

|

EMERGENT DESIGN

**Explorations in Systems Phenomenology in Relation to Ontology,
Hermeneutics and the Meta-dialectics of Design**

by

Kent Duane Palmer

Bachelor of Sociology and East Asian Studies [University of Kansas, USA]

Doctor of Philosophy in Sociology [London School of Economics, UK]

A thesis submitted for the Degree of

Doctor of Philosophy

School of Electrical and Information Engineering

Division of Information Technology, Engineering, and the Environment

University of South Australia

28 September 2009

USA and Worldwide Copyright 2009 Kent Duane Palmer

Not for Distribution. All Rights Reserved

No Electronic Storage without express permission of the Author

Download for personal study permitted

Research website at <http://holonomic.net> or <http://emergentdesign.net>

See also <http://archonic.net>

Author Contacts <http://kentpalmer.info>

{[dissertationatemergentdesign.net](http://emergentdesign.net)or[doitinfo](http://kentpalmer.info)}

PO Box 1632, Orange, CA 92856 USA

+1 714-633-9508

Post-Examination Copy Corrected and Revised

File Name "Emergent Design PalmerKD UNISA DASI Dissertation A4
WebVersion10 LT 100215kdp84a.docx"

See associated errata sheet "Errata 091106kdp29a.docx"

Degree awarded December 17, 2009

Table of Contents

Front Matter.....	i
Table of Contents.....	iii
List of Figures.....	vii
List of Tables.....	ix
Acronyms.....	x
Summary.....	xi
Declaration.....	xiii
Supplemental Disk.....	xiii
Acknowledgements.....	xiv
Introduction.....	1
The Question to be Explored.....	1
Schemas.....	4
Sub-schemas.....	11
Beyond Dialectics.....	13
Exploring the Meta-levels of Being of the System and Meta-system.....	16
Standing Up In Existence.....	17
The Context of the Exploration.....	18
Complexity of the Argument.....	20
Rationale for the Form of the Argument.....	22
Chapter 1. Beginning with Husserl’s Phenomenology.....	27
Introduction.....	27
Naïve View of the System.....	30
Phenomenology of the System.....	32
A Bridge to the Unconscious: Incorporation versus Introjected Hyle.....	45
Chapter 2. World Horizons and Other Horizons.....	51
From Bracketing to World Horizons.....	51
The System as a Horizon between the Form and World Horizons.....	54
A Cultural Blindspot.....	68
Chapter 3. Philosophical Categories and the Schemas.....	85
Another Phenomenology.....	85
Minimal System of Forms.....	95
Hyperspheres and Higher Dimensional Openness.....	95
Logic of the Philosophical Categories and the Foundational Mathematical Categories.....	112
Chapter 4. Heidegger’s Inversion of Phenomenology.....	119

Transforming Phenomenology	119
Phenomenology of the System: Dasein and Ejects.....	128
Being-in-the-System	133
Schematic Horizons and the Meta-systemic Blindspot	136
Chapter 5. The System and its Relationship to the Meta-system Open-scape Schemas	141
The Nihilistic Structure of Systems and Meta-systems	141
Ontotheology, Philosophy of Presence and Logocentrism.....	146
Enframing the System and Meta-system Schemas	154
Phenomenological Speculation on the Schemas.....	159
Blake's Four Zoas and the Articulation of Time.....	165
Chapter 6. The Wholeness of the Axiomatic Platform and the Entry into Hyper Being	171
Entry into Hyper Being.....	171
Ennead in the Context of the WorldSoul	181
Enneadic Axiomatic Platform in Absolute Geometry	183
Geometry as Proto-semiotics	190
Foundational Mathematical Categories and the Lifecycle of the Emergent Event	195
Ennead and Icosaheptad in relation to the Foundational Mathematical Categories	198
Devolution and Evolution of the Axiomatic Platform within the Foundational Mathematical Categories	204
The Fifth Axiom in Geometry as the Entry into the Meta-system	209
The Semiotic Greimas Square defines the System and Meta-system in relation to Dual-systems and Non-system.....	215
Mutual Grounding	219
Reflexive Autopoietic Dissipative Special Systems Mirroring	223
The Differentiated and the Undifferentiated.....	227
Examples of Hyper Being and the Transition into Design	232
Chapter 7. Exploring Sign Engineering.....	239
The Ennead	239
Kinds of System.....	248
Wissian Ennead Defined.....	252
Wissian Categories Expanded	265
Quadralectic Moments Defined	273
View from Beyng.....	280
Extension of the Ennead into the Quadralectic.....	281

Chapter 8. Context of the Quadralectic.....	287
Quadralectic Context for the Creative Design Activity.....	287
Hyper Being and Wild Being as Duals.....	289
Emptiness, Void, and Ultra Being in the Standing of Existence.....	291
Unfolding of the Quadralectic from the Singularity of Ultra Being.....	296
Geometrical Model of the Unfolding of the Kinds of Being from the Singularity of Ultra Being.....	302
Meta-levels of Being and the Unfolding of the Schemas.....	310
Chapter 9. The Trajectory of Emergent Design through the Quadralectic.....	317
Mediations within the Quadralectic.....	317
The Trajectory of the Emergent Event.....	320
The Quadralectic in terms of the Sub-schemas in relation to Minimal Methods and Realtime Viewpoints.....	325
Representations of the System.....	332
Chapter 10. Meta-levels of the System and the Meta-system.....	347
The Various Kinds of Being in the System and Meta-system.....	347
Openness and Clearing in Higher Dimensional Spaces and Non-representability.....	350
Aspects of Being in the Meta-levels of the System.....	352
Chapter 11. Kinds of Meta-system Open-scapes.....	363
Meta-levels of the Sign.....	363
Exploring the Higher Scapes.....	371
Resisting the Mass Taboo.....	377
Chapter 12. Toward Working Designs.....	385
Meta-Methods.....	385
Integrity.....	395
Chapter 13. The Design Field and the Synchronization of the Cycles of Existence with the Quadralectic.....	407
Duality of the Design Field and the Cycle of Design.....	407
Meta-levels of the Philosophical Categories.....	408
Design Field.....	436
Order within the Design Field.....	439
Quadralectical Development.....	440
The Design Object.....	443
Embedded Knowledge.....	444
Transition between Design Field and Emergent Design Cycle.....	445
System and Meta-system Meta-levels of Being and the Dynamic of Existence.....	445

General Schemas Theory and Sub-schemas	449
Foundational Mathematical Categories and Quadralectics	454
Design Field and Synchronized Cycles	458
Images of the Quadralectic	463
On the Complexity of the Quadralectic Design Theory	467
Chapter 14. From Quadralectic to Pentalectic	471
Quadralectics Formally Defined	471
Golden Threads	481
Chapter 15. Speculations on Meta-design	493
Grounding the Pentalectic	493
System and Meta-System co-Design	507
Virtual and Actual	515
Structural Interlock	516
Being/Beyng and the Problem of Semantics	519
Chapter 16. Knowing Practice	525
Approaching Practice	525
Tactics of Practice	532
Practice and Time	536
Trope Cross as the Entry into Nondual Four-dimensional Spacetime	538
Kairos	543
Summary and Conclusion	551
Recapping the Argument	551
Conclusion	563
Glossary	565
Bibliography	615

List of Figures

Figure 1.1. Summary Diagram	48
Figure 2.1. Embedding in the World Horizon.....	53
Figure 2.2. Hierarchy of S-prime Schemas	57
Figure 2.3. System as Gestalt	58
Figure 2.4. System as Temporal Gestalt.....	61
Figure 2.5. Idealized System.....	62
Figure 2.6. System on Deeper Meta-system Background.....	65
Figure 2.7. Proto-gestalt of Systems within Meta-system Horizon.....	66
Figure 2.8. Nesting of Form, System, and Meta-system.....	68
Figure 2.9. Schematic Fold.....	69
Figure 2.10. Conceptual and Perceptual views of System and Meta-system.....	70
Figure 2.11. Duality of the Gestalt and Flow	72
Figure 2.13. Adjacency of Schemas	77
Figure 2.14. Complementary Structure of the Meta-system.....	79
Figure 2.15. Emergence and De-emergence of the System and Meta-system	80
Figure 2.16. Landscape of the Meta-system.....	83
Figure 3.1. Combinatoric Logical Arguments.....	87
Figure 3.2. Trans-Peircean Categories	88
Figure 3.3. Model Theory	91
Figure 3.4. Minimal System Forms	98
Figure 3.5. Three to Four-dimensional Mapping of Minimal System Forms	100
Figure 3.6. Sub-schemas and Geometrical Images of the Minimal System.....	100
Figure 3.7. Hypertorus Mediation between Third and Fourth Dimension	105
Figure 4.1. Difference between present-at-hand and ready-to-hand	121
Figure 4.2. Duality of Relativity and Quantum Mechanics in relation to Heidegger's distinction of ready-to-hand from present-at-hand	127
Figure 6.1. Meta-levels of Systems and Meta-systems.....	181
Figure 6.2. Levels of Plato's WorldSoul.....	183
Figure 6.3. First Three Axioms of Geometry Diagrammed with Flip.....	185
Figure 6.4. Fourth Axiom of Geometry showing Congruence	186
Figure 6.5. Fifth Axiom of Geometry as Fold with Superimposition.	187
Figure 6.6. Axiomatic Platform.....	189
Figure 6.7. Interpretation of the Axiomatic Platform as a Semiotic and also as a Higher Dimensional Embedding.....	191
Figure 6.8. First and Second Order Mediation in the Ennead.	193
Figure 6.9. Series of Orders of Mediation.....	194
Figure 6.10. Foundational Mathematical Categories as Lifecycle of the Emergent Event.....	197
Figure 6.11. Triality in the Icosaheptad.....	200
Figure 6.12. Relation between the Orders of Mediation and the Foundational Mathematical Categories..	201
Figure 6.13. Relation of the Ennead to the Icosaheptad as the transition between System and Meta-system.	208
Figure 6.14. Relation between Geometries and the Axiomatic Platforms in the Icosaheptad.....	209
Figure 6.15. Greimas Square.....	213

Figure 6.16. Tetralemma in the Greimas Square.	214
Figure 6.17. Orders of Mediation as Cartesian Crosses of the Special Systems.....	216
Figure 6.18. The Result of the Failure of Self-grounding.....	218
Figure 6.19. Mutual-grounding as an Alternative to Self-grounding.....	219
Figure 6.20. Reflexive Mutual Grounding.....	221
Figure 6.21. Foundational Mathematical Categories as Dual Reflexive Mutual Grounding.....	222
Figure 6.22. Aliquot Numbers.....	223
Figure 6.23. Special Systems as Mirror Configurations.....	226
Figure 6.24. Being and Beyng.....	228
Figure 6.25. Striated and Unstriated Pairs in relation to the Foundational Mathematical Categories.....	229
Figure 6.26. Hypothetical Structure of the Worldview.....	231
Figure 6.27. Beyng, Being, and Existence.....	232
Figure 7.1. Triality of the Structure of the Sign in relation to the Subject and Object Dualism.....	241
Figure 7.2. Concentric Layers of the Ennead.....	243
Figure 7.3. Formal Information Transformation across Dimensions.....	246
Figure 7.4. Re-entry into the Information Infrastructure after Mediation.....	247
Figure 7.5. Wissian Template for the Quadralectical Moment.....	273
Figure 8.1. Standings.....	293
Figure 8.2. Relations between Manifestation, Emptiness, Void, and Dualistic Being.....	298
Figure 9.1. Viewpoints and Minimal Method Bridges in Integral Software Engineering Methodology....	327
Figure 9.2. Relation between Methodological Distinctions and the Structure of the Viewpoints and Minimal Methods.....	328
Figure 9.3. Hyper-being Singularity at the core of the real-time System.....	329
Figure 9.4. Relation between Methods and Meta-methods.....	330
Figure 11.1. Meta-levels of the Sign.....	365
Figure 11.2. Relation of Meta-levels of the System to the Meta-level of the Open-scapes.....	376
Figure 12.1. Lattice of Methodological Distinctions.....	387
Figure 13.1. Relation between the Third Meta-level of the Design Field and the Moments of the Quadralectic.....	436
Figure 13.2. Relation of the Design Object, the Object of Design, and the Designed Object.....	445
Figure 13.3. Viewpoints on the Real-time System in relation to the Moments of the Quadralectic.....	467
Figure 13.4. Synchronization between the Cycles of Existence and the Quadralectic.....	469
Figure 14.1. Quadralectical and Pentalectical Tableau.....	491
Figure 15.1. The relationship between Icosa/Dodeca-hedron and the Pentahedron.....	495
Figure 15.2. Embedding of the Pentahedron in Three-dimensional Space.....	496
Figure 15.3. Cascade from Monolectic, to Dialectic, to Quadralectic to Pentalectic.....	498
Figure 15.4. Expansion and Contraction of Being-in-the-world.....	500
Figure 15.5. Emergent Effect from the Synergy of the Pentahedron.....	502
Figure 15.6. Quadralectical Co-Design.....	508
Figure 16.1. Vision of the Meta-system Tableau.....	548
Figure 16.2. Breather within the Arena of the Meta-system.....	549

List of Tables

Table 0.1 S-prime Schemas in relation to dimensions..... 5

Table 3.1. Hypersphere Expansion and Contraction in Higher Dimensions..... 110

Table 3.2. Alignment of Categories, FMC, Dimensions, and Schemas 117

Table 5.1. Special Systems interleaved with the Kinds of Being. 157

Table 5.2. Brumbaugh's Kinds of Philosophies and Times. 166

Table 5.3. Brumbaugh's Extensions of the approaches to the Kinds of Time..... 167

Table 8.1. Mediation between Schematic Levels..... 311

Table 8.2. Dimensions in relation to Schemas and Standings. 313

Table 9.1. Mediations between Schemas as the Foundational Mathematical Categories and Philosophical Categories in relation to the Standings. 319

Table 9.3. Fusion of Sub-schemas with Moments of Quadralectic as mediated by the Hypertorus. 333

Table 11.1. Facets of the Field of Design..... 379

Table 13.1. Design Field Table..... 412

Table 13.2. Large Expanded Design Field Table..... 415

Table 13.3. Comparison of the Meta-levels of the Sixth Category with the Special Systems and their Algebras..... 430

Table 13.4. Comparison of the Meta-levels of the Negenary and Seventh Categories..... 433

Table 13.5. Complementarity between Meta-levels of System and Meta-system. 446

Table 13.6. Synchronization between Cycles of Existence and the Moments of the Quadralectic..... 457

Acronyms

A5 – Alternating Group of Order Five

BI – Background Interpretant

ConOps – Concept of Operations

CPU – Central Processing Unit

CSER -- Conference on Systems Engineering Research

DARTS – Design and Analysis of Real-time Systems

FI – Foreground Interpretant

INCOSE – International Council of Systems Engineers

ISEM – Integral Software Engineering Methodology

REM – Rapid Eye Movement (indicative of dreaming sleep)

SysML – Systems Engineering Modeling Language

TINSIT – Tendency-in-Situation

UML – Unified Modeling Language

Summary

SYNOPSIS

A Phenomenological Analysis of Emergent Design is performed based on the foundations of General Schemas Theory. The concept of Sign Engineering is explored in terms of Hermeneutics, Dialectics, and Ontology in order to define Emergent Systems and Meta-systems Engineering based on the concept of Meta-dialectics.

