods for Geometric Origami*. Boca Raton, FL : CRC Press, Taylor & Francis Group, 2018. Hull, Thomas. *Origami3: Third International Meeting of Origami Science, Mathematics, and Education*. Natick, Mass: A K Peters, 2002. Bohac, Marci S. *The Mathematics of Origami*. M.S. Eastern Washington University, 2005. Hernandez, Edwin A. P., Darren J. Hartl, and Dimitris C. Lagoudas. *Active Origami: Modeling, Design, and Applications*. Cham, Switzerland : Springer, 2019. Sriraman, Bharath, and Viktor Freiman. *Interdisciplinarity for the Twenty-First Century: Proceedings of the Third International Symposium on Mathematics and Its Connections to Arts and Sciences*, Moncton 2009. Charlotte, N.C: IAP, Information Age Pub, 2011. Montroll, John. *Origami Polyhedra Design*. Natick, Mass: A K Peters, 2009. Mitchell, David. *Mathematical Origami: Geometrical Shapes by Paper Folding*. S.l.: Tarquin Pubns, 2020.

⁴⁹ Stjernfelt, Frederik. *Diagrammatology*. Dordrecht: Springer Netherlands, 2007.

⁵⁰ Jacques Derrida. *Of Grammatology*. Baltimore: The Johns Hopkins University Press, 1998. Spivak, Gayatri translator.

⁵¹ https://www.wikiwand.com/en/Charles_Babbage

⁵² <https://www.computerhistory.org/babbage/>

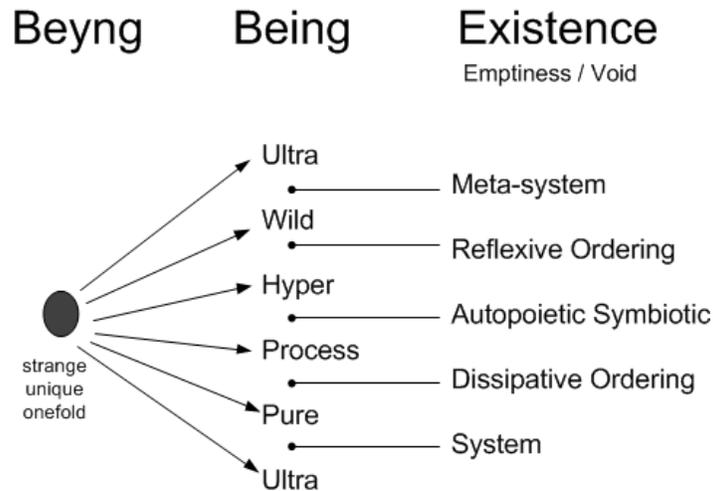


Figure 20. interleaving of Special Systems with the Kinds of Being

It seems clear now that the various pairs of FMCs that are related to each other as bookends of various levels in the FMC folded hierarchy⁵³ are associated with different aspects of the EMS that are cognate with the various Special Systems that make up the EMS. The EMS is a combination of a System plus the Special Systems. It should be noticed⁵⁴ that the System appears in the Niche of the Meta-system. The Meta-system has as its “essence” a Locus (Nerve⁵⁵, i.e. essence-like infrastructure). The Essence is related to a Source Form as series of constraints that allow copies to imitate that model. Copies are related to the Source Form through participation whose inverse is Ousia (presence of the good). The empty Niche is a Zeroth. The Source Form is an image of the One which is a First. The Essence is based on Scission which is the power of Twoness. The Figure that appears as copies of the System is a continuity of disseminations that are figures on grounds of the Meta-system and thus an image of mediation which is Third.

- Three =Figure (System) on Ground of Meta-system field
- Two = Essence (Scission, power of Twoness) = Complementarity⁵⁶
- One = Source Form (Idealization, power of Oneness) = Wholeness of Meta-system
- Zeroth = Niche (Emptiness) = Void

The System as Figure covers the Locus Nerve of the Meta-system. The Form as Figure covers the Nucleus Nerve of the System. The Pattern as Figure covers the Essence Nerve of the Form. The Monad as Figure covers the Structure Nerve of the Pattern. In other words, the so-called ‘Essence’ or better ‘Nerve’⁵⁷ of each Schema is covered by the prior schema in the hierarchy of schemas. Essence is a pattern of constraints. Structure is a monad of ordered facets of

⁵³ Notice that the FMC hierarchy is folded and this is like the folds in Origami.

⁵⁴ See Figure 37

⁵⁵ https://www.academia.edu/29403507/Schematic_Nerves

https://www.academia.edu/36071713/Essential_Schemas_Theory_Grounding_Schematic_Nerves

⁵⁶ Plotnitsky, Arkady. *Complementarity: Anti-epistemology After Bohr and Derrida*. Durham: Duke Univ. Press, 1994.

⁵⁷ [https://www.wikiwand.com/en/Nerve_\(category_theory\)](https://www.wikiwand.com/en/Nerve_(category_theory))

content. These elements associated with Philosophical Principles are the Generators⁵⁸ of the Situation of Site/Event that gets repeated at each higher level of the Schemas.

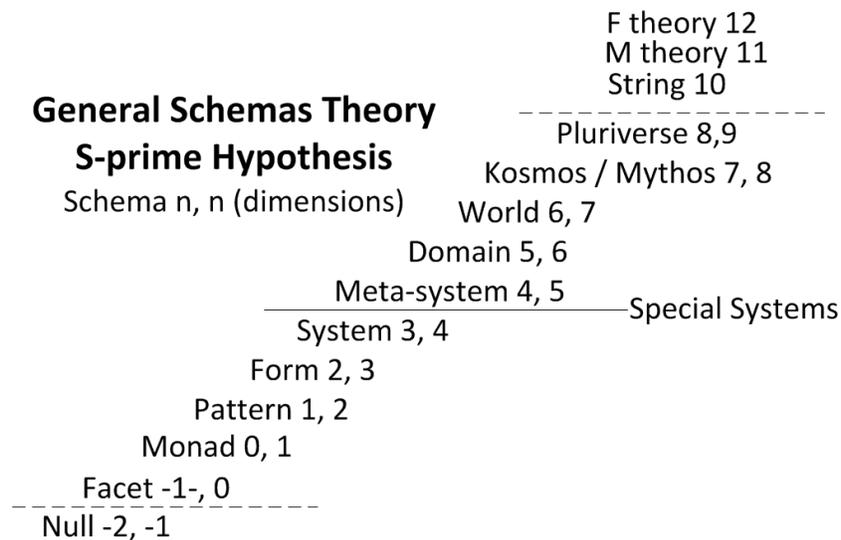


Figure 21. Schemas Theory

This means that the EMS has a well-defined Locus covered over by the System that appears as Figure that stands out on the Meta-system background. And this locus is depleted in the de-emergent meta-system because in that case the system is separated from its background in the meta-system. The Emergent Meta-system is a rare event compared to the norm of having a de-emergent meta-system as the depleted homogenous plenum that the system is seen sitting on unrelated to it. The background of the depleted and deflated de-emergent Meta-system is a reservoir of Nihilism that grows over time until the advent of the novum of the Emergent Event. The Emergent Meta-system has active niches in which the system might dock with it as it acts as an Operating system for it supplying resources of various kinds to the System. System has a duality with the Process. The Process is the mass-like version of the System. The dual of the Meta-system is the Meta-process. Thus, Set Theory and Mass Theory are the basic duality by which the complementarity of the 'nerve' of the Meta-system Locus is understood. Set Theory comprehends it digitally while Mass Theory comprehends it in an analog manner. Another way in which it may be further explicated is in terms of Algebra/CoAlgebra verses Geometry/Topology in terms of the Kantian Meta-episteme⁵⁹. It is clear that the Set has its own logic which is traditional syllogistic logic. The logic of Mass Theory is pervasion logic⁶⁰. When we drop down to the Multiple which is a Matroid the logic is the Topoi and its topological characteristics are found in the Site/Event FMC.

⁵⁸ See Figure 37

⁵⁹ https://www.academia.edu/7993339/Epistemic_Roots_of_the_Schemas_for_Synergistic_Engineering

⁶⁰ https://www.wikiwand.com/en/Buddhist_logico-epistemology Matilal, Bimal K, Jonardon Ganeri, and Heeraman Tiwari. *The Character of Logic in India*. New Delhi: Oxford University Press, 1999.

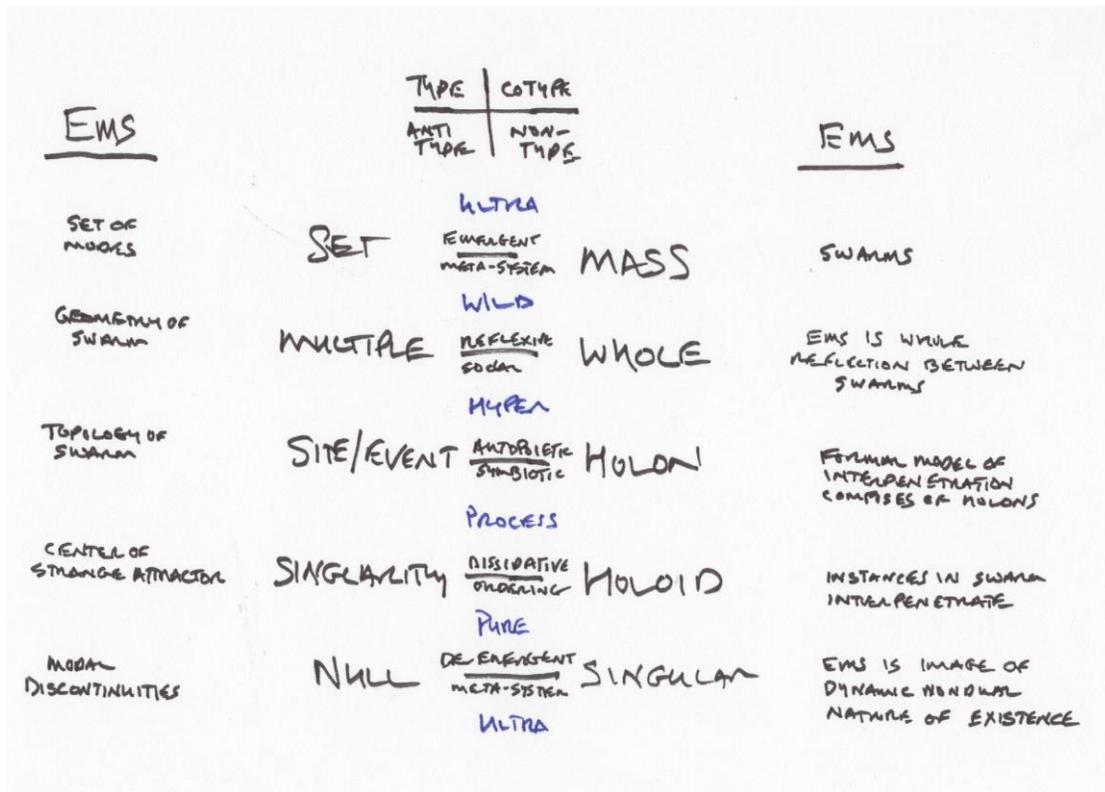


Figure 22. EMS characteristics in relation to FMC Arc

If we move up from the Mass to the Whole the logic is dialectical. At the level of the Holon we would posit that this is the Matrix Logic⁶¹ of August Stern. Thus, each of the FMCs have their own logic and the whole series forms a meta-logic⁶². We are seeing each of these Mathematical Categories as being described in terms of Mathematical Category Theory⁶³. Beyond the Set and Mass FMCs there is a Type Theory cap that encompasses Type, Co-Type (Class), Anti-Type, and Non-type. The types form a Greimas square⁶⁴. In series⁶⁵ there is the cap of the nominal differentiation of Logical Type Theory based on Homotopy Type Theory⁶⁶ based in topology and related to Ramified Hierarchical Type Theory⁶⁷ of Russell. Then there is the pair of FMCs that are the locus of the EMS related to Set and Mass FMCs. Then below that is another pair comprised of Multiple as Matroid with Groupoid plus Whole as a Mereotopology. This is associated with the Reflexive Social Special System. Then below that

⁶¹ Stern, August. *Matrix Logic and Mind: A Probe into a Unified Theory of Mind and Matter*. Amsterdam: North-Holland/Elsevier, 1992. Stern, August. *Matrix Logic*. Amsterdam: North Holland, 1988. Stern, August. *The Quantum Brain: Theory and Implications*. Amsterdam: North-Holland/Elsevier, 1994. Stern, August. *Foundations of Intelligence Code*. Hoogezand: Stubeg, 1983. Stern, August. *Quantum Theoretic Machines: What Is Thought from the Point of View of Physics*. Amsterdam [etc.: Elsevier, 2008.