ABSTRACT

Phenomenology, Ontology, Hermeneutics, and Dialectics will dominate our inquiry into the nature of the *Emergent Design* of the *System* and its inverse dual, the *Meta-system*. This is an speculative dissertation that attempts to produce a philosophical, mathematical, and theoretical view of the nature of Systems Engineering Design. Emergent System Design, i.e., the design of yet unheard of and/or hitherto non-existent Systems and Meta-systems is the focus. This study is a frontal assault on the hard problem of explaining how Engineering produces new things, rather than a repetition or reordering of concepts that already exist. In this work the philosophies of E. Husserl, A. Gurwitsch, M. Heidegger, J. Derrida, G. Deleuze, A. Badiou, G. Hegel, I. Kant and other Continental Philosophers are brought to bear on different aspects of how new technological systems come into existence through the midwifery of Systems Engineering. Sign Engineering is singled out as the most important aspect of Systems Engineering. We will build on the work of Pieter Wisse and extend his theory of Sign Engineering to define Meta-dialectics in the form of Quadralectics¹ and then Pentalectics². Along the way the various ontological levels of Being are explored in conjunction with the discovery that the Quadralectic is related to the possibility of design primarily at the Third Meta-level of Being, called Hyper Being. Design Process is dependent upon the emergent possibilities that appear in Hyper Being. Hyper Being, termed by Heidegger as ~~Being~~ (Being crossed-out) and termed by Derrida as *Differance*, also appears as the widest space within the Design Field at the third meta-level of Being and therefore provides the most leverage that is needed to produce emergent effects. Hyper Being is where *possibilities* appear within our worldview. Possibility is necessary for emergent events to occur. Hyper Being *possibilities* are extended by Wild Being *propensities* to allow the embodiment of new things. We discuss how this

¹ A 'Quadralectic' is a form of Super-synthesis between Dialectic and Anti-Dialectic.

² A 'Pentalectic' is a form of Ultra-synthesis between Quadralectic and Anti-Quadralectic.

philosophical background relates to meta-methods such as the Gurevich Abstract State Machine and the Wisse Metapattern methods, as well as real-time architectural design methods as described in the Integral Software Engineering Methodology³. One aim of this research is to find the foundation for extending the ISEM methodology to become a general purpose Systems Design Methodology. Our purpose is also to bring these philosophical considerations into the practical realm by examining P. Bourdieu's ideas on the relationship between theoretical and practical reason and M. de Certeau's ideas on practice. The relationship between design and implementation is seen in terms of the Set/Mass conceptual opposition. General Schemas Theory is used as a way of critiquing the dependence of Set based mathematics as a basis for Design. The dissertation delineates a new foundation for Systems Engineering as Emergent Engineering based on General Schemas Theory, and provides an advanced theory of Design based on the understanding of the meta-levels of Being, particularly focusing upon the relationship between Hyper Being and Wild Being in the context of Pure and Process Being.

DEDICATION

I dedicate this work to my parents and my grandparents, especially my grandmother, Beulah Emanuel.

³ See Wild Software Meta-systems at http://works.bepress.com/kent_palmer

Declaration

I declare that this thesis presents work carried out by myself and does not incorporate any material previously submitted for a degree or diploma in any university unless it is given acknowledgement; and to the best of my knowledge it does not contain any materials previously published or written by another person except where due reference is made in the text. All substantive contributions made by others to the work presented, including jointly authored publications, is clearly acknowledged.

Kent Duane Palmer
September 26, 2009

Supplemental Disk

A supplemental DVD disk is attached to this dissertation in the pocket of the binding.

Acknowledgements

I would like to thank the University of South Australia for this opportunity to conduct research into the foundations of Systems Engineering and the nature of Design and for making it possible for me to do this research as a part-time external student.

I must thank the Defence and Systems Institute (DASI), formerly Systems Engineering and Evaluation Centre (SEEC), at the University of South Australia for their patience with a nonstandard approach to research in an Engineering discipline.

My supervisor, Dr. Tim Ferris, deserves special mention for all the support and encouragement he has given me over the course of the six years during which I have pursued this research. He has given me the freedom to pursue my research into the realms of Advanced Systems Theory, Mathematics and Philosophy, which are beyond the realms that are normally considered to be within the province of Systems Engineering. I appreciate the times that he has come to visit me to discuss my project in the United States and I have enjoyed the INCOSE, CSER, and other conferences that we have attended together.

I would also like to thank Joseph Kasser, Ph.D. for providing valuable insights and serving as my associate advisor for some time.

I would like to thank Martin Schwab, Ph.D. for his courses at University of California Irvine in Nietzsche, Deleuze, and the later Heidegger.

I would like to thank Kevin Romero for many discussions on Quantum Physics and the theoretical aspects of Systems Engineering. And I would like to thank Javier Bustamante for his insights into the practical nature of Systems Engineering work.

Other Engineers who have influenced me are Donald Bauerschmidt, Leonard Woo, Mike Keane, Larry Daubert, Robert Cummings, and Franz Huber.

Other intellectual influences include Alfonso Verdu, Charles Warriner, David Martin, H. P. Rickman, James Hillman, Robert Bosnak, George Klir, Ben Goertzel, Onar Aam, Steven Briggs, and David Grove.

I would also like to thank my wife and editor, Robyn Josephine Palmer, for her unfailing help and support which allowed me to finish this dissertation.

Introduction

An Approach to Answering the Question Concerning Possibility and Actuality in Emergent Design

This introduction outlines various themes that will subsequently be examined in this dissertation. First, the question to be explored is presented. Then, we will explore the concept of General Schemas Theory, which serves as a major tool for developing our approach to Emergent Design. From there we go on to introduce the concept of sub-schemas, which demonstrates the ways that schemas are articulated. Multi-lectics is then introduced as the principle way that design can be understood. In addition to this, the duality between the System and Meta-system, as well as how meaning is interpreted in Design will be explored. Ultimately, the complexity of the argument is discussed as well as our rationale for the form that the argument takes within this dissertation.

The Question to be Explored

This dissertation will explore the intellectual environment and the contextual circumstances that coalesce to make the Design of Emergent Artifacts possible. Beyond that, we will examine how this realm of possibility paves the way for the Designed Emergent Artifact to reach actualization. This issue is important because Design is an activity that is focused on producing emergent effects through artifacts, yet, when artifacts become actualized, we often experience the profound consequences of their emergent effects within our culture and upon the material infrastructure where we pursue our vocations and live our lives. We usually label design activity as being creative, but we do not understand how *possibility* fits into the creative process, either explicitly, or theoretically, even though we are regularly engaged in activities that create the *emergent conditions* for the design and production of artifacts.

Our answer to the question: *What makes the Design of Emergent Artifacts possible?* will be quite complex⁴. We will present a summary of our themes in this introduction and we

⁴ This is a difficult question. What makes it even more difficult is the fact that modality theory in philosophy itself is in disarray. In other words it is not well understood how we transition from possibility to potentiality to actuality. These questions are dealt with in chapters written after the dissertation was turned in for examination. In this dissertation we assume a naive viewpoint that it is possible to transition from possibility through potentiality to actuality based on common understanding of these terms derived from Aristotle.

will summarize our findings in the conclusion of this dissertation. This answer is complex because so many different types of elements, both human and material, as well as cultural and social, are involved in the process of creative Emergent Design. First of all, we need to establish our approach to this question because generally, when the subject of design is discussed, it is not simultaneously linked to *both* creativity and emergence. Therefore, although there is a vast literature that is *implicated* in the answer to this question, there are very few examples of an *integrated* answer. Within our tradition this is considered to be a very difficult question to answer. It is tantamount to questioning the unique abilities that we possess as human beings. In fact, in our history we see that there was a particular time within our shared Stone Age culture when humans began to develop more rapidly than Neanderthals⁵ until our culture *diverged* completely from theirs. This change is captured most poignantly in the cave paintings found in France⁶ where the first known monumental art artifacts that humans produced are located. Aesthetically we are impressed by these paintings that today still seem sophisticated, yet primitive, at the same time. Archeologists have also discovered small portable art objects and a variety of different types of tools that date back to this period of history, which proves that the creative design of emergent artifacts is an integral part of our human capacity. Since then, humans have persisted in exploring ever more complex designs of emergent artifacts that continue to produce the technological infrastructure with all its emergent qualities that we have come to depend upon. This divergence was an *emergent change* from the stable stone culture that humans and Neanderthals shared previously. Once humans moved beyond the technological status quo they entered a less constrained and less stable design space that allowed for the possibility of their continued exploration and creative invention, which produced emergent effects on a regular basis.

In this particular study, we are asking this question in the context of Systems Engineering. Systems Engineering is a new discipline that wishes to establish itself in academia although, as soon as this happens, questions arise concerning its foundations. Our answer to the question of foundations harkens back to Systems Theory. It seems reasonable that

However, in the working papers which specifically deal with this problem we use the work of Ian Thompson and his dispositional philosophy of nature, and attempt to produce a dispositional theory of the transition through the modalities of Being into actuality from possibility via potentialities. This theory uses the idea of derivatives that Ian Thompson takes from Swedenborg. This highly technical argument about the nature of the modalities will not be breached in the dissertation proper. See Thompson, Ian Philosophy of Nature and Quantum Reality, 1993 at http://www.ianthompson.org/philosophy_papers.htm.

⁵ Shreeve, James. The Neanderthal Enigma: Solving the Mystery of Modern Human Origins. (New York: Morrow, 1995).

⁶ Curtis, Gregory B. The Cave Painters : Probing the Mysteries of the World's First Artists (New York : Knopf, 2006).

Systems Engineering should be grounded in Systems Theory. But it quickly becomes clear that as a practical discipline, Systems Engineering overflows Systems Theory because we not only describe systems scientifically, but we design them and build them and deploy them. Systems Engineering is focused on creating systems as artifacts that are used and operated, which, in turn, change the environment for newer systems that will take their place in the future. These systems are created by a lengthy and involved development process that includes: Requirements Development, Architectural and Sub-system Design, Implementation, Verification, Validation, Integration, and Operation⁷. Our premise is that of all these lifecycle phases, the most crucial is *design* because it allows *new* systems to come into existence. Here we are focused on the emergence of new systems rather than the replication of existing systems. We will not discuss the entire development lifecycle, but only the part that is dedicated to design, and only in as much as it leads to the innovation of Emergent Design. As we examine Emergent Design, we will focus on what makes Systems Engineering unique, and what is most relevant to its foundations. This is what is needed to give Systems Engineering academic respectability. The search for a theoretical foundation is justified only by the fact that it is expected that a discipline should search for those things that it can teach, i.e., that can be deemed as knowledge. And knowledge is expected to increase, although each increment of it is expected to be as stable as possible so that one may depend on that knowledge for greater leverage once it is implemented.

In general, our approach toward producing these foundations for Systems Engineering is to push beyond Systems Theory into Schemas Theory and to consider all other schemas that are like the System, such as Form, Pattern, etc. as a basis for Schemas Engineering⁸. The term, ‘System’, appears in the name of this discipline but we actually use a variety of schemas that are different in scope as they become necessary for our work. Thus, from this perspective ‘Systems Engineering’ is a misnomer. It is a misnomer from the point of view of what we actually focus upon in our discipline. The main focus of our discipline is on the *creation* of artifacts that exhibit *emergent characteristics* at whatever schematic level is necessary. Our discipline would be more properly defined as Emergent Engineering⁹ based on the Science of Emergence¹⁰. At this point a ‘Science of Emergence’ is but a dream. But Emergent Engineering is already something we are engaged in on a daily basis

⁷ Kossiakoff, Alexander and Sweet, William N. Systems Engineering Principles and Practice (Hoboken, N.J. : J. Wiley, 2003).

⁸ See “General Schemas Theory” CSER 2004 by the author.

⁹ See Emergent Engineering essays at <http://holonomic.net/> by author.

¹⁰ See Foundations of Emergent Science and Engineering essays at <http://holonomic.net> by author.

even though it is difficult to clearly explain how it is possible or how we do it. In the process of Emergent Engineering we create all sorts of artifacts of different schematic levels as understood by General Schemas Theory¹¹ *so our problem is actually reduced to examining the way design processes interact with schemas*. We are going to assume that a creative act involves the production of an artifact with emergent properties that are new, unheard of, and hitherto unseen. Yet, we also want to emphasize that creativity relies on human talent, skill, and luck. In other words, *design* employs more than just method; we actually produce Emergent Design out of ourselves and this, in itself, is a creative act. It is not something that merely happens objectively outside of our human nature, but instead it is something *intrinsic* to our human nature that allows us to explore the possibilities that lead to the emergence of uniquely designed artifacts that work within our world. In this work the psychological factors that affect creativity will be de-emphasized. Our focus here will be upon Emergence and Design. In other words, we will assume that the design of emergent properties is a creative activity, but we will not delve deeply into the psychological nature of creativity in these chapters¹². However, we will continue to refer to Emergent Design as a creative activity in order to distinguish it from *rote design activities*, which are not emergent. The emergent¹³ aspects of design relate to the novelty that is outwardly due to the inward creative mental processes, which occur coincident with design activities¹⁴.