⁶² <https://www.academia.edu/9913135/Meta-Logic>

⁶³ https://www.wikiwand.com/en/Category_theory

⁶⁴ https://www.wikiwand.com/en/Semiotic_square

⁶⁵ See Figure 15

⁶⁶ https://www.wikiwand.com/en/Homotopy_type_theory <https://homotopytypetheory.org/>

https://www.wikiwand.com/en/Homotopy_type_theory

⁶⁷ <https://plato.stanford.edu/entries/type-theory/>

is the Site/Event FMC related to the Holon. This is associated with the Autopoietic Symbiotic Special System. Then below that is the Singularity plus the Holoïd which is a Hologram signaling the arising of interpenetration and intra-inclusion. This is associated with the Dissipative Ordering Special System. Then below that is the Null FMC plus the Singular FMC. This is the De-emergent Meta-system.

It turns out that Sartre in Critique of Dialectical Reason⁶⁸ (CDR) has a model of the Special Systems in the context with the Meta-system completely worked out. In that scheme the de-emergent meta-system is the Serial state of Alienation with its isolation of Human Beings related to Collectives. Then out of that comes the Fused Group that is like the Dissipative Ordering Special System. Added to that is the Autopoietic Symbiotic Special System seen in the Statutory Pledge group. Added to that is the Reflexive Social Special System that appears as the Organization. Then finally there is the equivalent to the System which is the Institution. An Institution is in a social and cultural environment which is its Meta-system. We recognize the Firm that is legally established, its name is published in the newspaper “doing business as” some name. However, the Enterprise⁶⁹ is the meta-system with its emergent associated qualities as the meta-system within this Institutional System. But the Enterprise as Meta-system may go beyond the Firm as System and relate to all the other entities that are part of its mission to interact with in the broader environment beyond the boundaries of the institution of the firm itself. So, there is in the CDR a good example of this sort of hierarchy which I just discovered unexpectedly on a recent second reading after many years.

These pairs of FMCs at the various levels augment each other. But what I had not noticed before is that we can see that they relate to key features of the Emergent Meta-system (EMS)⁷⁰ and we can see this series of FMC pairs as being an insight into the microgenesis of the Emergent Meta-system out of the de-emergent Meta-system where the former is the new paradigm/episteme/ontos and the later is the old one that is fading as a new ordering is established after the Emergent Event. The microgenesis⁷¹ embeds the EMS into the stages of arising of the Emergent Meta-system out of the de-emergent meta-system. But to understand this we must realize that the formation of the FMCs on the upward limb⁷² of their arc is organized according to the Diagonalization of Cantor as is the downward limb⁷³ of their arc. And so, this brings us back to looking at the upward arc in terms of Badiou’s ontology.

Out of the Null FMC which can really only be seen in terms of flaws in a the Singular of SpaceTime or some other singular like the World there appears the Singularity by an act of

⁶⁸ Sartre, Jean-Paul, and Arlette Elkaim-Sartre. *Critique of Dialectical Reason*. London: Verso, 2009.

⁶⁹ This idea of Enterprise as Meta-system due to James Martin. Personal Communication. Martin, James N. *Systems Engineering Guidebook: A Process for Developing Systems and Products*. Boca Raton: CRC Press, 2000.

⁷⁰ See Figure 32

⁷¹ Abbey, Emily. *Innovating Genesis: Microgenesis and the Constructive Mind in Action*. Charlotte: Information Age Publishing Inc, 2008. Ögmen, Haluk, and Bruno G. Breitmeyer. *The First Half Second: The Microgenesis and Temporal Dynamics of Unconscious and Conscious Visual Processes*. Cambridge, MA: MIT Press, 2006. Bachmann, Talis. *Microgenetic Approach to the Conscious Mind*. Amsterdam: John Benjamins Pub. Co, 2000. <http://www.gestaltrevision.be/en/resources/reference-guides/67-what-we-do/overview/research-areas/high-level/contours-and-curvature/78-microgenesis-of-fragmented-picture-identification> https://www.academia.edu/36188930/Foundations_of_Systems_Architecture_Design_07_Microgenesis_of_Internal_Difference

⁷² See Figure 16

⁷³ See Figure 18

Nihilation. This is the Nihilation of Nothing. Singularities may have various dimensions as we see them in the Bose-Einstein condensate our model for singulars.

Dimensional Singularities

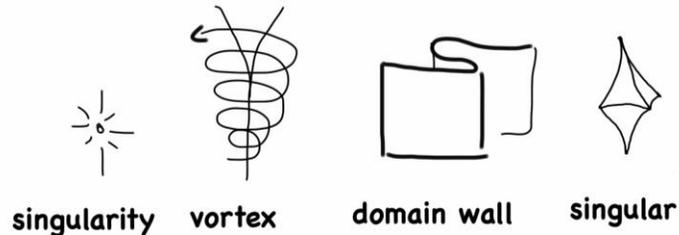


Figure 23. Dimensional Singularities

They can be point singularities, or vortices around a line singularity, or domain walls that are two dimensional or enclaves that are three dimensional and so on presumably up to any dimension. Our example of Singularities with respect to the EMS is the division by zero elements in the Sedenion⁷⁴ hypercomplex algebra⁷⁵.

Hyper-complex algebras unfold from the singularity of $\sqrt{-1}$

- Real
- Complex - lose unity of conjugate
- Quaternions - lose the commutative property
- Octonions - lose the associative property
- Sedenions - lose the division Property
- Infinity of less and less interesting algebras

Produced via the Cayley-Dickson process

Figure 24. Hyper Complex Algebras

But it also appears as the singularity of minus one which is the gateway to the imaginary numbers through the square root operation. This we call the Neganary Philosophical Principle. Nihilation is how we modify nothing to establish a domain wall or some other singularity within the Singular condensate. However, this leads to the positing of Nothingness that gives rise to the Site/Event FMC. Site/Event FMC represents the Emptiness or Void Zeroth Philosophical Principle.

⁷⁴ <https://www.wikiwand.com/en/Sedenion>

⁷⁵ https://www.wikiwand.com/en/Hypercomplex_number

It is here where we enter into Badiou's philosophy. Badiou wants a topological model of the subject⁷⁶. In this FMC model there is a topologically determined Site, but it is related to an Event so that we have a representation of local spacetime⁷⁷. The event is reflexive in a cognitive way while there is behaviorally reflexion through intervention in the site. This is at the level of the Void because it appears as an adumbration of the Chora or Receptacle which has the *third kind of Being* according to Plato. This allows us to understand how Nothingness of Sartre and Difference of Derrida are essentially the same. According to Fraser⁷⁸ Nothingness appears between the Event and the Intervention. But we might add that differance appears between the Site and the Event in its differing and deferring. The Event is related to reflected-on and reflecting in the synopsis that Sartre posits that never achieves synthesis, but which establishes a situation. We note that Coutu⁷⁹ identifies the idea of Tendency in Situation (TINSIT) as the basic element of his description of sociality. The Site/Event situation is fragmented with different images of Hyper Being as the discontinuities between patches of Wild Being with varying potentials that are the diaspora of tendencies in the situation. These five patches of Wild Being in the situation can be related to the Pentalectic in Emergent Design dissertation (UniSA 2009) and also to the equations⁸⁰ of inward/outward erasure and deconstruction in *of Grammatology*⁸¹ of Derrida. In this way, we can see how situations can be seen in terms of propensity, disposition and tendency associated with Wild Being and not just in terms of Hyper Being. The key point is that the topological Site/Event is a description of the elements in the Situation, which can be thought of as a micro-World, that gives rise to a description of ensembles using the Multiple which can be seen as a Matroid. Notice the Matroid is what distinguishes the Monad and Facet in Schemas Theory, as it is the embodiment of orthogonality⁸². The Multiple is pure heterogeneity and incommensurability. Out of the Multiple comes first the *ultra-one* which gives rise to the possibility of plurality. This is the realm of Firsts which are isolata. The *ultra-one* establishes that particulars or instances can be produced. In the case of the particulars they come to be the members of Sets. Sets are projected without any content just based on the one/zero designation of the null set and empty set. Set is related to the Second Philosophical Principle which is characterized as *relata*. The relation is that of belonging or membership. This is balanced by the relation between sets of inclusion that allows for subsets. Sets relate particulars to each other through a membership relation. The Set does not need any particulars to be completely defined so that the members of the set must come from the outside. The arising of the *ultra-one* is like the derangement operation (!) of the Cantor Diagonalization Category. The move from Site/Event to Multiple is like the Delta Δ operation that takes us from Set to PowerSet in the diagonalization process. The functional evaluation $f()$ is the projection of the Set as an ordering of the Multiple seen in terms of its plurality. The *ultra-one* is thus an uncountable excess. And as such it represents a fixed point delta δ

⁷⁶ Badiou, Alain, and Bruno Bosteels. *Theory of the Subject*. Bloomsbury Publishing, 2014.

⁷⁷ See Figure 25

⁷⁸

https://www.academia.edu/199621/This_infinite_unanimous_dissonance_A_Study_in_Mathematical_Existentialism_through_the_Works_of_Jean-Paul_Sartre_and_Alain_Badiou

⁷⁹ Coutu, Walter. *Emergent Human Nature: A Symbolic Field Interpretation*. New York: A.A. Knopf, 1949.

⁸⁰ See Figure 35

⁸¹ Jacques Derrida. *Of Grammatology*. Baltimore: The Johns Hopkins University Press,

1998. https://www.academia.edu/34370258/Adorno_with_Derrida_Deleuze_and_Zizek

https://www.academia.edu/31976900/Zizek_verses_Deleuze

⁸² https://www.academia.edu/38147459/Schemas_Theory_Overview_Part_06_Exploring_Faceted_Monads

in the structure of the Set. This fixed point has two manifestations which are on the one hand the Universe and on the other hand the null set \emptyset that is present in every set. In other words, there is no Super-set, i.e. set that contains all sets, because that leads to Russell's paradox. This then is a representation of the Cantor Diagonalization which is an embodiment of paradox. There is a paradox in the upward arc limb of the FMC evolution and another in the downward arc limb so that the two together gives us an absurdity. This unfolding is a synopsis of the philosophy of Badiou and we do not argue with it except in its details. Evidently it is a distillation and modification of Sartre's philosophy in Being and Nothingness (B&N) and CDR according to Fraser⁸³. And our point is that on the downward limb of the FMC arc we should find a similar structure⁸⁴ that is the dual of the one presented here.

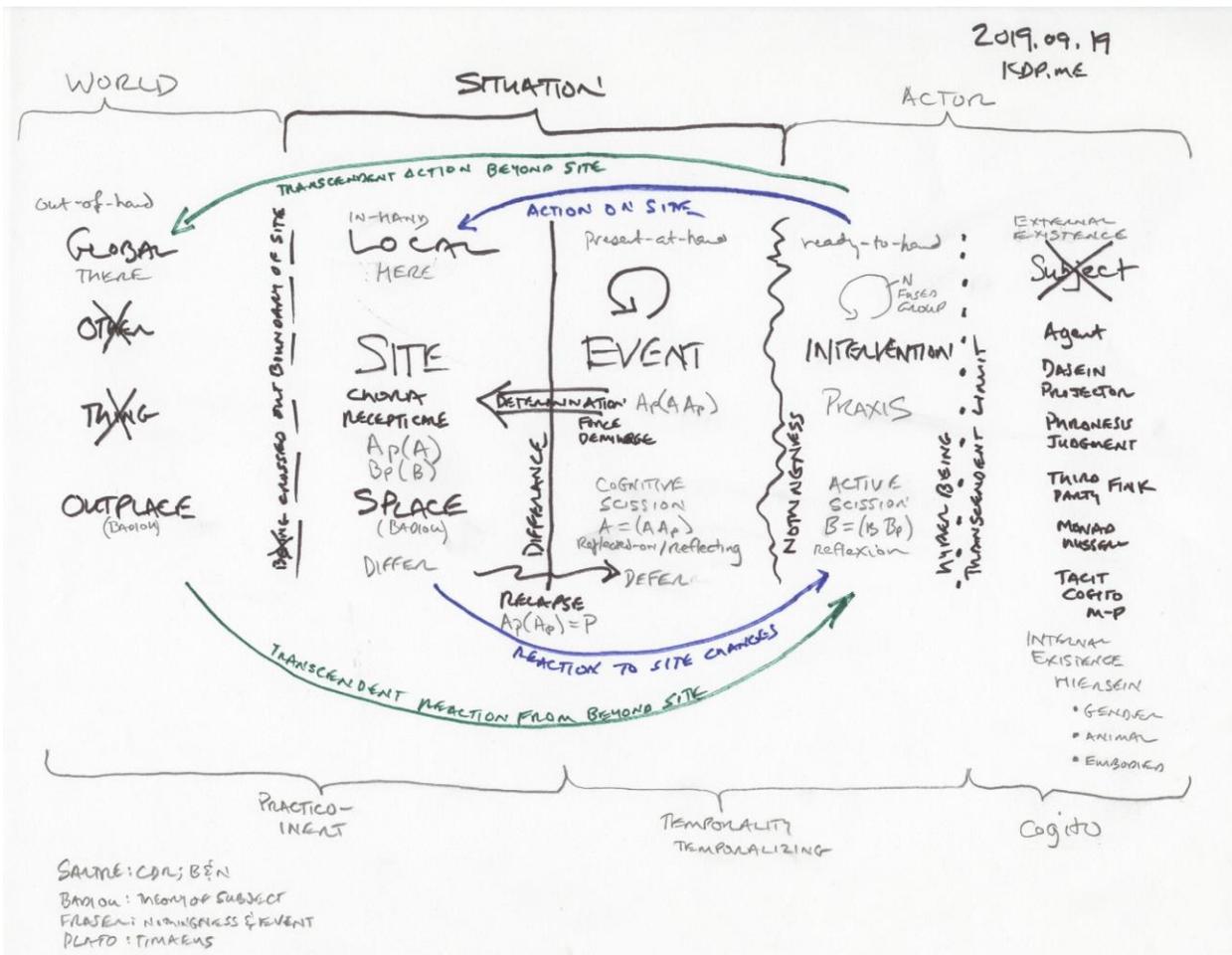


Figure 25. SITE/Event Situation

We go across the mirror into wonderland when we transform from Set Theory with Syllogistic Logic to Mass Theory with Pervasion Logic. Mass is a Third characterized by Continuity as a concrete continua or medium (sometimes related to substance with

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https://www.academia.edu/199621/This_infinite_unanimous_dissonance_A_Study_in_Mathematical_Existentialism_through_the_Works_of_Jean-Paul_Sartre_and_Alain_Badiou

84 Another Cantor Diagonalization structure.

properties). Sets are made of particulars and the emergence within them are in the particular. Masses are opposite this in that they are made of instances and the emergence is in the boundary of the mass as in waves or tides of the sea. When we go from the Mass to the whole what is added is a mereology to the boundary in order to produce a mereotopology⁸⁵. In this instance, we use the organism as the analogy for the whole and note that at a structural level it is made of cells. But these cells combine into parts (organs) that together make the whole as a sum greater than the parts. A Multiple which is the dual of the Whole on the other hand is a manifold full of holes. The Whole is related to the Fourth Philosophical Principle which is Synergy. It is a manifold whose content is not specified but which is the origin of every synthesis of content through its groupoid function. Wholes and parts are related to each other by becoming holons which are both wholes and parts at the same time as described by Koestler⁸⁶. The Special Systems are examples of Holons⁸⁷. Holons are related to the Philosophical Principle of Integrity which is a Fifth. But when we ultimately get to the cellular level we realize that through DNA coding they interpenetrate each other. Moving from Mass to Whole is like the Delta operation Δ that produces the PowerSet from the Set. Parts are embedded within the mass and Sartre calls this *interiorized multiplicity*. The recognition of the holon is like the coding of the parts that orders them. The derangement (!) selects out the anomalies of the Special Systems. And they are seen as defining the possibility of interpenetration formally. Notice that there is a single fixed point of the *ultra-one* on one side while on the other side there are three anomalies that appear as the Special Systems. One is a singularity at the origin of the swarm taken as a whole on the other side they are the formal definition of interpenetration in terms of Aczel's Non-well-founded Sets⁸⁸ that appear in the Cayley-Dickson process⁸⁹ that gives rise to the Hyper-complex algebras. There are four anomalies in all one on the side of the Set/Multiple and three that appear as the Special Systems on the side of the Mass/Whole. The Holoïd has the structure of a hologram as its embodiment of interpenetration and intra-inclusion. The Philosophical Principle associated with the Holoïd is Poise which is a Sixth.

Beyond the the Holoïd is the Singular which is a seventh. There may be an eighth which would be the minimum maximum optimization principles⁹⁰ such as we see in bubbles⁹¹ that naturally seek lowest energy. Sometimes the variable is maximized instead of minimized. However, Nature seems to seek global optimization of some phenomena. What would be the dual of this proposed FMC is unknown. It is perhaps merely a characteristic of Singulars and not a Philosophical Principle in its own right. However, we know that the EMS does function on the maximization and minimization principle. It minimizes energy expended but maximizes variety.

What we note with respect to this unfolding of the FMCs is that it is a reasonable emergent progression from one mathematical category to the next in which each of the categories plays a crucial role in managing the increase of complexity at each stage. Keeping the complexity

⁸⁵ <https://www.wikiwand.com/en/Mereotopology>

⁸⁶ Koestler, Arthur. *Janus: a Summing Up*. London, 1983.

⁸⁷ https://www.academia.edu/3795498/Holonomic_Alchemy

⁸⁸ Aczel, Peter, and Jon Barwise. *Non-well-founded Sets*. Stanford, Calif: CSLI, 2000.

⁸⁹ https://www.wikiwand.com/en/Cayley%E2%80%93Dickson_construction

⁹⁰ https://www.wikiwand.com/en/Minimal_surface

⁹¹ https://www.academia.edu/36022714/Rewriting_and_Extension_of_the_Three_Systems_Concepts_of_David_Rousseau

at each stage intelligible in terms of mathematical structure is an important role for the emergent sequence of the FMCs. Outward dimensional complexity governed by Pascal Triangle is controlled by the Schemas. But mathematical orders are inward determinants of complexity and the mathematical categories keep the complexity comprehensible. But because these are possible foundations of mathematics the types of order expressed in the categories are very different in each case producing an emergent series.

The next step is to see how the Emergent Meta-system is characterized by each step in this bookended sequence. We can read the microgenesis in either direction. We normally think of the microgenesis going from the de-emergent Meta-system to the Emergent Meta-system since this is the temporal order. But in order to understand it we have to read it in the opposite order from Emergent Meta-system to de-emergent Meta-system. There are meta-systems on either end of the micro-genesis but the robust and living meta-system is the one associated with a Systemic covering a nerve that appears as its Locus. In the de-emergent meta-system this is deflated and separated from the locus to appear in isolation on the homogenous plenum of the background of the de-emergent meta-system that acts as a hyperbolic geometry with entropy falling away in all directions from the closure of the system that is an elliptical geometry. The Emergent Meta-system with the Systemic locus as a nerve and that is the figure on its ground acts as a gestalt. So, the microgenesis goes from Set/Mass to Multiple/Whole to Situation/Holon to Singularity/Holoid and finally to Null/Singular. The Null/Singular pair is associated with extension and is seen as pure externality of the de-emergent Meta-system as what Sartre calls Seriality of the Collective where isolation of the individual and alienation is the norm. On the other hand, at the level of the Set/Mass we get the nerve of the Emergent Meta-system fulfilled by the System/Process duality. Beyond that there is the Type, CoType (Class), Anti-type and Non-type that are purely nominal, but act as a groupoid for the labeling and appears as a representation of the Ramified Hither Logical Types. In terms of the Orthogonal Centering Dialectic (OCD) this is related to External Difference. When we look at the OCD the first nihilistic duality is Set/Mass which is too much difference or too much identity. With respect to the EMS the Set is related to the modes of its cycle which Deleuze identifies in Bergsonism⁹² as virtual, actual, real and possible. These are associated with the various swarms that make up the EMS which are seeds in a pod, monads in a swarm, views in a constellation, and candidates in a slate. These swarms are inter-transformed by operations which give modal changes from seed to monad by a creation operator, from monad to view by a mutual action operator, from view to candidate by a schematization operator, and from candidate to seed by an annihilation operator. This structure is also ordered by its analogy to the Cantor Diagonalization process⁹³.

⁹² Deleuze, Gilles, Barbara Habberjam, and Hugh Tomlinson. *Bergsonism*. New York: Zone books, 2011.