Schemas

We must first examine the framework of the schemas in order to fully understand the creative act of producing a design and how this creative act can unleash the emergent properties of the artifacts that we construct. *Schemas are templates of pre-understanding of spacetime envelopes that we project onto our experience in order to differentiate objects of different scales in terms of their dimensionality*. The hypothesis that we have developed for testing schemas is called S-prime theory¹⁵, which states that there are *two dimensions per schema and two schemas per dimension*, and that *there is a hierarchy of ten schemas in all*

¹¹ See also Foundations of General Schemas Theory and Introduction to General Schemas Theory essays at <http://holonomic.net> by author.

¹² The classic in this field is The Act of Creation by Arthur Koestler (Penguin, 1990).

¹³ Johnson, Steven. Emergence: The Connected Lives of Ants, Brains, Cities, and Software (Scribner, 2002)

¹⁴ Bayley, Stephen and Conran, Terence. Design: Intelligence Made Visible (Firefly Books, 2007). See also Norman, Donald A. The Design of Everyday Things (Basic Books, 2002).

¹⁵ S-prime theory is the first of three hypotheses developed in the course of exploring General Schemas Theory. See works by author on General Schemas Theory at <http://holonomic.net>. Each of these theories refine the next additional schema and add dimensions that a schema may reach under special circumstances.

that fall between dimensions -1 and 9. This is the extent of our ability to schematize based on our inherent finitude. We name the schemas in S-Prime theory as follows:

<u>Schema</u>	<u>Dimensions</u>
Pluriverse	8 → 9
Kosmos	7 → 8
World	6 → 7
Domain	5 → 6
Meta-system (OpenScape)	4 → 5
System	3 → 4
Form	2 → 3
Pattern	1 → 2
Monad	0 → 1
Facet	-1 → 0

Table 0.1 S-prime Schemas in relation to dimensions

These schemas are all the Zeroth Meta-dimensions¹⁶ that exist within our worldview. And each one has its own specific organization, which we project on the *envelopes of spacetime* that characterize the various dimensions that are mentioned. Some of these dimensions are higher than the third, or even the fourth dimension, and thus they stretch into invisible realms, but that makes them no less real. This set of schemas is taken from our study of the diverse disciplines and these various schemas show up in scientific disciplines that study specific phenomena. They are generalized across phenomenal domains in the same way that systems schemas are. These other schemas are like systems, yet different. Part of this difference is in their scale, but their essential nature embodies how they cover the range of possible scales without leaving any gaps.

Schemas are different from the normal types of emergent hierarchies, which are *ontic*¹⁷ rather than *ontological*¹⁸. One such hierarchy might be a string, quark, fundamental particle, atom, molecule, macro-molecule, proto-cell, cell, multi-cell, organism, social

¹⁶ See Foundations of General Schemas Theory at <http://holonomic.net> by the author. Meta-dimensions are the next level of abstraction beyond dimensions and are used as a basis for understanding the structure of the Western worldview.

¹⁷ Miller, James Grier. Living Systems. (New York: McGraw-Hill, 1978).

¹⁸ Ontic/Ontological is a distinction taken from Heidegger that corresponds to his ontological difference between beings and Being.

group, species, multi-species web, or Gaia. All of these types of hierarchies are *ontic* in the sense that they are posited as being ‘out there’ in the world as levels of complexity that exist in nature. Schemas, on the other hand, are ontological because they are *what we project* onto nature and culture in terms of their basic spacetime encapsulation. We can project different schemas onto the same ontic threshold in nature but we will see them differently due to the inherent differences in the organization of the schemas. Schemas are ontological because they are projections, and this brings us to confront the underlying principle that *projection* is part of the fundamental nature of Being¹⁹. As we examine the schemas, we are looking at an ecstatic²⁰ projection of spacetime organization that is culturally mediated, which *both reveals and covers up* the actual organization of the phenomena. It is the business of science to sort out the difference between how *the noumena*²¹ are organized in themselves and how we *project our own organization onto the noumena* to create experienced phenomena that is governed by how we understand facts²², theories²³, paradigms²⁴, epistemes²⁵, ontos²⁶, existence, and absolutes²⁷. The ontic hierarchies discovered by science are, to some extent, formulated by the interplay between our projections and what we actually discover to be real. Reality appears as anomalous cases that flow from observation (or experiment) that go beyond our projections of how nature ‘ought’ to operate according to our projections.

It is interesting that in the historical development of the Western Worldview, ontic and ontological organizations have never been fully separated, which has become a source of endless confusion. The confusion centers on the fact that we take our schematic projections as being the *actual* organization of the phenomena in spite of the fact that it is clear that we can *project* different schemas onto the *same* phenomena and obtain *different* views of it.

¹⁹ Heidegger, Martin, John Macquarrie, and Edward Robinson. Being and Time. (Oxford: Blackwell, 2000) p. 331.

²⁰ Ecstatic in this context depends on Heidegger’s conflation of existence with ecstasy, which are both taken as meaning *exi-stance*, i.e., standing outside of. Projection is the production of a standing outside of oneself. That is why the various kinds of Being (even existence as something found outside of oneself) is what actually stands outside oneself. Of course, that implies that we are standing toward what we find or what we have projected.

²¹ Noumena means ‘thing-in-itself’, prior to any experience, and is essentially non-experienceable. This concept comes from Kant’s Critique of Pure Reason. See Adorno, Theodor W., and Rolf Tiedemann. Kant’s Critique of Pure Reason (1959). (Stanford, Calif: Stanford University Press, 2001).

²² Raffoul, François, and Eric Sean Nelson. Rethinking Facticity. SUNY Series in Contemporary Continental Philosophy. (Albany, N.Y.: State University of New York Press, 2008).

²³ Dubin, Robert. Theory Building. (New York: Free Press, 1969).

²⁴ See Kuhn, T.S. The Structure of Scientific Revolutions (University of Chicago Press, 1996).

²⁵ See Foucault, M. The Order of Things: An Archaeology of the Human Sciences (London: Routledge, 2001).

²⁶ See Heidegger, Martin. The End of Philosophy. (New York: Harper & Row, 1973).

²⁷ These are the scopes within which emergence can occur within the Western tradition.

When different scientists, or engineers, project different schemas onto the same phenomena there is endless argument. This is the “parts of the elephant” theme²⁸ with a different twist. It is not that different people are seeing different parts and taking that to be the whole. If it were only that simple... Instead, different people are projecting different schemas, which calls for dividing up the elephant into different parts and into different organizations of those parts. The parting of the elephant based on the projection of different schemas is fundamentally unresolvable unless people can transform their way of looking at things from one schema to another²⁹. Each schema has its own internal organization, which means that we must switch from the internal organization of one schema to that of another. And having something like General Schemas Theory should help us to better understand the nature of these transformations between schemas. Yet, in our tradition, nothing like General Schemas Theory has been developed before, even in obvious places such as criticism of the Arts and Crafts, or in Architectural criticism. These various art disciplines are so embedded in the formalist approach to things that they have hardly explored other schemas as complementary ways of understanding their craft. Thus, it is left to Systems Engineering in its search for its foundations to recognize the necessity of understanding the hierarchy of schemas and how those schemas form the basis of Emergent Design, because the schemas not only apply to the creative design process of the Arts, but to Science and Engineering as well. The schemas are universal (at least, in Western Culture) regardless of the discipline. Whether or not they are universal across human culture is a question to be answered by later research once we understand what the schemas are with respect to our own culture.

As spacetime projections of intelligible organizational templates, schemas are fundamental to our relationships to everything in our environment, including ourselves. When we do science, we are trying to understand and unlock the design of nature in a way that goes beyond our schematic projections. But when we implement the design of artifacts, we are using the schemas as the basic templates for the objects that we will produce through our design activities. Those objects are artificial³⁰, not natural³¹. But the outpouring of the schemas as spacetime projections is part of our own nature/culture matrix that appears through our practice, and it is not based on reflexive theory. The schemas show up

²⁸ Poem by John Godfrey Saxe 1816-1887 in Hall, Donald. *The Oxford Book of Children's Verse in America*. (New York: Oxford University Press, 1985) pp. 82-83.

²⁹ Schemas are emergent going up the hierarchy and supervenient coming down the hierarchy.

³⁰ Simon, Herbert A. *The Sciences of the Artificial*. (Cambridge, Mass: MIT Press, 1981).

³¹ Science *discovers* the Design of Nature and Engineering *designs artifacts* based on that knowledge.

spontaneously in our works as the most natural way to produce representations and presentations, or reproductions and productions. We build up our artificial environment and fill it with things made in the image of the schemas, which is our internal pre-understanding of the organization of the emergent thresholds of spacetime. What is interesting is that when we produce things according to the templates of the schemas, we find that it is the most natural way to organize our expressions; it is naturally what we feel is right. Yet, when the schemas are *applied* they lead to an *artificial* environment. That is because the natural environment contains the schemas of many different species, and thus there is a blending of different species with specific schematic organizations of spacetime. When we create an artificial environment based on and extending our material culture, we are only using *one set* of those schematic organizational principles, while excluding the schematic organization of species that are different from our own³². The richness of nature comes from the *variety* of schematic organizations that are being projected by different species, while the artificial creation of our human centered environments tends to blot them out and replace them with our own schematizations exclusively, which leads to a lessening of the variety of schematizations that can be realized in the overall natural environment. This is a very different way of looking at the environment that goes beyond just simply acknowledging the physical presence of various species. We need to consider how each species *contributes to environmental variety through their inherent projection of a particular spacetime schematization onto the environment*, as well as the *blending of these various different schematizations within the natural environment* as it is mutually constructed between species. If there is a Dasein³³ of humans, then there is an equally different dasein of the various species, which together creates an ‘interspecies’ Mitsein³⁴. But because only humans have Being³⁵, and only Indo-European humans at that, then we need another terminology for this insight that will emphasize how these various

³² Different species have different experiences of time and different sensory sensitivities, but little research has been done on the various schematizations intrinsic to different schemas. It is quite clear that spiders and humans would have very different schematizations based on body plan differences. We are assuming a spectrum of schematic projections by different species.

³³ Means “There-being” a term used by Heidegger in Being and Time, which means the individual within a community who has being-in-the-world. It is a term for a state that is prior to the differentiation of subject and object.

³⁴ Means “With-Being” A term used by Heidegger in Being and Time, which means the community, that *together* had being-in-the-world. In the broadest sense this can be interpreted to be not only the human community but the broader community of living species within the same ecosystem, or within Gaia in general.

³⁵ Being is a unique linguistic artifact of the Indo-Europeans. Within the sixty percent (or so) of humanity that speak Indo-European languages it is understood that Being and Thinking is understood according to Parmenides’ definition. In other words, Being is the intelligibility of what IS and only human beings have access to that intelligibility.

schematizations are existential in nature and not caught up in Being, which is a purely *human*, and at that, a particularly *Indo-European* construct. Perhaps we can use the term from K. Jaspers' "Existenz"³⁶. We could say that part of *existenz* is the projection of schemas (by each species) upon their environment, and that those schemas blend in their *existenz* to produce an interweaving of the schematizations of their mutual environments. Humans do this just as all species do, but human projections are mediated by language and culture, and within our range of cultures we must emphasize that Indo-Europeans have incorporated an additional overlay of Being that takes us beyond existence and transforms simple 'projection' into a *projection of illusory continuities*. Indo-Europeans have a concept of Being in which *projection* is made *self-conscious within itself* and supported by language. This is a pivotal and decisive feature of Indo-European culture that we need to recognize because this sets it apart from other world cultures. Through their language, Indo-Europeans create more distance between themselves and the things that are projected upon (within their spacetime envelopes) by reifying the projection process and giving it a substrate of Being that is preternatural and ultimately delusional³⁷. Thus, General Schemas Theory should not only concern human or Indo-European culture-specific schematizations, but should study schematization across all species to highlight how the variety of schematizations produced by different species interweave to create the rich spacetime of nature. In this work we will restrict ourselves to the tradition of schematization that has been fostered by Indo-European culture, while giving particular attention to Western European and American culture. Through globalization, Euro-American schematization is becoming the dominant cultural construct of the spacetime envelopment, and so we will focus on understanding that as a starting point.

We understand schemas through their nesting and through their relationship to dimensionality, which facilitates a topological and geometrical understanding of space, as well as a narrative understanding of time. We also see them as an ontological hierarchy³⁸

³⁶ Jaspers, K. Reason and Existenz Five Lectures (London: K. Paul, 1956; Marquette University Press, 1997).

³⁷ Cf. Maya, the term for illusion in Hindu philosophy. Delusions are illusions that are compounded by being acted upon. Delusions are illusions that are compounded by being acted upon. See also Glass, James M. Delusion : Internal Dimensions of Political Life. Chicago: University of Chicago Press, 1985.

³⁸ The schemas are called an Ontological Hierarchy because they are not a discovered hierarchy within nature at different Emergent levels of phenomena, although they are Emergent levels of the projection of Being on Phenomena. The projection of Man on Nature is not unified as a single Intentional Morphe, but instead, the projection (itself) is fragmented into the Schemas, and from there it is fragmented into the Standings of Being, Existence, Manifestation, and then from there into the Aspects of the Standings. See also Schürmann, Reiner, and Reginald Lilly. Broken Hegemonies. Studies in Continental Thought. (Bloomington: Indiana University Press, 2003).

as a result of their relationship to the ontic hierarchy³⁹ from which they differ. In addition, schemas serve to give access⁴⁰ to the ontic hierarchy, although in some cases, they may simultaneously hide or cover up⁴¹ the very ontic hierarchy that they are providing access to. The schemas form an arena with a given internal structure that bounds the process of ‘Emergent Design’, which is the focus of this study. We can compare different design activities based on the framework of the schemas, and this can give us some insight into the nature of design itself. But, for the most part, there is a central norm to the schematization process that is fairly stable and established within our culture. Thus, we can use the hierarchy of schemas as a general framework for the expression of Emergent Design. If we fail to understand this framework, it will be difficult to understand the creative activities of design, which assume the existence of the framework and use it as a tool for the expression of creative works in the Arts, in Engineering, and in Science. General Schemas Theory does not as yet exist as a discipline beyond Systems Theory because it is too close to us. We dwell within the Schemas. Schemas are like water for fish or air for birds, the schemas are the way we see everything, and we think of them as perfectly transparent and without an organization of their own. We think of schemas as our perfectly open access route to things, and we consider them to be the *clearing* where things will reveal themselves to us as they are without our interference⁴². But, as we reflect, we realize the truth of Kant’s insight that we must project space and time and the categories *from ourselves* if we are to *aVoid*⁴³ the nihilism of Hume’s skepticism. Critical Philosophy supports the view that we must value and take responsibility for the most fundamental

³⁹ The ontic hierarchy are the levels of emergent things, such as quarks, particles, atoms, molecules, macro-molecules, proto-cells, cells, organisms, communities of organisms, ecologies, Gaia. This set of emergent levels is cut up differently by different theorists. But the ontic hierarchy is about emergent phenomena that form thresholds of more complex organization, while the Ontological Threshold is about the emergent levels of our templates of the pre-understanding of phenomena. See Murphy, Nancey C., and William R. Stoeger. *Evolution and Emergence: Systems, Organisms, Persons*. (Oxford: Oxford University Press, 2007). See also Clayton, Philip. *Mind and Emergence: From Quantum to Consciousness*. (Oxford UK: Oxford University Press, 2006).