⁹³ https://www.academia.edu/37922118/Minimal_Sartre_Diagonalization_and_Pure_Reflection

Explanation of Diagonalization diagram by John Bova: "With relabelings, this abstract presentation models equally well the uses of diagonalization by Gödel, Turing, Tarski, etc. (though so does Cantor's theorem itself, we come to see, in part through experiments of this sort). It is the central wager of my investigations here that the quasi-formalism now presented in three ways, which emerged unexpectedly from formal mathematics' reflection on itself (i.e., reflection on the matheme) is also the matheme of reflection, that is, that it exhibits, by participating in it, the essential trajectory of the self-application of the concept, whether this be called knowledge of knowledge, thinking of thinking, or even consciousness of consciousness, placing it in relation to a lack and excess that is at once reflection's limit and its own most possibility. The diagram can be read as the disturbing fixation of the true mediating relation, by its ascending and descending arrows, between its two levels—the level of first-order cognition at the bottom and the level of reflection at the top. The emergence of the true mediation is disturbing because the content of reflection's articulated truth is ironically identical to the recognition of its weakness. The specification of reflection's true relation to the pre-reflective has, as the fruit of its exceptional

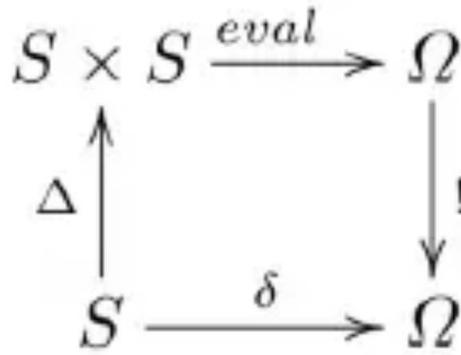


Figure 26. Category Theory diagram of Cantor Diagonalization

Schematization is the Delta operation Δ that produces the candidates. Annihilation is a selection operator that is equivalent to derangement (!). That means selected seeds (small delta δ) give rise to monads which will be in the Set to which the PowerSet will be applied as Delta Δ to give the Views. Then the Views are schematized as a functional Evaluation operation that labels the views and produces the candidates. Then the candidates are deranged (!) through a selection process via mutual annihilation with side effects. When we look at the EMS what we see is that the mass aspect is the swarms. However, the swarms are made up of ipseities in aggregate⁹⁴ rather than instances or particulars and they are nondual between these nihilistic alternatives. The swarms can be seen as Situations, or Ensembles, or Multiples or Sets but these are projections onto them. Their nature is nondual inherently as being the Same, or belonging together, as Heidegger indicates⁹⁵. Leibniz's Monadology⁹⁶ is a good model of the monads in the swarm that produces a pattern. Swarms go through a set of modes as they mutually transform as they go about the cycle that continually recreates them and then annihilates them in a cycle producing the ipseities in aggregate that make up the swarm out of nothing and then returning them to nothing where they only exist as a

eventual success, the breaking of the image of an accessory (Sartre) or Critian (Plato) faculty or power of reflection. The diagram works by producing, as δ or the diagonal function, a first-order witness of the failure of the reflective functions at the top to successfully inventory or index the first-order functions at the bottom. Note that, in Sartrean terms, this indicates an excess in pre-reflective intentionality which cannot be captured by an accessory reflection; at the same time the truth of this excess cannot be witnessed by the pre-reflective itself, but only by a purified reflection. The priorities of the pre-reflective and the reflective are thus appropriately distributed. Here, S is any set, of course including infinite ones; Ω is the truth-value object (classically 2); ! is any "derangement", that is, negation or any other fixed-pointless difference; $\text{eval}(x, y)$ returns the result of the function named by its first/second input applied to its second/first input; and Δ is the "diagonal functor" requiring us to consider the application of each function to its own index, for some putative indexing scheme. The term "diagonalization" is sometimes used narrowly to indicate only the application of this functor; I reserve it for the construction as a whole, and especially for the resultant function $\delta = !(\text{eval}(\Delta(s)))$, which is the crux of the diagonal theorems as a class, the central topic of philosophical interest, and which would otherwise go unnamed. Diagonalization in my sense thus includes as elements both the production of a fixed point through the use of the diagonal functor, and the exclusion of a fixed point from at least some intralogical operation (that is, some function from the truth-value object to itself). This distribution of fixed points is the essence of the discovered mediation between the two levels of reflection which enables us to evaluate reflection's global structure. One way of putting the necessity which the diagonal theorems express is this: if you exclude a fixed point over here, in the definition of negation, say, then you must pay the price of rediscovering it over there, that is, finding that the fixed point of reflection is not a facultative Critian power of knowledge of knowledge, but an exceptional Socratic knowledge of ignorance." Bova, John in "Minimal Sartre: Diagonalization and Pure Reflection" *Open Philosophy* 2018; 1: 360–37 <https://doi.org/10.1515/opphil-2018-0026>

⁹⁴ See Figure 40

⁹⁵ Heidegger, Martin, and Martin Heidegger. *Identity and Difference*. Translated. by Joan Stambaugh. New York: Harper & Row, 1969.

⁹⁶ Leibniz, Gottfried W, and Nicholas Rescher. *G.w. Leibniz's Monadology: An Edition for Students*. London : Routledge, Taylor & Francis Group, 2015.

trace, or more likely as a propensity, until the next cycle. This cycle is natural and is like that of the seeds, leaves, flowers and fruits that is the basis of the real dialectic according to Hegel in the preface to the Phenomenology of Spirit⁹⁷.

In our microgenesis we then move from the EMS with its System covering the Locus across Wild Being toward the next level which sees the pair Multiple/Whole. The Multiple is a Matroid and that gives rise to myriad geometries one of which is the Fano Projective Geometry that appears in the Reflexive Social Special System. Projective Geometries are purely diacritical and completely closed. This is the opposite of the EMS which is open and transforming. But we characterize the OCD in terms of this duality between Essence and EMS. This is an example of the second level OCD nihilistic duals that are produced out of the first nihilistic set of Set/Mass. It is in relation to these two nihilistic duals that are orthogonal to each other that Deleuze says we can find the *Internal Difference* or Difference-in-itself. The essence is an example of Internal Relations that are used by Hegel and Sartre in their philosophies in contrast to External Relations in extension. In terms of the EMS we can see it as a whole, but in the process of open conjunctive transformation between modes. These modes can be seen as four mirrors in which the various swarms are reflected. This is the *inwardly mirroring tetrahedron*, comprised of four facing mirrors, that appears in the Reflexive Social Special System, and onto that tetrahedron is inscribed the Projective Plane⁹⁸ $PG(3,2)$ which is made of 15 Fano planes⁹⁹ $PG(2,2)$ that are intertwined and interpenetrated. From geometry we get the anomalies of the Fano Planes which are non-orientable surfaces¹⁰⁰ and other projective geometries. From the Whole we get the structure of the Tetrahedron as Minimal System which when considered in terms of a mirroring reflected-on/reflecting system gives us the Inwardly Mirrored Tetrahedron that appears in the Reflexive Social Special System. Wholeness appears as geometrical configuration of the Minimal System and this holds a non-orientable surface that is the simplest projective geometry of Fano plane that is interpenetrated with itself to form a tetrahedral projective geometry that fills that minimal system. We can see the EMS as Multiple or Whole interchangeably. As a Multiple it is a Matroid from which we can select anomalous geometries such as the projective geometry that are non-orientable and thus nondual. On the other hand, we can see it as a whole as an example self-consciousness with a repetition of reflected-on/reflecting like that which Sartre constructs. This is repetition-for-itself as mentioned by Deleuze in the first part of Difference and Repetition¹⁰¹. The EMS is nondual between Multiple and Whole as the Reflexive Social Special System that makes up one of its moments in its cycle. By looking at it as Multiple we see its conjunction of ipseities in the aggregate. Buddhists would call these dharmas¹⁰² and Shaivites would call them Tattvas¹⁰³. An example of these are the *Me* in Sumeria which are the mechanisms of existence like simple

⁹⁷ Hegel, Georg W. F., Terry P. Pinkard, and Michael Baur. *The Phenomenology of Spirit*. , 2019.

⁹⁸ https://www.wikiwand.com/en/Projective_geometry

⁹⁹ https://www.wikiwand.com/en/Fano_plane

¹⁰⁰ <https://www.wikiwand.com/en/Orientability>

¹⁰¹ Deleuze, Gilles, and Paul Patton. *Difference and Repetition*. London ; Oxford ; New York ; New Delhi ; Sydney
Bloomsbury Academic, 2014.

¹⁰² <https://www.wikiwand.com/en/Dharma>

¹⁰³ <https://www.wikiwand.com/en/Tattva>

machines but for culture. Deleuze calls these *desiring machines* in *AntiOedipus*¹⁰⁴. By seeing the EMS as whole we see its entire lifecycle as with plants when we look at a forest of trees that have seeds, leaves, flowers, and fruits where all the different modes are present and visible at the same time. But when we consider it as nondual between these two visions what we see is the Reflexive Social Special System as Holon.

The next stage in microgenesis is to cross Hyper Being into the next level where there is Situation/Holon. The Situation sees the swarms as existing in spacetime and with a topology rather than a geometry. On the side of the Holon we have here the example of the Autopoietic Symbiotic Special System. This is what is nondual between the extremes of the Holon and the Situation. There are three holons but the autopoietic special system is between these extremes of the dissipative and reflexive holons. This level is described by Maturana and Varela¹⁰⁵ in their existential biology focused on the viability of the organism. The organism is seen as a closed living creature that fused with intelligence inwardly. The responses of this self-producing system cannot be predicted in a determinate way. The autopoietic system is perfection from the point of view of holonomics. The three special systems when brought into conjunction with the Normal System in the EMS formation gives us the dynamism of the Emergent Meta-system which is very much like the functioning of a genetic algorithm. The Autopoietic Special System has three facing mirrors that are mutually reflective. It is represented by the Kleinian Bottle as a non-orientable surface. Autopoietic Symbiotic Systems contain *negative information*¹⁰⁶. Thus, the Situation characterizes the modal transformation of the swarms. The Holon gives us the parts of the EMS formation as a dynamic configuration. These are specified by the Cayley Dickson process by which Hyper complex algebras are spawned. In terms of OCD this is where the nondual distinction that is the golden mean between the External Difference and Internal difference is produced. At this third level nonduality comes to the fore and becomes embodied overcoming the nihilism of the first two levels of the OCD method. This emergent appearance of nonduality at this level is unexpected.

The next stage in microgenesis is to cross Process Being into the next level where we get the pairing between the Singularity and the Holoïd hologram that embodies interpenetration. These are two ways of looking at the Dissipative Ordering Special System which is nondual between these extremes. The singularity is the point where the injection of negative entropy occurs at the center of the dissipative ordering special system. The Dissipative special system is made up of content that has been transformed into the system from the environment. But this occurs at the cellular system as a whole and we can see this as the DNA coding of the cells that is the mark of their interpenetration and intra-inclusion. There are division by zero singularities in the Sedenion which is the base hyper-complex algebra within which the cycling continues to occur over and over as a repetition. But that repetition as repetition-for-itself exists as what Deleuze calls an Eternal Return of difference which is a spiral rather than

¹⁰⁴ *Anti-oedipus : Capitalism and Schizophrenia*. University of Minnesota Press, 1998. Deleuze, Gilles, Félix Guattari, and Brian Massumi. *A Thousand Plateaus*. London: Bloomsbury, 2013.

¹⁰⁵ Maturana, Humberto R, and Francisco J. Varela. *Autopoiesis and Cognition: The Realization of the Living*. Dordrecht: Reidel, 1980.

¹⁰⁶ https://www.academia.edu/34467629/Dark_Entropy_and_Dark_Information

a circular cycle and in fact should be seen as a strange attractor as a perpetual information machine. The content of the EMS, the ipseities are interpenetrated and intra-included like the Monads of Leibniz¹⁰⁷. The EMS is a dynamic model of interpenetration and intra-inclusion like that we can see in the commentary¹⁰⁸ of the Awakening of Faith¹⁰⁹ by Fa Tsang¹¹⁰ in Hua Yen Buddhism¹¹¹. At this level there are two facing mirrors. The Dissipative Ordering Special System can be looked at as either based on a singularity from which order showers into a particular system as negative entropy. Or, it can be looked at as an interpenetration of all its content where the same ordering is imposed on everything in a fractal fashion. But actually, the Dissipative Ordering Special System is nondual and is based on negative entropy within a limited enclave protected from the second law of Thermodynamics and supplied with a continuous stream of energy to drive its organizing of itself. The Dissipative Ordering Special System contains two facing mirrors. It is represented by the Mobius Strip which is a non-orientable surface.

The last level of microgenesis is that across the threshold of Pure Being where we see the pair Null/Singular. The Null FMC shows up as flaws in the Singular which is the analog to the Bose-Einstein Condensate¹¹². Those flaws or discontinuities are seen in the modal troughs in which the Ipseities appear as if they were instantons. The Singular is the fundamental continuity of spacetime as a single thing. Or it may be another singular like the World. But in that singular Minimizing and Maximizing optimizations may occur as a possible Eighth Philosophical Principle. The de-emergent Meta-system can be seen as like the Clearing of Being of the old paradigm/episteme/ontos making way for the new emergent one that is taking shape in the Clearing in Being. This System that stands out on the plenum that is homogeneous has only one mirror which is the de-emergent Meta-system itself. We can look at the Meta-system as Empty or Void which is its nature in Existence. Or we can look at it as a singular across which minimization or maximization optimizations operate like the minimization of surface in bubbles. But the de-emergent meta-system is itself nondual between these two extreme views that we have fabricated to project on it to see it as deflated and no longer vital.

The next transition is through ultra Being to the Domain. On the other hand at the other end between the Logical Type Theory and the Systemic Nerve of the Emergent Meta-system there is also a threshold of Ultra Being. Forms appear nominally with types in this realm beyond Ultra Being.

¹⁰⁷ Leibniz, Gottfried W, and Nicholas Rescher. *G.w. Leibniz's Monadology: An Edition for Students*. London : Routledge, Taylor & Francis Group, 2015.

¹⁰⁸ Fazang, . *An English Translation of Fa-Tsang's Commentary on the Awakening of Faith*. Lewiston, N.Y: Edwin Mellen Press, 2004.

¹⁰⁹ Ásvaghoṣa, , and Yoshito S. Hakeda. *The Awakening of Faith: Attributed to Ásvaghoṣa*. New York: Columbia University Press, 2006.

¹¹⁰ <https://www.wikiwand.com/en/Fazang>

¹¹¹ Cook, Francis H. *Hua-yen Buddhism: The Jewel Net of Indra*. Delhi, India: Sri Satguru Publications, 1994. Zhang, Zhenji. *The Buddhist Teaching of Totality: The Philosophy of Hwa Yen Buddhism*. London: Routledge, 2009.

¹¹² https://www.wikiwand.com/en/Bose%E2%80%93Einstein_condensate

This model explains the relation between the Clearing of Being as the old paradigm/episteme/ontos and the revitalized and newly organized Clearing in Being that sports a new paradigm/episteme/ontos that grows up in the ruins of the old one. It explains this as a transition between the de-emergent meta-system and the Emergent Meta-system. And it makes this Emergence of a more vital meta-system through a set of microgenetic steps which are associated with the Special Systems and the Normal System. The EMS is seen as related to the Cantor Diagonalization scheme and the upward and downward limbs of the FMC unfolding are also seen as related to that scheme producing its odd structure. At each stage of unfolding of the folded FMC arc the bookend duals that are presented are related to the nonduals that need to be defined to make the EMS work. This microgenesis gives rise to the sequence of the Special Systems. And the sequence explains why it is that the OCD methodology can be used to identify nondual distinctions at the third level.

In general, this is a grand synthesis of the FMCs, the OCD, and the EMS formations along with its basis in the Special Systems and the meta-levels of Being. It explains mathematically the structure and nature of the Emergent Event which has been a long-time goal of my research over the past 40 or so years¹¹³. I am very satisfied to offer this glimpse of a possible answer to the conundrum of Emergent Events within the Western worldview throughout its history as discontinuities produced through our historicity. It is a speculative answer to a very old problematic that has matured over the years. But I am very pleased to offer it for the reader's consideration as the culmination of a very long research project that will claim success based on the production of this speculative model. No other likely model this detailed has been proposed to my knowledge. It gives us a theoretical departure for further research some of which might be aimed at either finding examples of its appearance or disproving it. And further research might also be aimed at coming up with another model like this one or even more detailed that is mathematically inspired, and perhaps philosophically even more interesting.

What does this tell us about the Emergent Event? It tells us that Badiou is on the right track in basing his thought on Mathematics but does not go far enough in his pursuit of a model of the Event¹¹⁴. When we extend his mathematical theory beyond Set Theory, Multiple and the Site/Event we find that we can produce a theory of Foundational Mathematical Categories that include many possible foundations of Mathematics. We can arrange those according to the Philosophical Principle of Peirce and Fuller. And we can see them as a trace inscribed in the bedrock of Existence for the Emergent Event. But we find here that this trace based on the sequence of the FMCs has embedded within it hidden an image of the microgenesis of the Emergent Meta-system. And we can see this connecting the deflated and de-emergent meta-system representing the old paradigm/episteme/ontos and the Emergent Meta-system as a model of the new paradigm/episteme/ontos that is reorganizing the Clearing in Being and replacing the Clearing of Being which writes the old paradigm/episteme/ontos under erasure as the ashen ruins out of which the phoenix of the Emergent Event must arise. This structure also has the form of the Orthogonal Centering Dialectic and thus it has a way of

¹¹³ Starting with dissertation [The Structure of Theoretical Systems in relation to Emergence](http://theses.lse.ac.uk/3174/). (U. London, LSE, 1982).
<http://theses.lse.ac.uk/3174/>
https://www.academia.edu/2711376/THE_STRUCTURE_OF_THEORETICAL_SYSTEMS_IN_RELATION_TO_EMERGENCE

¹¹⁴ Zizek, Slavoj. *Event*. Brooklyn, NY: Melville House Pub, 2014.

distinguishing nondually between the Nihilism and the meaningfulness of the new regime reorganizing and taking hold within the Clearing.

Appendix contains large versions of hand drawn figures. Some of these diagrams after Figure 33 are not explained in this paper but are provided as supporting information.

2019.09.19
K.P.M.E

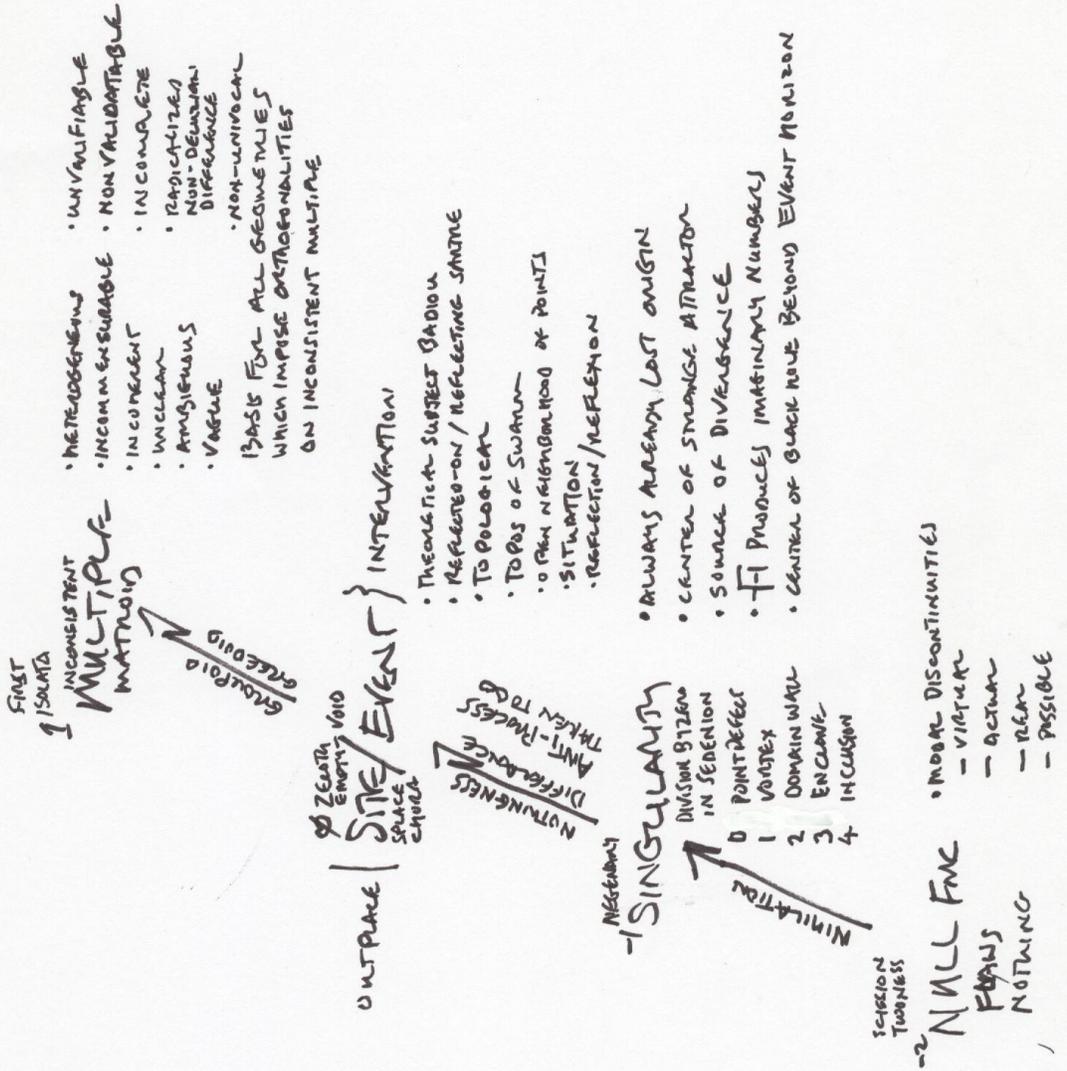


Figure 28. Upward Limb of Emergent Event Arc [Large]