⁴⁰ Schemas give us approaches to phenomena, which are pre-understandings that guide our comprehension of the phenomena. Schemas open up ways of accessing various phenomena of a certain scale or scope.

⁴¹ Once the decision is made to apply a particular schema this is a hard habit to break. Actually changing our schematization of a phenomenon is very hard, but our classification of phenomena by schemas is done quickly and perhaps unconsciously for survival reasons. Once we have opened up phenomena, via a particular schema, it is very difficult to change and that may hide certain aspects of the phenomena that would be seen if we applied a different schema to it.

⁴² Clearing and Open are metaphors that Heidegger uses for the realm of presence where things come to presence. They are striated and unstriated pairs. We assume that the realm of presence is cleared successively and become open to the arrival of old and new things. The clearing of the realm of presentation for the arrival of the utterly new is the Emergent Event.

⁴³ “aVoid” is a neologism, which attempts to show that in order to *avoid* Hume’s nihilistic skepticism it is necessary to venture out of Being into Existence which may be interpreted as a Void. Nihilism needs a nondual solution. Dualistic solutions to nihilism always fall back into nihilism, which is the very thing they are trying to avoid.

aspects of what we see in the world, such as space, time, and causation if we are to *aVoid* the nihilism that occurs when we try to distance ourselves from them or think of them as objective. This is one of the main reasons for the idealistic bent of Western Philosophy. We separate ourselves from phenomena in order to analyze it objectively with the consequence that it can return and haunt us in a nihilistic form. But, if we admit that the things that are as basic as space, time, and the categories actually *come from us*, then we will be able to sustain their meaning and efficacy. Thus, we accept the schemas as an ecstasy⁴⁴ of Dasein, although we reject the subject/object dichotomy that Kant employed when he articulated them as the temporal analogs of the categories. We will focus on what Umberto Eco refers to in Kant and the Platypus⁴⁵ as the “Mathematical and Geometrical Schemas”, rather than other connotations of the term. ‘Schema’ has had a rich history and pertains to almost any habitual template for the recognition of things known already. Here we will strictly use the term to mean *the projection of orders on spacetime at various scales that interlock and nest with each other, which, in turn, form a finite set, each with connections to specific dimensions.*

Sub-schemas

Once we have the framework of the schemas hypothesized and in place, then we can discuss how the schemas give us a basis for the exercise of design activities. This occurs because the schemas can be separated into Sub-schemas based on representation, repetition, and dimensional segregation. There are at least two dimensions per schema and at least two schemas per dimension⁴⁶. This means that any given schema can be projected on two phenomena of different dimensionalities. For example, phenomenal form can be either two or three-dimensional, so we see forms in pictures based on the outlines of shapes. We see three-dimensional objects as continuous and contiguous and these have shape as forms as well. Our argument proposes that phenomenal forms appear in only two dimensions in S-prime theory and that higher dimensional forms, for example, forms in four-dimensional space, are *not* phenomenal as such. Other hypotheses beyond S-prime develop the *implications* of a higher dimensional extent by schemas, but only in rare circumstances. This same thing is true of all the schemas. They all apply to phenomena of at least two different adjacent dimensions. But once we realize that schemas can have

⁴⁴ Exi-stance is ‘standing out side of oneself’. As Heidegger notes, existence and ecstasy are related in language.

⁴⁵ Eco, U. Kant and the Platypus (Harcourt Brace, 1999).

⁴⁶ This is the S-prime hypothesis advanced by the author in the formulation of General Schemas Theory.

different dimensional presentations, it becomes clear that it is necessary to separate the *ascent* from the *descent* of this series of dimensions and divide them into two series. One series consists of representations that *lose* information going *down* the hierarchy, and the other series consists of repetitions that *generate* information while going *up* the hierarchy. We take this theoretical difference from Deleuze's Difference and Repetition⁴⁷. We are applying his theory and using his distinction to differentiate these two movements. Thus, every schema has four images, which we will refer to as *sub-schemas*. A schema has a higher dimensional presentation, a lower dimensional representation, a lower dimensional generator, and a higher dimensional repetition based on that generator. We call the higher dimensional presentation the 'whole schema' and we consider the other sub-schemas as derivative schematizations of the 'whole schema'. The best understood example of this is to designate higher dimensional presentation as the *whole form*, the lower dimensional representation as a *picture*, the lower dimensional generator as a *plan*, and the higher dimensional repetition as a *model*. This type of disaggregation of the sub-schemas happens at each schematic level based on *dimension* and on *repetition/representation* as defined by Deleuze. We have given examples of what these sub-schemas might be at each schematic level in other works⁴⁸. If we observe architectural design work we will find forms, pictures, plans, and models of buildings. The building is the whole form, but it is preceded in the design work with pictures, plans, and models that *stand in* for the actual building's form during the process of design. In our culture we accept the Building Architects' *modus operandi* as a paradigm and we will follow that example here for simplicity's sake⁴⁹. In order to do design we need these semiotic artifacts that *stand in* for the final *construct* during the design process. The artifacts are semiotic in the sense that they *point* toward the construction of the final whole form by giving representations with information loss, by giving generative planning information, or by modeling it prior to its construction. We will designate the *whole schema* as the *construct*. The construct has its loss⁵⁰ representation, its generators, and its fulfillments based on the repetition of the generators. At each level of the schemas there are different constructs, representations, generators, and repetitional fulfillments. For the most part, we will talk about these in relation to Form with its

⁴⁷ Deleuze, G. Difference and Repetition (Columbia University Press, 1994).

⁴⁸ See Introduction to General Schemas Theory at <http://holonomic.net> by the author.

⁴⁹ For an archetypal example see Manetti, Antonio The Life of Brunelleschi (Pennsylvania State University Press, 1970). For a mythic example see the myth of Daedalus.

⁵⁰ This term indicates a communication or representation that loses fidelity in the process of being sent or composed. A caricature is a 'lossy' representation of a portrait or photograph. Gibson, Jerry D. The Communications Handbook. Electrical Engineering Handbook Series. (Boca Raton, Fla: CRC Press, 1997) Section 36-2.

pictures, plans, and models because this is the most well known level where the sub-schemas are most fully understood. But, what we say about this level will need the suitable modifications necessary in order to express its applicability to all the various schematic levels.

The relationships between the representational series and the repetitional series of sub-schemas is expressed in terms of mimesis. The plan is a mimetic construct of pictures from orthogonal angles. The model is a mimetic construct of the whole form. The picture's representation is a mimesis in fewer dimensions. When the model is generated from the plan through repetition, the result is mimesis, i.e., an imitation of the Whole Form. When the various sub-schemas mirror each other, they form a mimetic space where the various schemas can be articulated in different ways. This mimesis has been studied by M. Taussig and we will use his work as representing the nature of mimesis⁵¹. It is important to note that there is a field of mimetic artifacts and they have different embodiments that articulate each schema. The sub-schemas give us a guide to the limits of this mimetic field in terms of dimensions and in terms of whether we are moving up or down the hierarchy of the schemas. Within the framework of the nested schemas the mimetic field gives us an environment for creative Emergent Design to occur. Our creativity is played out on the mimetic field during the design process and is expressed in terms of Sign Engineering⁵². This creative design process that we have termed as Sign Engineering presents the product in its particular whole schematic context and precedes the actual construction of engineered products, which are brought into being from out of other sub-schematic conceptual artifacts.

Beyond Dialectics

Once we understand the structure of the schematic framework of the field within which Emergent Design occurs, then it is possible to try and understand the actual dynamics of the process of design. We envisage that process as being trans-dialectical. The design process consists of more than two dialectical moments (thesis and anti-thesis) synthesized by *Aufhebung*⁵³, and should, instead, be viewed as a multi-moment synthesis. The field of the sub-processes has four limits and our trans-dialectical process actually consists of four

⁵¹ Taussig, M. T. *Mimesis and Alterity: A Particular History of the Senses* (London: Routledge, 1993)

⁵² See Wisse, Pieter Egbert, *Semiosis & Sign Exchange*. (Voorburg: Information Dynamics, 2002). See also Wisse, P. *Design for a Subjective Situationism, including Conceptual Grounds of Business Information Modeling* (Information Dynamics, 2002) at <http://www.wisse.cc/>

⁵³ Uplifting and sublimation of thesis and anti-thesis into a new whole synthesis that maintains the tension between the opposites contained within it. From Hegel, called 'Sublation' in English translations.

moments that together make up a creative synthesis that produces an emergent result. Thus, in its simplest form, the theory that we propose is that the process is a Quadralectic. The Quadralectic is a super-synthesis of the dialectic and anti-dialectic. It is comprised of four theses that pose two opposite thesis/anti-thesis pairs in interaction. The Quadralectic moments enable the sub-schemas to transfer from one sub-schema to another in the order formally stated, i.e., from construct, to representation, to generator, to model, and then, back to construct. In effect, the Quadralectic carries us to the limits of the mimetic field of the sub-schemas. This field is very complex and reflexive but the Quadralectical super-synthesis can provide a simplification of all the possible paths through that field, while the Quadralectical moments form a limit of the possible paths through the mimetic field at the specific schematic levels. Furthermore, just as the separation of the sub-schemas from the schemas is an idealization, the separation of the schemas from each other is also an idealization. Our solution to the question of how creative Emergent Design is possible revolves around the nature of the Quadralectic. The Quadralectic gives us a framework for understanding how we can begin with the whole construct and then proceed to produce a new construct by using the sub-schemas as mediating artifacts. It turns out that this is not simple. Deleuze teaches us about the complexities of the attempt to regain wholeness in Difference and Repetition. Repetition does not necessarily lead to a new whole. An emergent whole is particularly difficult to produce.

Once we understand the relationship of the Quadralectic moments to the sub-schema limits of the mimetic field, then, in a purely dialectical way, it is possible to understand the progression of Monolectics, to Dialectics, to Trialectics, to super-synthetic Quadralectics⁵⁴ and perhaps, from there, to ultra-synthetic Pentalectics⁵⁵. In other words, we can understand the nature of the Quadralectic by examining its relationship to emergent

⁵⁴ Marten Kuilman has the only known serious attempt to develop the idea of 'Quadralectics' that appeared as excerpts from unpublished manuscripts on the Web at <http://quadralectics.com> but are no longer accessible. He mentions books he has written:

1. Isagoge - An Introduction in the quadralectic philosophy (1986)
2. The Four Countries (De Vier Landen) (1990; revision 1997)
3. Four - A Rediscovery of the 'Tetragonus Mundus' (1996)
4. Visions of Four Notions (2002)
5. Quadralectic Architecture (in prep.)

From the few excerpts found on the Web seems that his development of the concept is different from the one presented here.

⁵⁵ Arvydas Sliogeris in Names of the Nihil says "The dialectics of a falsification of Presence and a simulacrum of Nihil makes one dizzy. To tell the truth the term "dialectics" does not suit here any longer. It would be more exact to speak about the trialectics, tetralectics, pentalectics, or decalectics, and finally about n-lectics of the simulacrum of Nihil and the falsification of Presence." page 74. Sliogeris, Arvydas. Names of Nihil. On the boundary of two worlds, 14. (Amsterdam: Rodopi, 2008). Only known mention of the extension of dialectics to a series of higher meta-dialectics.

thresholds that are above it (Pentalectical) and below it (Dialectical). Each are synthetic thresholds with their own emergent qualities. Following out the sequence of X-lectics allows us to see how the synthetic layers are generated in each case. Hegel viewed dialectics as recursive at different levels of abstraction, such as the nesting of the same schema. Only J.P. Sartre in Critique of Dialectical Reason⁵⁶ went beyond the mechanical conceptions of dialectics to a ‘dialectical dialectics’. Our concept that proposes an interaction of syntheses with emergent structures beyond the dialectical level is unique. Our view is based on B. Fuller’s Synergetics⁵⁷, which we view through the lens of dialectics, i.e., in terms of dynamics, rather than in terms of static geometrical shape.

However, we are interested in discovering how *possibility* plays a role in the process of creative Emergent Design, but in order to begin, we first need to consider the meta-levels of Being⁵⁸ and how each meta-level contributes to the Emergent Event. There is a whole series of meta-levels of Being and we must understand each of them in turn but, the one that we will particularly concentrate on is the level of Hyper Being, which is beyond Pure and Process Being. Plato refers to the existence of this meta-level in the Timaeus as the *third kind of Being*. It is significant that the Quadralectic initiates its movement at the *third meta-level of Being* because that is where the realm of possibilities open up. We will also undertake an analysis of the sign, as well as its meta-levels and show that De-Sign is at the third meta-level of the sign⁵⁹. Thus, we find that at the third meta-level of the sign, the design is, in fact, a interconnected field and not merely a collection of elements. Design is possible because possibility opens up at the third meta-level of Being, and at this third meta-level, signs have the character of *designs*. So, design is made possible by this convergence between an ‘opening up’ of the realm of possibility and the creation of a interconnected field of design within that realm as a meta-level of semiotics. Semiotics is a major part of Engineering due to the fact that the relationship of the sub-schemas to the whole schema is one of reference. Engineering creatively produces sign systems, which can embody designs that point toward the realization of emergent possibilities. So, the question concerning the possibility of creative Emergent Design is answered through the unity of the design field in Hyper Being, and this field can *emulate* the landscape of *possible designs* within a design landscape. On the other hand, the question of *how* these

⁵⁶ Sartre, J.P. Critique of Dialectical Reason (Verso, 1976, 1991 two volumes).

⁵⁷ Fuller, B. Synergetics (Macmillan, 1975, 1983 two volumes).