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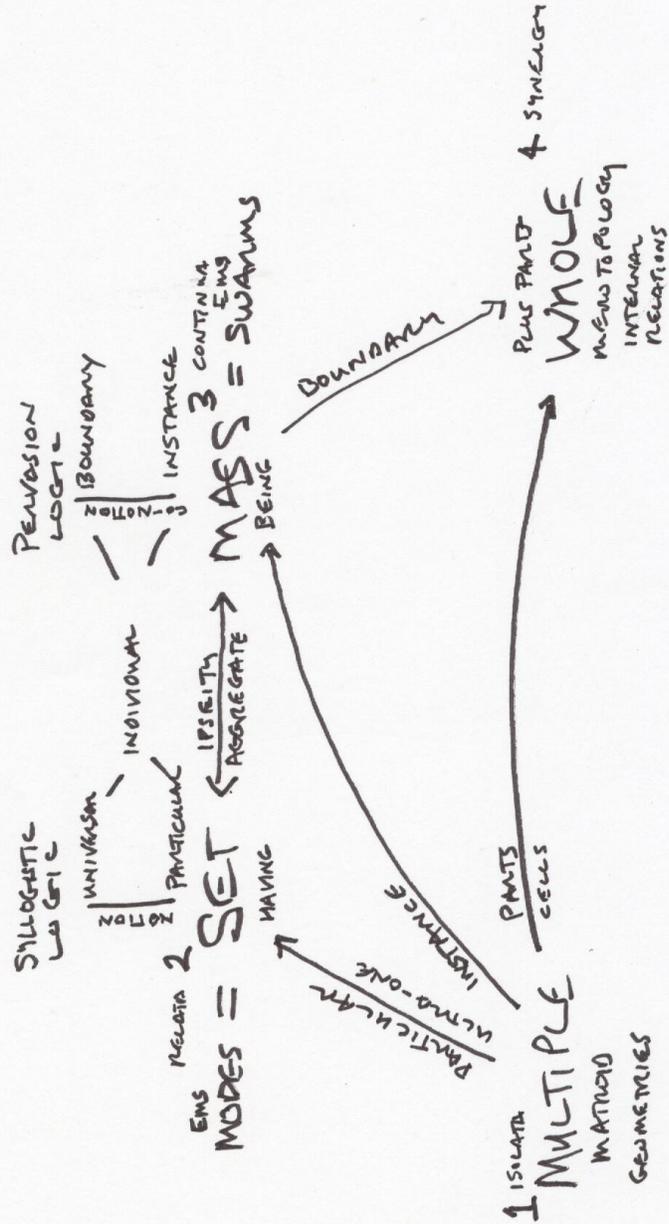


Figure 29. Top of Emergent Event Arc [Large]

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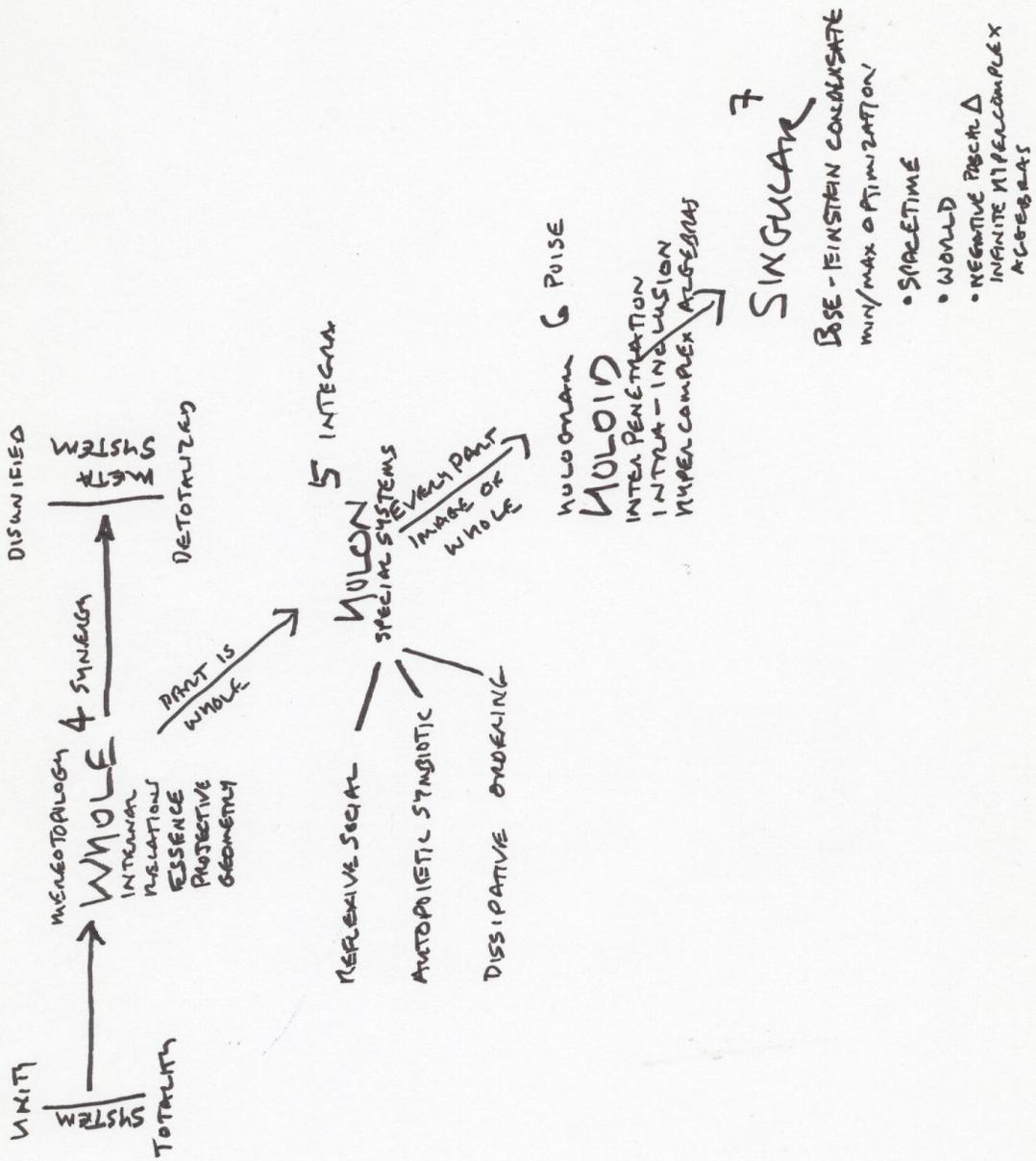


Figure 30. Downward Limb of Emergent Event Arc [Large]

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<u>EMS</u>		<u>EMS</u>	
TYPE	COTYR	ANTI TYPE	NON-TYPE
SET OF MODELS	SET	KUTRA EMERGENT META-SYSTEM	MASS
GEOMETRY OF SWARM	MULTIPL	WILD REFLEXIVE SOCIAL	WHOLE
TOPOLOGY OF SWARM	SITE/EVENT	HYPER ANTIBIOTIC SYMBIOTIC	HOLON
CENTRAL OF STRANGE ATTRACTOR	SINGULARITY	PROCES	HOLOID
MODAL DISCONTINUITIES	NULL	PURE DE-EMERGENT META-SYSTEM	SINGULAR

SWARMS

EMS IS WHOLE
REFLECTION BETWEEN
SWARMS

FURTHER MODEL OF
INTERDEPENDENT
COMPOSES OF HOLON

INSTANCES IN SWARM
INTERPENETRATE

EMS IS IMAGE OF
DYNAMIC HOLONAR
NATURE OF EXISTENCE

Figure 32. Embedded EMS Characteristics [Large]

2019.09.06

Kopoma

Humblyger & an Idea

Explains relation between old & new Paradigm via EMS & FMC Integration w/ OOD. (Uber - Studyings)

External Dynamic & Superficial

Type CoType
AuthType NonType

FMCs
LCMA
Network Emergence with Site-Locus
Reflexive Hyper
Autogenetic Process
Disruptive
Pure
System - de-fragment
LCMA

Emergent
Meta System
Enterprise

Multiple
Modes
Networks

Site/Event Intervention
Reflexive

Singularities
Various Dimensions
1. Locus
2. Domain Nodes
3. Enclave

Null Form
Nothing
Flaws

Network
Discontinuities
Are Like
Flaws in
Singularities

Deviated Network = Old Paradigm
Emergent Meta System = New Paradigm

First Level
Micro-Elements

WMOLE
Internal
Reactions

MOON
Origin

FOURTH LEVEL
Instances
in Summa
Interpenetration
Intra-Interpenetration

Space
Time
on
World

SINGULARITY
Base Einstein Condensate

EMS & FMC
Image
Dynamic
Network
Nature of
Existence

Network
Meta-System
Optimal

Second Level
Micro-Elements

WMOLE
Internal
Reactions

MOON
Origin

FOURTH LEVEL
Instances
in Summa
Interpenetration
Intra-Interpenetration

Space
Time
on
World

SINGULARITY
Base Einstein Condensate

EMS & FMC
Image
Dynamic
Network
Nature of
Existence

Network
Meta-System
Optimal

Third Level
Micro-Elements

WMOLE
Internal
Reactions

MOON
Origin

FOURTH LEVEL
Instances
in Summa
Interpenetration
Intra-Interpenetration

Space
Time
on
World

SINGULARITY
Base Einstein Condensate

EMS & FMC
Image
Dynamic
Network
Nature of
Existence

Network
Meta-System
Optimal

Fourth Level
Micro-Elements

WMOLE
Internal
Reactions

MOON
Origin

FOURTH LEVEL
Instances
in Summa
Interpenetration
Intra-Interpenetration

Space
Time
on
World

SINGULARITY
Base Einstein Condensate

EMS & FMC
Image
Dynamic
Network
Nature of
Existence

Network
Meta-System
Optimal

First Level
Micro-Elements

WMOLE
Internal
Reactions

MOON
Origin

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Intra-Interpenetration

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Intra-Interpenetration

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on
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SINGULARITY
Base Einstein Condensate