⁵⁸ See Structure of Theoretical Systems in relation to Emergence (LSE, U. London, 1982) prior to the dissertation of the author.

⁵⁹ See Application of General Schemas Theory: Design Methods and Meta-methods at <http://holonomic.net> by the author.

designs are actualized is answered through understanding the moments of the Dialectic, Quadralectic, and Pentalectic. The Monolectic exists in Pure Being, the Dialectic appears in Process Being, the Quadralectic appears in Hyper Being, and the Pentalectic appears in Wild Being. Beyond that is Ultra Being, which is a Singularity in Existence⁶⁰. When we understand how it is possible to configure dialectics and anti-dialectics to produce a Quadralectic, then we can consider how to configure Quadralectics and anti-Quadralectics to produce a Pentalectic. So, each of these higher levels of synthesis not only accounts for the emergent properties that appear, they also give us the ability to jump over the abyss that separates repetition from attaining the emergent whole form. The answer to this question involves overshooting. In other words, the whole set of sub-schemas forms a synthesis beyond that of the *whole form*, and the Quadralectic allows this super-synthesis to be produced; then we can fall back into the *new emergent whole form*. It is a matter of moving from synthesis to analysis to super-synthesis back down to new a whole synthesis that allows the Emergent Design to be realized. Emergence is inherently nihilistic. This means that without a background of nihilism the Emergent Event cannot be seen. The meta-levels of Being are the mechanisms in our worldview that not only produce the background of nihilism but also define the anomalous and rare Emergent Event. Their collapse down from the super-synthesis is the nihilistic moment within the cycle of the sub-schemas that makes the emergence of the Whole Form possible. Within the cycle of representation and repetition there is a division of the schematic level into sub-schemas. The cycle produces a super-synthesis of all the sub-schemas that is held together by the Quadralectic. This super-synthesis that is composed of all the sub-schemas eventually falls apart producing a construct of a new whole schema as one of its sub-schematic elements. This theory of overshooting to a higher super-synthesis is the key to understanding how the Emergent Event can be constructed in a process that is both analytical and super-synthetic. This process is intrinsically nihilistic in itself, but leads to an emergent end-product.

Exploring the Meta-levels of Being of the System and Meta-system

This simultaneous analysis of sub-schemas and projected super-synthetic thresholds is dependent on an understanding of the meta-levels of Being. This is a subject that needs to be explored in some length and we seek to understand it first by explaining how the concept of the System is transformed at the various meta-levels of Being. At each of these

⁶⁰ Trialectics are skipped in this series because they relate to mediation as shown in Hegel's definition of Work in the [Phenomenology of Spirit](#).

stages Systems and Meta-systems are compared in order to see how each of them appear at the various meta-levels from the points of view of a number of Twentieth Century philosophers such as Husserl, Heidegger, Merleau-Ponty, Derrida, and Deleuze. Suffice it to say that in our exploration of the Quadralectic we are most interested in the level of Hyper Being, but in order to grasp a complete picture, we must also explore Wild Being, which leads us to posit the existence of the Pentalectic as the next threshold beyond the Quadralectic. It turns out that ultra-efficacy occurs with the addition of just one moment at the Pentalectical level. Thus, a greater synthesis becomes possible beyond the Quadralectic. While the Quadralectical level allows for possibilities to be explored efficiently, it is actually at the level of Wild Being that they are embodied. At the end of this dissertation we begin to explore this higher level because it facilitates our understanding of the Quadralectic. We do this because the Quadralectic exists between the Dialectical and Pentalectical levels and is thus informed by that structural position between those limits.

Standing Up In Existence

Understanding the nature of the Quadralectic in Hyper Being, and beyond that, the nature of the Pentalectic in Wild Being, is not the end of the saga. We also need to understand how these movements in the ‘projection space’ of Being are mapped onto Existence. For Existence, we have two models: the Foundational Mathematical Categories, which model the Lifecycle of the Emergent Event, and the Emergent Meta-system⁶¹, which models the dynamic of Existence itself. We posit that since Being is a projection, there must be an alternative state where there is no projection that would serve as a reference. We discover that there are two states of Existence, one characterized by Emptiness and the other by Void. In Emptiness we find a picture of the Mathesis⁶² of the Nomos⁶³ in terms of the Foundational Mathematical Categories, which has been developed in our series on Emergent Science and Engineering⁶⁴. In Void we find a picture of the Emergent Meta-system, which is a model of the dynamics of Being based on an understanding of the Special Systems and their conjunction with the normal System to produce a model of the

⁶¹ See Reflexive Autopoietic Dissipative Special Systems Theory, (Apeiron Press, 2000) and also Autopoietic Reflexive Systems Theory, (Apeiron Press, 2000) available at http://works.bepress.com/kent_palmer

⁶² Op. cit. Mathematical comprehension. See Foucault, M. The Order of Things pp. 79-80.

⁶³ Order in Greek. McCullagh, Paul Fletcher. The Meaning of Nomos in Greek Literature and Thought from Homer to Aristotle. (Chicago: University of Chicago Dissertation, 1939).

⁶⁴ See also Emergent Engineering and Elements of the MetaNomos: Beyond Metaphysics and Metalogos at <http://holonomic.net> by the author.

Emergent Meta-system. These two models of Existence are duals of each other⁶⁵. And we find that they also may be synchronized with the Quadralectic, and that this possible synchronization over-determines the structure of the process of creative Emergent Design by aligning it with fundamental processes in Existence that are beyond the Quadralectic structure that we find in Hyper Being. Thus, we find that in terms of representations, the process of Emergent Design is aligned with the source of *all* representations, which are the Foundational Mathematical Categories. And with regard to bringing those representations into actuality, there is an alignment with the dynamic of the nature of Existence itself. Thus, these two synchronizations help to explain how it is that creative Emergent Design actually works to bring new things into Existence through the use of ordered representations. *It is the alignment of processes in Being and Existence that makes creative Emergent Design possible.* The Foundational Mathematical Categories define the Lifecycle of Emergence in the Nomos. And because that template is fixed in the unchanging Nomos, it is possible for that emergent event to occur in the lifecycle that is ordered by that template. But having the template is not enough, there must also be a minimization of the energy state that occurs in the Emergent Meta-system Cycle that will cause the emergent object to ‘stand up’ in Existence, not just in Being. If the emergent object only stood up in Being, it would be merely an illusion. Thus, Being must *borrow* from Existence in order to make itself real, true, identical, and present, as well as acquiring the capability to integrate their opposites: illusion, falsity, difference, and absence. The aspects appear both in Existence and Being. So, Being can borrow aspects from Existence within its projection process to make things *look* real, true, identical, or present. The aspects fuse to produce Knowledge but actually have the type of *persistence* that is claimed by Being. Thus, we posit that creative Emergent Design is based on Knowledge and it manifests in Being, but has its roots in Existence.

The Context of the Exploration

The final piece of this argument concerns the context within which the interaction between Being and Existence occurs. This is a general theory based on an insight of Heidegger in his later works, Contributions⁶⁶ and Mindfulness⁶⁷. This aspect of the argument is briefly taken up toward the end of the dissertation. It is called the theory of Striated and Unstriated pairs. Emptiness is striated and Void is unstriated. By striated and unstriated we mean

⁶⁵ The meta-levels of Being interleave with the Special Systems, which are a model of nondual existence.

⁶⁶ Heidegger, M. Contributions to Philosophy: From Ereignis (Indiana University Press, 1999).

⁶⁷ Heidegger, M. Mindfulness (Continuum International Publishing Group, 2006).

differentiated and undifferentiated. There are meta-levels of differentiated Emptiness that define the nondual⁶⁸ core of the Western Worldview, but Void is undifferentiated. Similarly, Heidegger mentions the difference between Being (Sein) and Beyng (Seyn) in his later works. Being has meta-levels, but Beyng, which is called strange, unique, and onefold does not have internal differentiation. It is what was “always already the same”⁶⁹ prior to differentiation in Being. Another striated and unstriated pair is the “Clearing” and “Open”. They are two metaphors often used by Heidegger to discuss the place where things (that are constrained by the Schemas) appear within our experience. Another important pair is Finitude (Immanence) and Infinitude (Transcendence). There are certain finitudes that are defined as dimensions and meta-dimensions of transcendence and they appear on an infinite background of possible dimensions and meta-dimensions. Human beings can only handle finitude, which is one of the major points of Heidegger’s philosophy. Alternatively, we cannot handle infinitudes very well and this point is explored by G. Cantor⁷⁰. Interestingly, infinitudes beyond Aleph are indefinite to the extent that there is no hierarchy of cardinals with definite measure beyond Aleph. Thus, beyond the pair of Finitude/Infinitude there is only a vast expanse of indefiniteness. It is the interaction of these striated and unstriated pairs of opposites that form the arena where we will focus on the relationship between Being/Beyng and Existence/Void in our theory. We will attempt to define the Open/Clearing and how it is constrained by the Finitudes/Infinitudes of the schemas as they relate to the dimensions and meta-dimensions. Understanding this context allows us to focus in on the interaction of these fundamental pairs of elements that define our lifeworld as well as the emergent events that are characterized in that lifeworld. The context is wider than traditional ontology, which only deals with Being. It not only incorporates Heidegger’s idea that Being has a dual called Beyng, but also incorporates the interaction between these types of Being and Existence in terms of Emptiness and Void, and it is here, within the *context* of this interaction that we find the Emergent Meta-system Cycle and the Emergent Lifecycle that are based on the Foundational Mathematical Categories. Schematization appears at the level where the Finitude/Infinitude pair appear beyond the Clearing/Open. This structure is called the meta-Quadrlectic (or the *Pleroma*). It is the structure of the field from which our worldview arises, and although it will not be explored in detail, it will serve as the

⁶⁸ Loy, David. Nonduality : A Study in Comparative Philosophy. (New Haven: Yale University Press, 1988).

⁶⁹ This phrase means that all the things that are differentiated in Being were never different in Beyng.

⁷⁰ Wallace, David Foster. Everything and More: A Compact History of Infinity. Great discoveries. (New York: Atlas Book, 2003).

backdrop for examining how the System and Meta-system are developed in Being and how they interact within the cycles of Existence. We mention this to clarify that we are going beyond Fundamental Ontology as it is generally understood because we are dealing with Existence as something separate from Being as it relates to how *beings within Being* are grounded. We wish to deal with Existence beyond Being in order to ground the illusions of Being and to provide a basis for the embodiment of the illusory continuities that appear in Being. Existence gives us the basis from which the Emergent Event can arise within Being. Without a non-Being that is beyond Being, there is nowhere for anything New to emerge from. Existence is a fundamental ‘ground’ for the process of emersion⁷¹ to manifest from. It is also an Afoundational⁷² ground in the Emptiness and Void of Existence, rather than a ground in Being. It has always been the goal of the Western Tradition to establish a ground, in Being, although this ‘ground’ in Being has been shown to not actually exist. Rather Being must take its grounding non-foundation from outside itself from Existence. This type of indirect and unreachable foundation beyond the groundless ground is called Afoundational because it is nondual and neither Foundational nor Anti-foundational.

Complexity of the Argument

This is a preview of the central argument of this dissertation titled: Emergent Design, Explorations in Systems Phenomenology in Relation to Ontology, Hermeneutics, and the Meta-dialectics of Design. The end of the dissertation treats the advent of the Pentalectic as the next level of ultra-synthesis within Wild Being. Our argument turns on defining the Schematic Framework and breaking it down into sub-schemas in order to present the Meta-dialectics. By Meta-dialectics we mean those beyond the Dialectics that Hegel defined in the Phenomenology of Spirit⁷³, i.e., beyond the Dialectics of Thesis and Anti-thesis and the Trialectics of Work, which is the transition to Spirit. The Quadralectic represents the moments of transformation between the limits of the sub-schemas. Our argument then overflows into the concept of the Pentalectic, which gives an upper bound that, along with the lower bound of the Dialectic, allows us to see the limits of the Quadralectic itself. The transition between the Quadralectic and the Pentalectic allows us to understand the process of creative Design in the context of the System and the Meta-system.

⁷¹ Emersion is the process of Emergence. It means coming into view. It is the moment of the Advent of the Emergent Event.

⁷² Neither with foundation, nor anti-foundational.

⁷³ Kojève, Alexandre, and Raymond Queneau. Introduction to the Reading of Hegel; Lectures on the Phenomenology of Spirit. (New York: Basic Books, 1969).

The question that we set out to explore is dealt with succinctly although the answer is, in itself, somewhat complex. The complexity comes from the fact that the processes that underlie emergence are themselves complex and not simple. General Schemas Theory provides a framework for comprehending the processes that underlie Emergence by distinguishing the hierarchal levels of the schemas, which differ from the ontic hierarchies that exist within the complexity of phenomena. Within the hierarchy of the schemas there is the differentiation of the sub-schemas based on the dimension and direction of movement. This movement produces two series and those series cross in mimetic space, which is bounded by the limits of the sub-schemas. It is between these limits of the sub-schemas that the Quadralectic performs its transformations. The transformations of the Quadralectic are defined and clarified in a series of X-lectics that are associated with the meta-levels of Being. The Quadralectic is poised at the level of Hyper Being and there is a confluence of the appearance of possibility at that level of Being. The process of design occurs at that meta-level as the differentiation of the sign. This is what makes design possible. *The Quadralectic actualizes emergence by enacting the Lifecycle of the Emergent Event and by producing a super-synthesis from which we can collapse back down into the entire construct of the whole schema, which then becomes a new entity with emergent characteristics*⁷⁴. The process of ‘standing up’ the emergent artifact that produces an Emergent Event in Existence is accomplished on the basis of the movement of the Emergent Meta-system to a lower energy state. The lower ‘material’⁷⁵ energy state of the System, with its emergent properties, appears within the context of the de-emergent Meta-system. It is the synchronization of the cycle of the Quadralectic with the cycles in Existence that allows Being to borrow its aspects from Existence and bring an Emergent Entity into actualization. The ability to distinguish the grounded veracity and reality of an artifact to be more than just a projection is significant and necessary for the design process to proceed efficiently and successfully. As we practice design, we need to embody the emergent artifact as a materially concocted spacetime envelope so that we may actually use and benefit from these emergent properties that have been actualized or realized. We must

⁷⁴ Sometimes, as one is imagining certain emergent characteristics, others appear instead. Emergence is an extremely unpredictable phenomena. Emergent events are extremely counter intuitive. The production of the supersynthesis from which a whole new schema comes is part of the reason that Emergence is so surprising. It is, in fact, the most surprising event possible within our worldview. See Taleb, Nassim. The Black Swan: The Impact of the Highly Improbable. (New York: Random House, 2007).