EMS & FMC
Image
Dynamic
Network
Nature of
Existence

Network
Meta-System
Optimal

Figure 33. Original Draft

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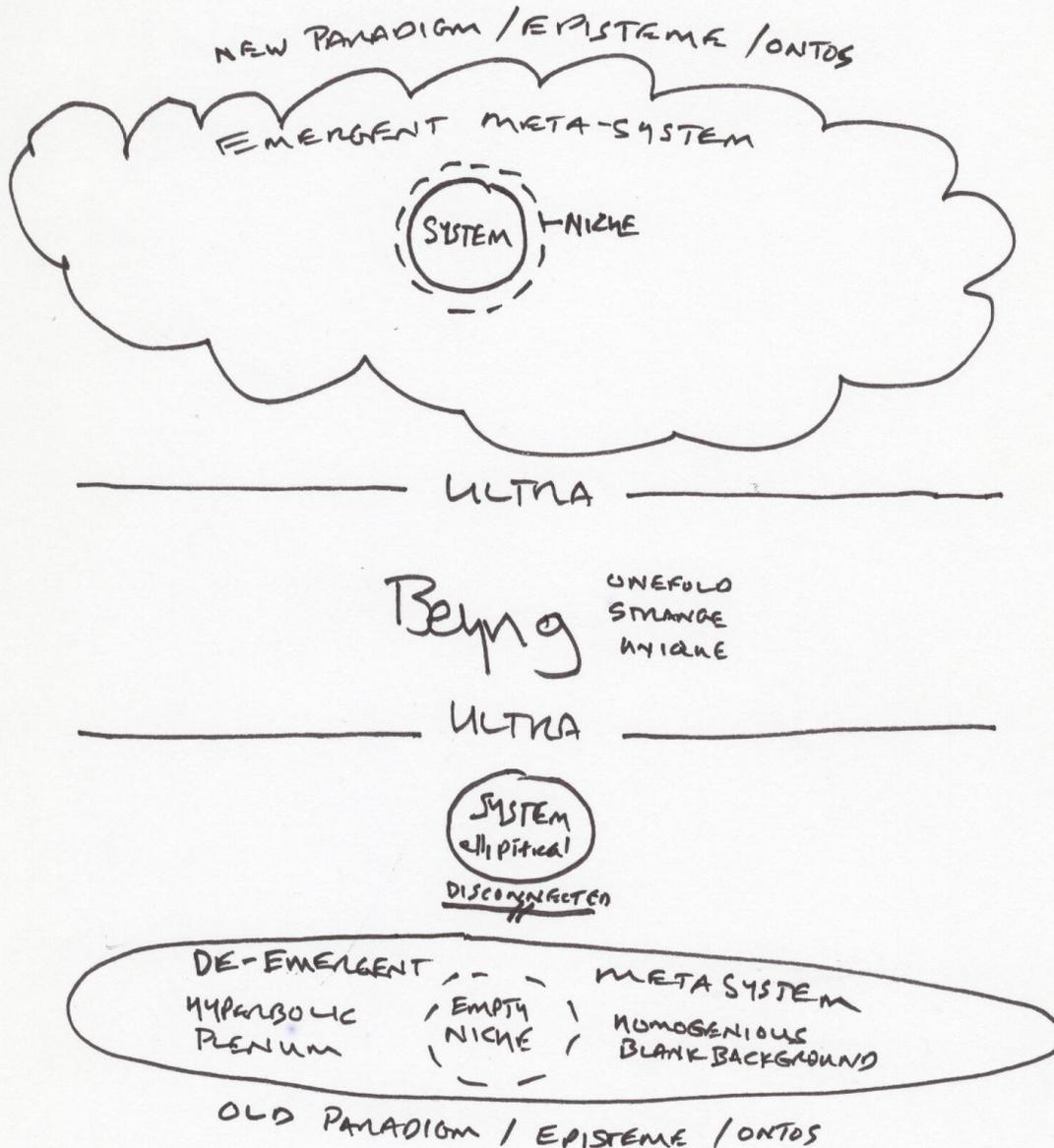


Figure 34. Transition through Beyng with Ultra Being Shields between Old De-emergent Meta-system and New Emergent Meta-system

Two Meta-systems representing the old and new orders are separated by Ultra Being which hides the inverse of the Meta-levels of Being in the form of Beyng from Heidegger's Contributions to Philosophy. This is the impossible path between the Meta-systems which is the dual of the possible path discussed in this paper via the microgenesis of the Emergent Meta-system in relation to the folded FMCs.

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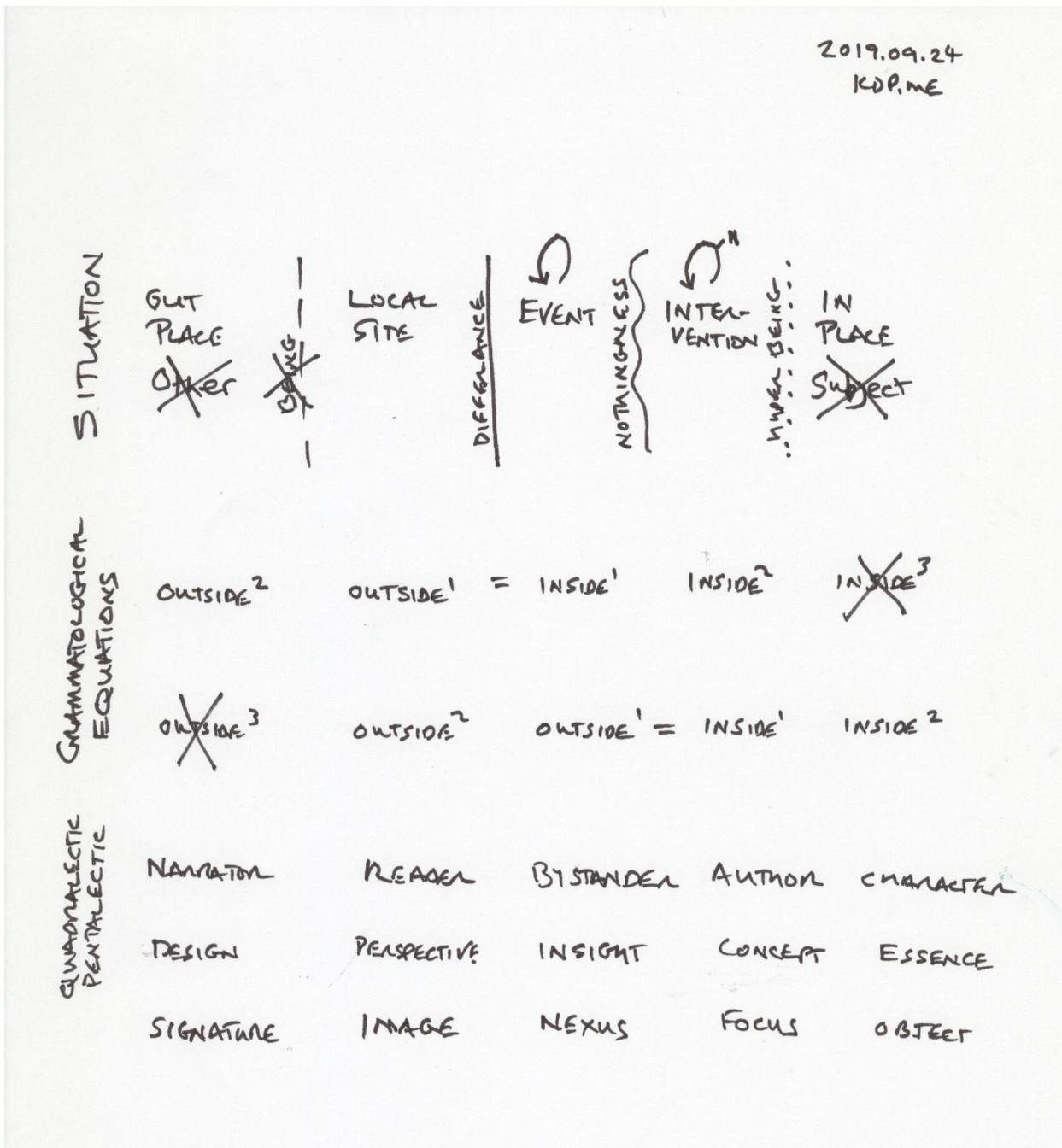


Figure 35. Situation, Grammatological Equations, and Pentalectic Alignment

The articulation of the Site/Event situation in Figure 31 reminds us of both the equations of the ramification of Inward and Outward from Derrida's of Grammatology but also the Pentalectic in Emergent Design dissertation of the author. This connection that occurred to me rather late in the process of writing the paper has fairly profound implications. Just as the Groupoid is the dual operation that forges syntheses within Multiple so to the Pentalectic appears to be the dual of the Site/Event Situation. The Quadralectic becomes the Pentalectic (Figure 39) within the Emergent Design dissertation which is a model of the design process based on Dialectics.

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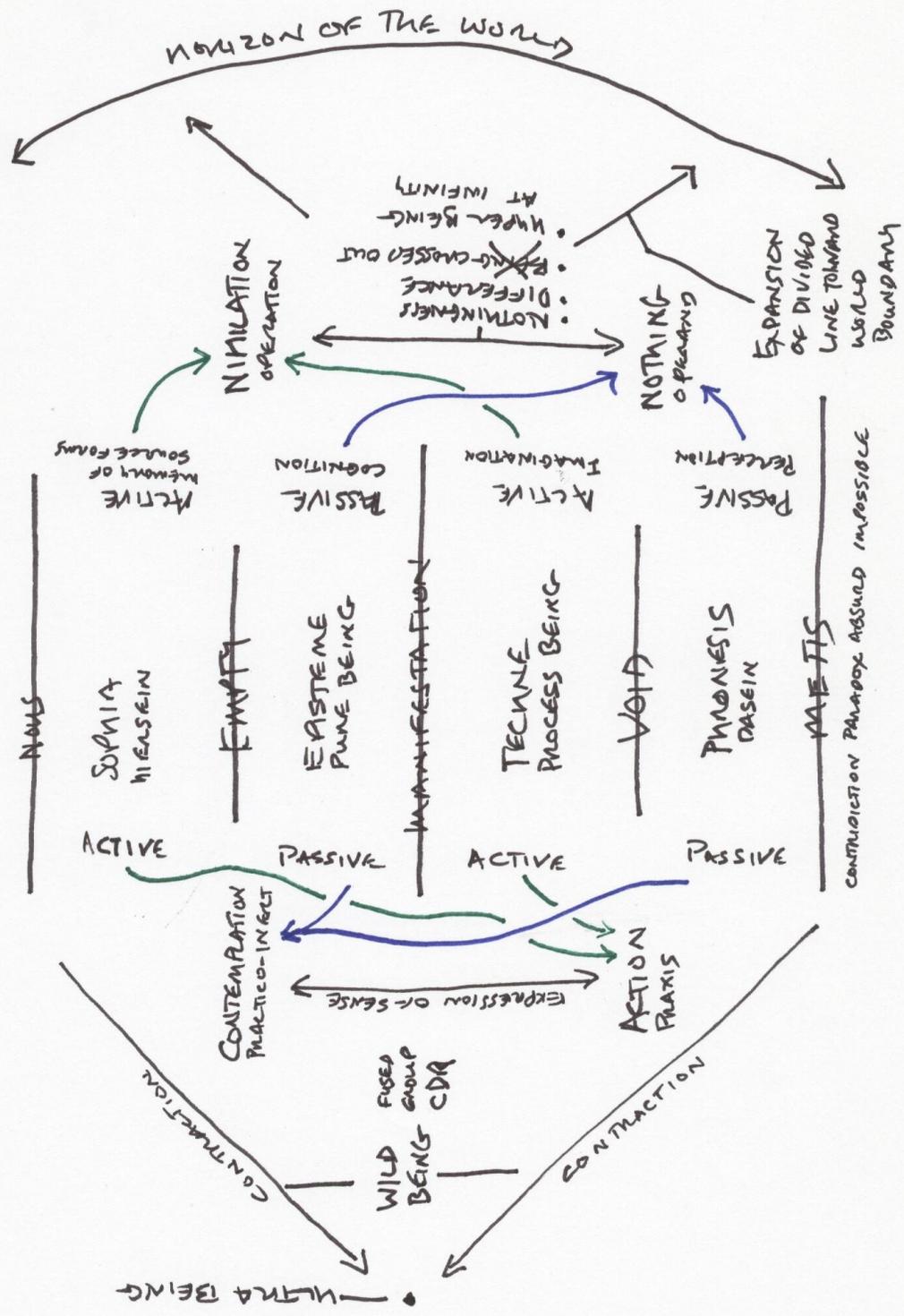
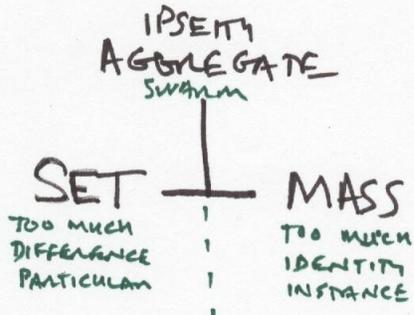


Figure 36. Necessity of Nothingness and Wild Being in relation to Divided Line
https://www.academia.edu/40341922/The_Necessity_of_Nothingness

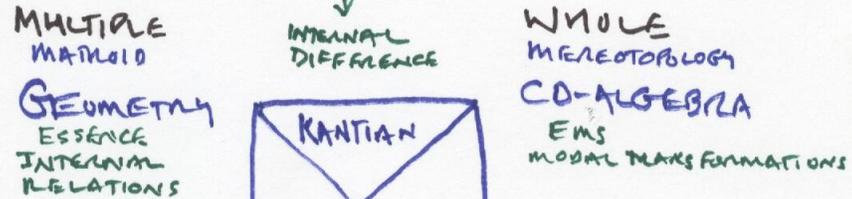
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OCD
DUALS

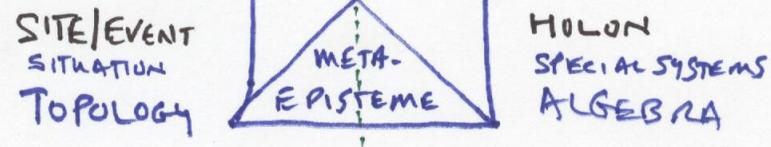
LEVEL 1



LEVEL 2



LEVEL 3



LEVEL 4



LEVEL 5

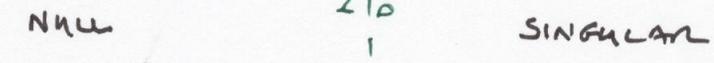


Figure 38. Kantian Meta-episteme and OCD in relation to the Foundational Mathematical Categories

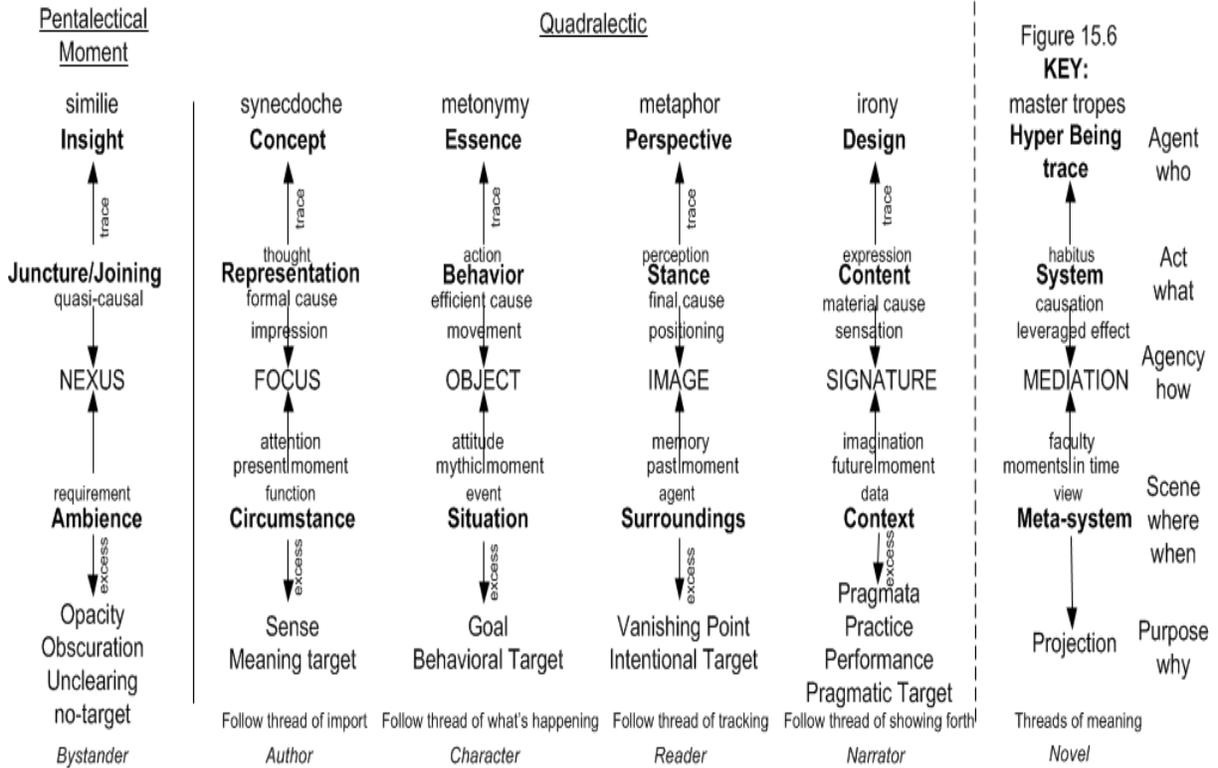


Figure 39. Quadralectic/Pentalectic from Emergent Design dissertation

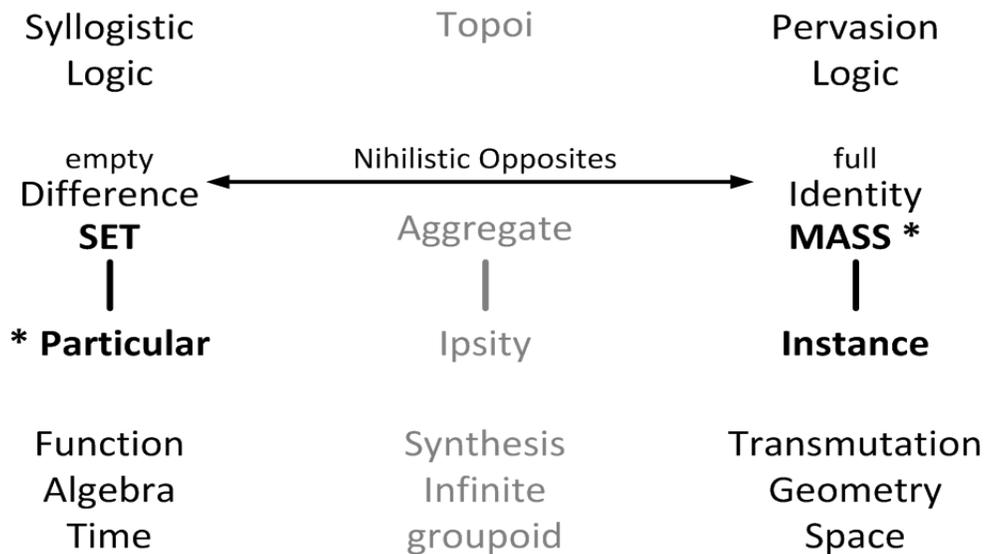


Figure 40 Relation of Set and Mass to Aggregates

Kantian Meta-Episteme

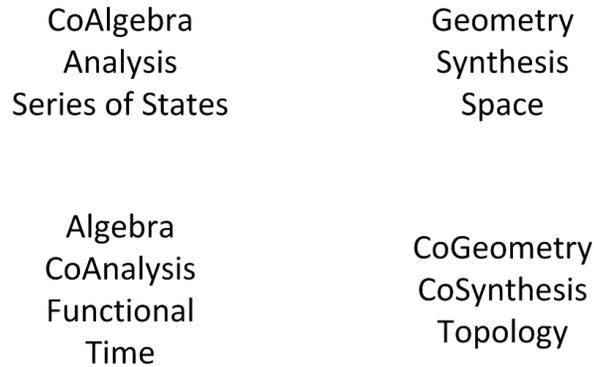
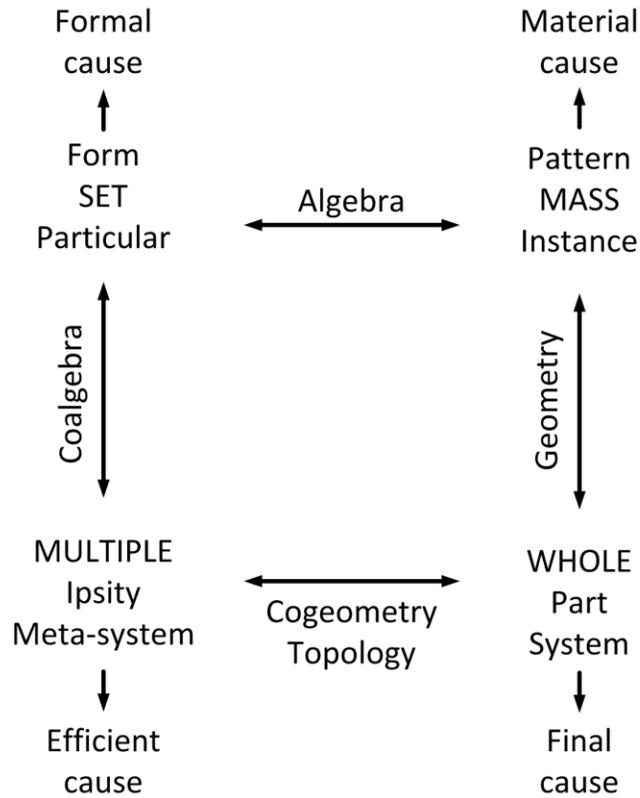


Figure 41. Kantian Meta-Episteme



Kantian Meta-Episteme

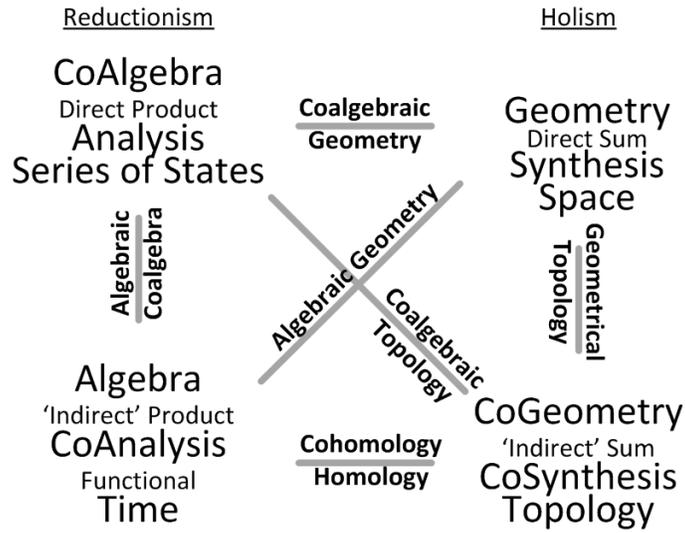


Figure 43. Kantian Meta-Episteme and kinds of Mathematics.