⁷⁵ We use ‘material’ in the special sense as defined by Hilary Lawson in Closure: A Story of Everything. (London: Routledge, 2001).

note how our practice creates this embodiment by examining the nature of Practice⁷⁶ as it appears in Wild Being and by studying the next higher threshold of ultra-synthesis, which is the Pentalectic.

Rationale for the Form of the Argument

The form and terminology employed in this dissertation may be considered non-standard within current engineering disciplines. This is because we are explicitly seeking to achieve transdisciplinarity and interdisciplinarity by introducing other viewpoints that are not normally shared in the engineering community. Standard engineering approaches have not solved the problem of establishing foundations for Systems Engineering. As a result, we must go outside the normal boundaries of the discipline to search for resources to solve this problem. This means that we will encounter ways of thinking and terminology that we are not accustomed to hearing as we explore what other disciplines have to tell us about the nature of foundations, such as Continental Philosophy, Mathematics, and Advanced Systems Theory.

In Chapter 1 the argument begins with continental philosophers such as Husserl and offers a tutorial concerning what they can tell us about the nature of the System. In Chapter 2 we examine Heidegger and in Chapter 4 we explain how Heidegger transforms Husserl's vision of the role of the World Horizon in Phenomenology. Chapter 3 discusses the concept of the Philosophical Categories of Peirce and the notion of General Schemas Theory. We do this in order to give a more concrete form to the ideas derived from Phenomenology. But, we soon discover as we move on to Chapter 5 that we must consider not only Systems Theory, but its inverse dual, which is Meta-systems Theory. In this context, open scapes, or organized environments, are presented as the opposite of Systems. This sets the stage for our inquiry into the nature of Design.

There is a crucial turning point toward the question of Design in Chapter 6. The concept of the Axiomatic Platform is introduced and there is an attempt to show that the difference between Absolute Geometry and the Fifth Geometrical Axiom contains a definition of the nature of Hyper Being, which is the basis for Design. This is because it is the basis for the entry of Possibility into the World. At this point we also introduce the theme of *meaning* in

⁷⁶ As seen by P. Bourdieu and M. de Certeau. Bourdieu, Pierre. Outline of a Theory of Practice. Cambridge Studies in Social Anthropology, 16. (Cambridge UK Cambridge University Press, 1977). Certeau, Michel de, Luce Giard, and Pierre Mayol. The Practice of Everyday Life. (Minneapolis: University of Minnesota Press, 1998).

Design by explaining the difference between Being and Beyng, which are concepts that come from Heidegger's later works. Given those tools, in Chapter 7 we are then ready to explore Sign Engineering as defined by Pieter Wisse and to develop a picture of the Ennead and its possible expansion into the Quadralectic. In Chapter 8 the context of the Quadralectic is defined as it relates to Hyper Being as well as an additional meta-level of Being called Wild Being. This is put into the context of all the Standings toward the World, which includes Existence and Manifestation as well as the various meta-levels of Being. Chapter 9 takes the process of Emergence and moves it through the various meta-levels of Being as they are aligned with the schemas. In this version the sub-schemas are identified with the moments of the Quadralectic. Chapter 10 then considers the meta-levels of the System and how they are affected by the sequence of the Meta-levels of Being that define the Emergent Event. Chapter 11 goes on to describe the meta-levels of the Meta-system (or open-scapes), which are duals of the meta-levels of the System. Following that, Chapter 12 brings these arguments back to bear on the *methods* of System and Meta-system design that can be employed by Systems and Software Engineering.

In Chapter 13 we turn to two major extensions of the theory developed so far. First, we define the elements of the Design Field from out of which the semiotic object of design must be constructed and then move on to define the synchronization of the Quadralectic in Hyper Being with the moments in the Emergent Meta-system Cycle and the phases of the Lifecycle of the Emergent Event within the realm of Existence. This synchronization of several cycles is seen as a major way that theory can be brought into a form that would allow it to be refuted. This is an attempt to make a speculative theory as scientific as possible. Chapter 14 continues this major expansion of the argument and makes it possible to recap the description of the Quadralectic and offers the possibility of expanding it into a Pentalectic, which is a major element of the argument of the dissertation. As a result, the argument begins to border upon doing *what the theory itself says*, which Alan Blum advocates in his book, Theorizing,⁷⁷ as being a critical element to constructing a theory. Chapter 15 goes on to define the Pentalectic as an expansion of the Quadralectic. Chapter 16 delves into the ramification of that expansion to a new level of ultra-synthesis. Here, the ultra-efficacy that takes place in the transition from the Quadralectic to the Pentalectic is explained through P. Bourdieu's and M. de Certeau's concepts of practical reason. In conclusion, we recap the argument at a high level of abstraction.

⁷⁷ Blum, Alan. Theorizing (London: Heinemann, 1974).

The argument takes this form because we are at the beginning stages of moving into a part of the Western Philosophical Tradition that is utterly alien to Engineering. It is a part of the tradition that still focuses more seriously on synthesis. During the Enlightenment the Western Tradition favored analytic and reductive approaches to phenomena. This was very successful and gave us modern science, but in the eye of many, this approach contained and perpetuated social sacrifices that were expressed through the excesses of the French Revolution. Even Kant warned that reason alone could not be trusted, not only because it produced antinomies, but also because it led to inhumane and ruthless approaches to humanity. Romanticism was a movement that was born out of a reaction to the Enlightenment. Hegel and Nietzsche were part of this movement and were avidly opposed to the tyranny of reason. This is also a major theme in Blake's *Four Zoas*. Continental Philosophy continued to move in this anti-enlightenment direction, but there was a backlash against it with the Pragmatism of Peirce on one hand, and the Analytical Philosophy of Schlick, Wittgenstein, and Russell on the other. Because Analytical Philosophy still emphasizes analysis and reduction (or at most supervenience) in its role as the handmaiden of Science and Engineering, it has nothing to tell us about synthesis, and particularly nothing to offer concerning the nature of Emergence.

This dissertation shows Emergence as seen in terms of the meta-levels of Being in relation to Existence. It also explains the nature of Design, because all Design occurs at the level of Hyper Being where possibility appears. Yet, we go further and show how Wild Being *complements* Hyper Being, as well as the complementarities that exist between System and Meta-system, Set and Mass, Being and Beyng, and other significant relationships that are not generally part of our approach to engineering activities. In essence, we are proposing that there can be a Social Constructionist critique of Engineering just as there has been a Social Constructivist critique of Science. Recently, there has been bitter debate in which scientists have reacted against this kind of critique. They have attempted to show that such critiques are unscientific and that the proponents of these critiques in the study of Science and Technology⁷⁸ do not really understand Science⁷⁹. But, the argument here attempts to bridge this abyss by finding ways to show that Hyper Being was not only recognized by Plato in the *Timaeus*, but is also implicated in the relationships between the Axiomatic

⁷⁸ Jasanoff, Sheila. *Handbook of Science and Technology Studies*. (Thousand Oaks CA: Sage Publ, 2001). http://en.wikipedia.org/wiki/Science_and_technology_studies accessed 091004

⁷⁹ Sokal, Alan; Jean Bricmont. *Fashionable Nonsense*. (New York: Picador, 1998). See http://en.wikipedia.org/wiki/Sokal_affair and http://en.wikipedia.org/wiki/Fashionable_Nonsense accessed 091004

Platform and the failure to prove the fifth axiom that generates the complementary non-Euclidian Geometries. Thus, our argument proposes that Science and Engineering must take some form of this critique concerning synthesis quite seriously because it is part of mathematics itself⁸⁰. We posit Hyper Being as our theoretical basis for Design by establishing that it exists at the threshold of difference between Absolute Geometry and the production of Euclidian and Non-Euclidian Geometries. The process of Design occurs at the *third* meta-level of the sign and this gives unity to the design process. At this crucial point we implement Pieter Wisse's concept of Sign Engineering and show that his Ennead structure is not only derived from Peirce, but is also an image of the Axiomatic Platform. We complete his structure by adding Perspective as an additional moment, which gives us the Quadralectic and extends Hegel's concepts of Dialectics and Trialectics. Once we have the super-synthetic Quadralectic as a basis for Design we can then begin to explain how the Quadralectic moments relate to the sub-schemas. As we continue on this track, it becomes apparent that the Quadralectical moments are operators that take us between the operands of the sub-schemas. In this way Design can fit into the picture of General Systems Theory and we can explain how Design is integral to the structure of the schemas by postulating that the same operators can apply to any schematic level. For the purpose of this dissertation we only consider the sub-schemas of Form, but the argument is considered to be a hypothesis that covers all the schematic levels.

Much of the rest of the argument confronts the consequences of defining the Quadralectic. We see how Systems and Meta-systems are transformed as they move through the various meta-levels of Being. We see how the Quadralectic follows the structure of the Emergent Event, which explains how the Quadralectic results in Emergent Events that cascade through the design process. Next, we review Working Design methods and study the difference between methods and meta-methods such as the Wisse Metapattern and the Gurevich Abstract State Machine method.

Yet, in the midst of laying out this argument something surprising, even emergent, occurs, which is our realization that we can derive the elements of the Design Field by crossing the Philosophical Categories with the Meta-levels of Being. Beyond that there is a fundamental synchronization of the moments of the Quadralectic with the Emergent Meta-

⁸⁰ There is an additional chapter, Chapter 17, that is not included in the dissertation, at <http://holonomic.net>. This chapter shows that this same argument applies to Algebra as well as Geometry and even to the <http://holonomic.net> complementarity between these two fundamental forms of Mathematics upon which our tradition is based.

system. Both of these theoretical extensions of the Quadralectic inevitably lead to the conclusion that there is a deeper theory or a higher synthesis behind the Quadralectic, which is called the Pentalectic. This leads to the realization that by adding only one moment to the Quadralectic we can reap an even higher level of organization, or an ultra-synthesis. This is pursued in the chapters following Chapter 13 in which we recap the Quadralectic and then define it in terms of the Pentalectic. We then explore how the Quadralectic unfolds into the Pentalectic, which will help us to better understand the essential nature of *practice*.

As we develop our theory we appeal to aspects of Mathematics and Advanced Systems Theory that most systems engineers are not aware of. And for this reason ample references to introductory material are given throughout the dissertation. Our theory goes beyond exploring esoteric philosophical realms just for the sake of the exotic. Rather, we attempt to explore what these academically foreign realms can offer us in order to understand the foundations of our discipline and how that relates to our concrete human capacity to design emergent things that have never previously existed in nature or culture. This quest is what drives our economy and our place in the world as a civilization.

Beginning with Husserl's Phenomenology

Modifications of Phenomenology Necessary to Support a View of the System

Husserl's Phenomenology will be our starting point for the exploration of the phenomenology of the System. A 'naive view' of the System will be defined with an introduction to the basic vocabulary of Husserlian phenomenology. Aspects of Gestalt psychology and the Unconscious will significantly contribute to our approach to studying the System, although Husserl's phenomenology lacks an appreciation for both Gestalt psychology and the concept of the Unconscious, so these limitations will also be discussed. This section is meant to be a tutorial for introducing a Phenomenological approach to studying the System rather than focusing on the purely Subjective and Objective approaches that are prevalent in Systems Engineering today.

Introduction

There is a perennial question in the Systems Engineering community as to whether a system is something that we freely project on things in our experience, whether it is motivated by social consensus, or whether a system is something in the world with an independent existence regardless of our projections, individual or social. Here we will consider this question and how phenomenology⁸¹, and other related disciplines such as ontology⁸², hermeneutics⁸³, and dialectics⁸⁴ can help us to understand the nature of systems. We will also take into account advances that have been made in our understanding of General Schemas Theory. We will attempt a step by step development of the subject based on advances in Continental Philosophy over the last century and in the early part of this century. In general we will begin with Husserl⁸⁵, and then cover

⁸¹ Sokolowski, Robert. Introduction to Phenomenology (Cambridge, UK ; New York : Cambridge University Press, 2000).

⁸² Grossmann, Reinhardt . The Existence of the World: An Introduction to Ontology (London : New York : Routledge, 1994); See also Coffey, Peter. Ontology: Or, The Theory of Being: an Introduction to General Metaphysics (Longmans, Green and Co., 1914). A classic text.

⁸³ Gadamer, Hans Georg. Truth and Method (New York : Continuum International Publishing Group, 2005); See also Ormiston, Gayle L., and Schrift, Alan D. The Hermeneutic Tradition: From Ast to Ricoeur (Albany, NY: SUNY Press, 1990).

⁸⁴ Warren, Scott. The Emergence of Dialectical Theory: Philosophy and Political Inquiry (Chicago: University of Chicago Press, 1984). Sartre, Jean-Paul. Critique of Dialectical Reason (London : NLB ; Atlantic Highlands, N.J. : Humanities Press, 1976), then (London ; New York : Verso, 1991) 2 Volumes.

⁸⁵ Moran, Dermot. Introduction to Phenomenology (London ; New York : Routledge, 2000).

Heidegger⁸⁶, Derrida⁸⁷ and Merleau-Ponty⁸⁸. We will also consider some later theorists such as Badiou⁸⁹, Deleuze⁹⁰, Baudrillard⁹¹, Bataille⁹² and others of their ilk. However, we will also have cause to refer to earlier philosophers such as Plato, Aristotle, Descartes, Kant, and other precursors⁹³. Our focus will be upon Systems Phenomenology as it affects the discipline of Systems Engineering and within this discipline especially Design, but, we will also delve into these questions in relation to Ontology, Hermeneutics, and Dialectics to the extent that it is necessary to make a full explication of the subject. We will concentrate on the subject in the beginning as it is debated within the Systems Engineering community and as it applies to the Systems Engineering discipline. However, we should not be surprised if we are led away from the traditional understanding of the practitioners and even that of the systems theorists into an esoteric philosophical realm where the concept of the system is transformed. This is inevitable because the issues highlighted by Systems Phenomenology and Hermeneutics tend to spill out into more areas than we may normally associate with either traditional Systems Engineering or traditional Systems Theory. This study comes on the heels of a broad research program into the ontological foundations of Systems Engineering⁹⁴ that has been developed into a discipline called General Schemas Theory⁹⁵. In the course of that study we redefined Systems Engineering as *Emergence Engineering*. This is an evolving discipline based on General Systems Theory, which is based on Emergent Science⁹⁶. We will bring this newly forged viewpoint of the problem back to the fundamental question of the nature of Systems from the viewpoints of Phenomenology, Ontology, Dialectics, and Hermeneutics. This study will focus on the nature of Emergent Systems Design and a Meta-dialectical theory of design, which will come into play as we pursue our subject concerning the nature of the system.

⁸⁶ Kockelmans, Joseph J. Martin Heidegger: A First Introduction to His Philosophy (Pittsburgh: Duquesne University Press, 1965).

⁸⁷ Hill, Leslie. The Cambridge Introduction to Jacques Derrida (Cambridge, UK; New York : Cambridge University Press, 2007).

⁸⁸ Kwant, Remigius C. and Remy C. The Phenomenological Philosophy of Merleau-Ponty (Duquesne University Press, 1963), then (Ann Arbor, Mich. : UMI Books on Demand, 2003).

⁸⁹ Barker, Jason. Alain Badiou: A Critical Introduction (London; Sterling, Va.: Pluto Press, 2001).

⁹⁰ Bonta, Mark and Protevi, John. Deleuze And Geophilosophy: A Guide And Glossary (Edinburgh: Edinburgh University Press, 2004). See also Colebrook, Claire. Gilles Deleuze (London; New York : Routledge, 2001).

⁹¹ Butler, Rex. Jean Baudrillard: The Defence of the Real (London; Thousand Oaks, Calif.: Sage, 1999).

⁹² Noys, Benjamin. Georges Bataille: A Critical Introduction (London; Sterling, Va.: Pluto Press, 2000).

⁹³ Mensch, James R. After Modernity: Husserlian Reflections on a Philosophical Tradition (Albany: State University of New York (SUNY) Press, 1996).

⁹⁴ Buede, Dennis M. The Engineering Design of Systems: Models and Methods (New York: Wiley, Wiley-Interscience, 1999).

⁹⁵ "General Schemas Theory" in Foundations of General Schemas Theory at <http://holonomic.net> also given at CSER 2004 by the author.

⁹⁶ Foundations of Emergent Science and Engineering at <http://holonomic.net> by the author.

Heidegger forged the link between Phenomenology and Hermeneutics in Being and Time⁹⁷. Phenomenology examines how phenomena appear and Hermeneutics examines how they are interpreted, which is to say, it is an attempt to glean the intrinsic meaning of the phenomena. It is necessary to consider both phenomenology and hermeneutics if phenomena are to make sense to us. And that is precisely what we endeavor to do: *to make the System a concept that will make sense to us and avoid nihilism in the process*. If we say that Systems are merely what we freely project as individuals or as social groups, or if we say that systems are only external objective phenomena, we would be defining Systems from viewpoints that are nihilistic extremes. What we want to do here is to attempt to avoid those nihilistic extremes of subjectivism and objectivism. These alternatives appear in Plato's Cratylus⁹⁸ as the difference between true names and conventional names of things. We wish to forge a way of looking at the *System* such that it retains its meaning and gives us a basis for exploring the nature of phenomena, especially the phenomena that we create from our designs as part of the Systems Engineering process⁹⁹. But in order to understand the system beyond these nihilistic extremes, it is necessary to construct a picture of how the concept of *what a System is* – transforms at various ontological meta-levels. And in order to understand the essence of the System, it is also necessary to comprehend the dialectical nature of systems design through which we create emergent systems as human artifacts. In this way we can better understand the nature of how we project Systems onto things in the world, which makes them different from 'free' projections that are arbitrarily induced by individuals acting freely and independently, and are also quite different from the other extreme of objective independent things-in-themselves, i.e., noumena. Understanding the nature of the System beyond these nihilistic alternatives is our challenge. And the case that we will use in our argument is Design, because it traverses these extremes, especially in the case where the results of design are emergent, i.e., radically new, and thus changing intrinsically both the subject and the object that are in the process of *coming into Being* as the Emergent System.

⁹⁷ Heidegger, Martin. Being and Time. Trans. John Macquarrie, Edward Robinson. (Oxford : Blackwell, 1962); Also Trans. Joan Stambaugh. Being and Time: A Translation of Sein and Zeit (Albany: SUNY Press, 1996).

⁹⁸ See Sedley, David Plato's Cratylus (Cambridge, UK ; New York: Cambridge U.P., 2003); See also partial commentary by the author at <http://holonomic.net> under title Genealogy of General Schemas Theory (unfinished).

⁹⁹ Notice that the systems we design and art that we create become part of an intersubjectively experienced external reality. Design traverses this interface between subject and object.

Naïve View of the System

Generally we take a rather naïve view of a System when it is reified into a term with a definition and is presented as a formal concept in a book on Systems Theory¹⁰⁰, Systems Science¹⁰¹, or Systems Engineering¹⁰². This naïve view of the system says that it is a set of things and their relationships with an abstract boundary, which persists within our mutual experience. Normally, when working from a scientific perspective, the system is assumed to be some objective fact in the external world, which is passively perceived by an observer. But this definition does not work well for Systems Engineers who hope to draw new boundaries for new systems with emergent properties. In this case there are those who say that a system is whatever we can draw a boundary around in our experience and that we alone are the source of the distinction between the system and its environment, either as individuals or as teams. The first thing that we need to do is to see how both of these naïve definitions are nihilistic so that we can begin our journey into a more subtle, sophisticated, and philosophically esoteric understanding of the nature of the System. When we view the system as a freeform boundary that we have drawn, it gives us the freedom to partition the environment, introduce new systems into the environment, and analyze this environment however we see fit. Yet, this view has problems, because, if everyone did that independently, then we would not be able to communicate effectively about the system we wish to build or call attention to. On the other hand, if the system is only what we (as subjects) objectively observe in the external world, then it makes the system something that is imposed upon us and difficult to change. These views are often presented as having consensual and common sense boundaries that we learn about and agree to, and this consensus on where the boundaries are to be drawn forms the basis of most systems. But individuals can, in their imagination, impose different boundaries that are beyond the general consensus, which enables them to generate new systems. In a way this solves the objectivity problem because what the group sees and agrees upon is considered the reality of what lies beyond the grasp of any given individual. Yet, this view, referred to as Social Constructionism, is considered by some to be controversial because it largely denies objective external reality. Realists want to say that there is an external reality beyond the experience of the individual and the group, and that this is the source of the system: *a*

¹⁰⁰ Klir, George J. and Elias, Doug. Architecture of Systems Problem Solving (New York: Kluwer Academic/Plenum Publishers also Springer, 2003). See also Bertalanffy, Ludwig Von. General System Theory: Foundations, Development, Applications (Harmondsworth, Middlesex: Penguin, Braziller, 1968). A classic text.

¹⁰¹ Klir, George J. Facets of Systems Science (New York: Plenum Press, c1991; also Springer, 2001).

¹⁰² Kossiakoff, Alexander and Sweet, William N. Systems Engineering Principles and Practice (New York: Wiley-Interscience, 2002).

noumena beyond phenomena. However, the way we understand such a reality has been problematic since the time of the philosopher, Immanuel Kant. This nihilistic view of the objective external reality as the source of systems makes them ultimately unknowable and difficult to change. A nihilistic view such as this obstructs the creation of a new system with emergent characteristics. On the other hand, viewing systems as self-drawn boundaries succumbs to nihilism because it is solipsistic. In other words, how would we communicate the nature of these systems that we have drawn or even know if they corresponded to anything in external reality? The social constructionist view is nihilistic because, while it is better than both the objectivist and subjectivist views, the relationship of the social group to the individual and to external reality becomes problematic. It also falls prey to a kind of group solipsism: the *group* takes the place of the *subjective individual*. As a result, it is the group that becomes removed from the reality of the system rather than the solitary subjective individual.

So, how do we go beyond these various nihilistic positions and arrive at a place that is free of nihilism in regard to the nature of the system? This nihilism has little to do with the fact that the system has various definitions that are in conflict with each other, rather, the real source of nihilism is that we call almost everything a *system*, to such an extent that the word has become almost meaningless. Thus, nihilism confronts us on two avenues, one is due to the fact that we really do not have adequate definitions of systems that everyone can agree upon, and the other is that we overuse the term and apply it to too many things. As a result we really do not have proper contrasting terms that can sharpen its meaning for us. This means that the term *systems* has become indefinite, and in some cases paradoxical or even absurd. This often happens to terms in the course of the history of a tradition, they become indefinite when they are taken up and used in too many ways for too many things. One of the ways that we can solve this problem is to take a structural approach to the term *system*. That is to say, we will attempt to understand all the ways that the term is used and allow ourselves to map that field of meanings. Now this approach is fine in terms of the history of ideas, but it really does not move us any closer to the meaning of the essential concept of the system. Rather, what we need to do is to develop a framework for the concept of the system that will give it a stable meaning. Using a broad approach we want this to be considered a phenomenological framework, and to some extent a hermeneutical framework. In other words, we want to tie the framework to what we actually experience in terms of phenomena. We want this framework to confer meaning upon the term, 'system.' However, we also want to know the ontological status of the things that this term is applied to so that we can know how much of what we call a system is actually out there

in the world, or how much of it is just a freeform projection. To begin developing this framework we will turn first to Husserl's Phenomenology and then to other figures in the Continental and Phenomenological tradition. The concepts of Hermeneutics and Ontology tend to be treated under the rubric of Phenomenology. Therefore, we will call this study a Systems Phenomenology, which will encompass hermeneutical, ontological, and dialectical concepts as well. Phenomenology under the Husserlian motto, "Back to the things themselves", attempts *to glean from appearances the reality of what appears*. The total context of those appearances tends to indicate their ontological status. And what appears must be more than a mere apparition; what appears must have meaning. Appearance is a dialectical process of *showing* and *hiding*, so we must also delve into the *process by which the appearance occurs* in order to understand those appearances entirely.

Phenomenology of the System

We begin with Husserl¹⁰³ in developing our framework because he was the first to develop a concise terminology for considering this question in terms of phenomena rather than in terms of theoretical doctrines. Husserl used the slogan, "Back to the things themselves", which meant that he wanted to define things in relation to *how they appeared within our consciousness*, rather than in terms of free floating ideas. That was how philosophy was studied prior to Phenomenology, although this is how Analytical Philosophy¹⁰⁴ presently

¹⁰³ Classic books by Husserl are Logical Investigations (Amherst, N.Y.: Humanity Books, 2000; Routledge, 2001). Also Cartesian Meditations (The Hague: M. Nijhoff, 1960, c1964; also Springer, 1977). The interpretation of Husserl we will be offering is greatly influenced by our recent readings of Welton, Donn. The Other Husserl: The Horizons of Transcendental Phenomenology (Bloomington: Indiana University Press, 2000). And also by Steinbock, Anthony J. Home and Beyond: Generative Phenomenology After Husserl (Evanston, Ill.: Northwestern University Press, 1995).

¹⁰⁴ Analytical Philosophy is and Continental Philosophy are two strains of contemporary philosophy that are often at odds. Analytical Philosophy derives from Frege, via Schlick, Wittgenstein, Moore, Quine and Putnam and included schools like Logical Positivism and Ordinary Language Philosophy early in its development. It is the main form of philosophy in the United States and England. Continental Philosophy is merely European Philosophy carrying on with the themes it has always been concerned with. But as the name suggests, Analytical Philosophy is about Analysis rather than Synthesis. For approaches toward syntheses, which we are interested in here, we need to turn to Continental Philosophy almost exclusively. But sometimes Analytical Philosophy is useful in a clarifying role such as when we refer to B. Russell, M. Schlick, L. Wittgenstein and others from that tradition. But for the most part we will be dealing with attempts to understand synthesis in order to lay the ground work to for understanding Emergence. In general, Analytical Philosophy developed the idea of supervenience in order to play down or reduce Emergent phenomena. And we consider Supervenience and Emergence to be opposite concepts here in this study. We consider Analytical Philosophy as carrying on the tradition of dogmatic philosophy in a pre-Kantian form in as much as it attempts to divorce concepts from experience. Phenomenology goes in the opposite direction and emphasizes 'experience as appearance' as the basis of philosophy. In many ways these are opposite approaches and both need to be considered. But, in the context of attempting to understand synthesis it is better to try to understand that is not through analysis and mere conceptual argumentation, but via experience of phenomena accepts the ubiquity of synthesis in our experience. Kant posited that reason and experience must join forces to yield understanding. We recognize that many Analytical Philosophers are oriented toward Kantian Critical Philosophy as well, but the cutoff point seems to come with Hegel who uses Dialectics and

deals with ideas. Phenomenology takes consciousness as the context for its understanding of things and concepts. And to the extent that systems are something that appear as phenomena in our consciousness, then phenomenology is an appropriate way of approaching their meaning and their appearance within consciousness. We are actually practicing a hermeneutical phenomenology because we are concerned with the meaning of Systems. *And*, because we are interested in the status of those Systems with respect to their independence from us, our phenomenology is also concerned with ontological issues. Also, because we are interested in the dynamics of the process by which we understand the ontological status of appearances, we end up dealing with dialectical considerations as well. Thus, our phenomenology can be robust like that of Husserl who did not study appearances for the sake of appearances themselves, but studied appearances in order to determine their status in relation to all the aspects of Being which are: truth, reality, presence, and identity.

Husserl lived in an era when Form was still the schema that was used as the primary basis for thinking about things, therefore, he did not really describe the *system schema* as such. Also, his work did not take psychological gestalts into account, but thought of forms as being independent of their backgrounds. We need to extend the work of Husserl with the continued work of his student Aaron Gurwitsch¹⁰⁵ in order to get a picture of what phenomenology based on a gestalt understanding might be like. It would also be apropos to consider the work of Alfred Schutz¹⁰⁶ who expanded the ideas of Husserl into the Social realm, although it is still worthwhile to start with the Husserl's terminology because of its precision in defining what appears in experience as phenomena within consciousness.

Husserl begins by distinguishing the *Intentional Morphe*¹⁰⁷ from the *Hyle*¹⁰⁸. *Morphe* means *Form*. *Morphe* contains *Hyle*¹⁰⁹, which is *content*. Intentional refers to the fact that we are always conscious *of* something. Consciousness is continually directed at something as its first and continual impulse. And one thing that consciousness can be directed toward is the *Form*, or in our case, a different schema, the *System*. But Husserl moves from this

posits not just global synthesis as the basis of analysis, but also proposes that experiences themselves undergo synthetic transformations in dialectics. This is absent from Analytical Philosophy, which tends to argue that synthesis needs to be analytically reduced and that it is an illusion if it exists at all. Thus, in this dissertation we will tend to ignore Analytical Philosophy unless it gives us specific tools for particular purposes that may be useful in our study, which is based mostly on Continental Philosophy.

¹⁰⁵ Field of Consciousness (Duquesne U.P., 1964).

¹⁰⁶ Phenomenology of the Social World (Evanston, IL: Northwestern University Press, 1967).

¹⁰⁷ De Muralt, Andre. The Idea of Phenomenology: Husserlian Exemplarism (Evanston, IL: Northwestern University Press, 1989) pp. 303 to 307 for intentional morphe.

¹⁰⁸ *Ibid.* pp. 289 to 303 for hyle.

¹⁰⁹ Farber, Marvin. Naturalism and Subjectivism (Springfield, Ill.: C. C. Thomas, 1959) p. 150.

initial position by saying that the fundamental thing happening in consciousness is the 'imposition of intention' as 'form on content', to the realization that content is never seen on its own, nor is the intentional morphe ever seen on its own, and it is never without meaning. As a result, these are mere abstractions based upon some transcendental superstructure or scaffolding inherited from Kant. What we actually see is a mixture of the form and content with meaning called *noesis* and *noema*¹¹⁰. Noesis can be described as having more conceptual meaning and less content, while noema has more sensory content and less conceptual meaning in the spectrum of pure form and pure content, which are never seen in consciousness¹¹¹. According to Husserl, in consciousness we see different modalities of content and form as mixtures infused with meaning, that appear within the spectrum from noesis to noema. And within this relationship of form and content, meaning is generated as an integral part of their fusion. Thus, phenomenology always incorporates some aspect of hermeneutics and semiotics, even when we are not only dealing with human cultural artifacts, but with any kind of percept or concept, because meanings are produced in the noematic and noetic fusion, and within experience there is signification occurring, even if we are not explicitly making signs for communication. Experience is integrally self-referential because all of its aspects point to other aspects in meaningful ways.

It is now necessary to translate the *Form* schema way of looking at things that Husserl introduced, into something that can be thought of in terms of a *System* schema, although this means that we need to understand the relationship between the *Form* and *System* schemas. This understanding of the system is crucial because it asks us to compare the system to other things that are similar, yet also different¹¹². The question is: How many things are like the System and the Form schemas? In order to answer that question we need to formulate a *General Schemas Theory*, which is a higher level of abstraction than General Systems Theory and General Forms Theory, because it considers the nature of all

¹¹⁰ Russell, Matheson. Husserl: A Guide for the Perplexed (London; New York, NY: Continuum International Publishing Group, 2006) p. 84.

¹¹¹ Husserl, Edmund, The Essential Husserl: Basic Writings in Transcendental Phenomenology. Ed. Welton, Donn (Bloomington, IN: Indiana University Press, 1999) Part IV Structure of Intentionality, Section 6. The Noetic and Noematic Structure of Consciousness. Noesis and Noema. p. 83, Also in Husserl, Edmund. Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy. Trans. Richard Rojcewicz, André Schuwer (The Hague; Boston: M. Nijhoff, 1980; Springer, 1989) Chapter 3, p. 277; See also Welton, Donn. The Origins of Meaning: A Critical Study of the Thresholds of Husserlian Phenomenology (The Hague; Boston: M. Nijhoff; Springer, 1983) Chapter 4, p. 121.

¹¹² i.e. have a "Family Resemblance" Nb. Wittgenstein. See Sluga, Hans article in Kober, Michael. Deepening Our Understanding of Wittgenstein (Amsterdam; New York: Rodopi, 2006) p. 1.

possible and actual schemas. At this point in time there is no General Forms Theory¹¹³, because all of Western Philosophy plays that role. The Form schema was the fundamental arbiter of experience throughout the development of the Western Tradition. It is only recently, since the turn of the last century that Systems theory¹¹⁴ and Structural theories¹¹⁵ have become important, and they are still relatively new. However, we should be aware that even though these other schemas have really only come into their own in the last century, they actually lived an underground existence in our tradition for a long time prior to that. For instance, it can be argued that it was really Kant who gave the *idea of the System* its philosophical meaning because he considered his philosophy a system and because he philosophized about systems. Yet, we feel that *Forms* are something we understand completely, but that *Systems* and *Structures* are new ways of looking at things that we are still exploring. The *Systems* way of looking at things has become the predominant view while the *Structural* way of looking at things is not as prevalent. We call everything a System these days, and to some the extent we are losing touch with what that means, and the only way to recapture that meaning is to contrast the System with other schemas such as the *Pattern* schema, which is the basis of structure, and the *Form* schema, which is fundamental to our tradition. Systems Theory was developed to consolidate the *Systems approach*, and to create an interdisciplinary Systems Science, which could be used in specific sciences as a general comparative way to describe systems. Structuralism was a school of thought that was doing something very similar to what System Theory was doing, although recently it has fragmented into various Post-structuralist schools¹¹⁶. Systems Theory has morphed into Complex Systems Theory¹¹⁷, so that what was once

¹¹³ E. Cassirer's philosophy of symbolic forms comes close to this goal dealing with one important type of form. See Cassirer, Ernst. *The Philosophy of Symbolic Forms*. 3 Volumes. (New Haven: Yale University Press, 1953).

¹¹⁴ Klir, George J. *An Approach to General Systems Theory* (New York: Van Nostrand Reinhold Co., 1969). Bertalanffy, Ludwig Von. "The History and Status of General Systems Theory", *The Academy of Management Journal*, Vol. 15, No. 4, General Systems Theory (Dec., 1972), pp. 407-426; See also Boulding, Kenneth E. "General Systems Theory-The Skeleton of Science" *Management Science*, Vol. 2, No. 3 (Apr., 1956), pp. 197-208.

¹¹⁵ Piaget, Jean. *Structuralism*. (New York: Harper & Row; Basic Books, 1970); Jameson, Fredric. *The Prison-House of Language: A Critical Account of Structuralism and Russian Formalism* (Princeton, NJ: Princeton University Press, 1975); Dosse, François. *History of Structuralism* (Minneapolis: U. of Minnesota Press, 1997) Two volumes; Gardner, Howard. *The Quest for Mind: Piaget, Lévi-Strauss, and the Structuralist Movement*. (New York: Knopf, 1973).

¹¹⁶ Colebrook, Claire. *Philosophy and Post-Structuralist Theory: From Kant to Deleuze*. (Edinburgh: Edinburgh University Press, 2005); See also Sarup, Madan. *An Introductory Guide to Post-Structuralism and Postmodernism* (New York: Harvester Wheatsheaf, 1993; also Athens: University of Georgia Press, 1993).

¹¹⁷ Auyang, Sunny Y. and A. *Foundations of Complex-system Theories: In Economics, Evolutionary Biology, and Statistical Physics* (Cambridge, U.K.; New York: Cambridge University Press, 1999); See also Cilliers, Paul. *Complexity and Postmodernism: Understanding Complex Systems* (London; New York: Routledge, 1998); See also Miller, John H. and Page, Scott E. *Complex Adaptive Systems: An Introduction to Computational Models of Social Life* (Princeton, N.J.: Princeton University Press, 2007).

known as traditional Systems Theory is now slowly dying as an interdisciplinary movement. It is our contention that unless we develop a General Schemas Theory, which subsumes Structuralism, Systems Theory, and Formalism into sub-disciplines of a single science that could be called *Schemas Science*, then we are not going to be able to leverage what is discovered in one schematic discipline to the others, and we will not really be able to appreciate the positive aspects of each as a way of describing the different phenomena. For instance, since Husserl uses the term *form* and does not even know Gestalt Theory, then we have to translate his terminology into a *system specific approach* in order to make it useful for our purpose of creating a Systems Phenomenology. However, why should we make this translation for every schema? Instead, we should generalize the terminology of phenomenology so it can cover all the possible schemas. That way, from the point of view of a Schematic Phenomenology, we can understand all the various schemas and their relationships to each other, and to the phenomenologically uncovered context of the consciousness that we experience.

So, let us examine this translation and see what it buys us in terms of the comprehensibility of the phenomenology of systems and other related schemas. First of all we want to distinguish between awareness and intentionality. Not everything that occurs in consciousness is intentional, and this idea is one of the limitations of Husserl whose thought did not fully comprehend the various developments in Psychoanalysis and Gestalt Therapy. *Awareness is a non-directed and non-intentional consciousness, which has a boundary that has been called the unconscious.* The unconscious has been theorized to have various depths such as the Personal Unconscious of Freud and the Collective Unconscious of Jung. For our purposes we prefer the Jungian view, which is wider in scope, although it is phenomenologically ambiguous¹¹⁸. At any rate, even if we thought about the "Unconscious as Infinite Sets" as I. Matte-Blanco¹¹⁹ does, we would still draw distinctions between three things: an unconscious of various and unknown depths, awareness, and intentional consciousness. Gurwitsch deals with some of this shading off of consciousness into the unconscious when he talks about marginal or fringe phenomena.

Intention, i.e., consciousness of something, is not all there is to consciousness; there is also a consciousness that, is more ambiguous, amorphous, and vague, which blends into pre-consciousness and unconsciousness at various depths. Yet, since the time of Kant, the concepts that we project onto things, which are: space, time, and categories have become

¹¹⁸ Brooke, Roger. *Jung and Phenomenology*. (London: Routledge, 1991).

¹¹⁹ Matte-Blanco, Ignacio. *The Unconscious as Infinite Sets* (London: Gerald Duckworth & Co. Ltd, 1975).

very strong within the tradition¹²⁰, and this counters the skepticism of Hume¹²¹. Thus, intention is just one modality of a more generalized ‘projection mechanism’ that is central to consciousness. And it is clear that this ‘projection mechanism’, which seems to be something we unconsciously perform, has various modalities of which *intention* (that we will later relate to the “present-at-hand” of Heidegger) is the highest and most transparent. This intentionality is split into several modalities, and the projection of a schema onto spacetime within experience becomes one of those modalities. Furthermore, the projection of Patterns, Forms, and Systems and other schemas become sub-modalities of that intentionality. Another modality, or higher layer of that intentionality, is to project *what* something is, i.e., a categorization or typification¹²² of a localized spacetime envelope. Another layer of the intentionality is the one that uses the intentionality to pick out individual differences between things of the same kind. And another modality of intentionality is to confer meanings onto things in terms of relevance, significance, and sense. It is this highest layer of the intention that is the concern of hermeneutics¹²³. Now, when we look at intentionality in this way, as having modal layers, then we can differentiate between the various modal layers of awareness such as peripheral vision, intuition, gut reactions, danger signals, glances at the environment, awareness of background sounds, and other more subtle phenomena, which crowd our consciousness and which, for the most part, we ignore in order to focus on whatever our intentionality picks out as important.

Now, we have noted that there was a layer of intentionality that projects the spacetime templates of understanding through which we localize embodied objects in our experienced environment. We will identify this lowest layer of intentionality with what Umberto Eco refers to in Kant and the Platypus¹²⁴ as the “Mathematical or Geometrical Schema”. This is the focus of the intelligibility of the envelopes of spacetime, which have their own projected organization that we use as a template of understanding in order to make intelligible references to individual things in our experience as they appear in

¹²⁰ O’Keefe, John “Kant and the Sea Horse” in Eilan, Naomi and McCarthy, R and Brewer, B. Spatial Representation (Oxford: Blackwell, 1993; Oxford U.P., 1999) pp 43-65.

¹²¹ Hume, David, and Tom L. Beauchamp. An Enquiry Concerning Human Understanding: A Critical Edition. (Oxford: Clarendon Press, 2000).

¹²² Op. cit. Schutz, A. uses the term typification p.189. See also Cox, Ronald R. Schutz’s Theory of Relevance: A Phenomenological Critique (The Hague; Boston: Nijhoff; Springer, 1978) p. 127; See also Schutz, Alfred. Alfred Schutz on Phenomenology and Social Relations: Selected Writings, Ed. Helmut R. Wagner (Chicago: University of Chicago Press, 1970) p. 82.

¹²³ Layers mentioned here are drawn from Kagan, Jerome. Surprise, Uncertainty and Mental Structures (Cambridge, Mass.: Harvard U.P., 2002). Much of the argument concerning the layers beyond the schemas and their order is drawn from this book.

¹²⁴ (New York, NY: Harcourt Brace; 2000) p. 79.

consciousness. We wish to call this most basic level of intentionality the *schema*, and we posit that it is situated on the border of awareness, and is still intentional, although it does not know what it is looking at, nor does it see individual differences between things of the same kind, or does it have meaning, sense, significance, nor relevance invested in it as yet. It is at the noematic base of consciousness on the border of awareness. Yet, as Eco says, *meaning, concept* and *schema* all fuse together as a trinity¹²⁵ in this noetic-noematic embodiment of a spacetime envelope that acts as a template for the pre-understanding of things.

Husserl had a simplistic view of formalism. He surmised that form and content were easily divorced from each other. In our view of schemas we recognize that the schema confers organization onto whatever is being schematized and acts as an *active media* for inscription, and that the content is not merely something passive, but it is also conceived and perceived as a schema, which means that it (the content) has its own organization and acts as an active media for inscription at its own nested level. Schemas are nested within each other and each one has different and emergent general organization, which is made concrete in a different way in every case. By recognizing that there are multiple schemas of different scope and that they all have a different inherent organizational principles, we can then see how the inherent organization of the schema distorts, yet organizes whatever appears at that schematic level. At the same time they reveal and cover over the noumena beyond the phenomena. This means that, in general, schematization as a morphe, needs to be distinguished from hyle as if it is *content* taken from the *noumena* or *content* taken from the *lower level schema*. In other words, everything is filtered, and no matter how far down you go, there is schematization. And so we need to distinguish between schematization of a more refined scope, such as ‘pattern in form,’ *and* the hyle that comes from the noumena, which is different from the projection. For the most part this means that we are seeing different levels of the projection at different levels of granularity, and that the contribution from the things that are the true hyle is a small but very significant part of what is being perceived and conceived. Let us call this “introjected hyle”. In other words, there is the projected hyle, which is just another schema, the schema of pattern, which is the content of form, and the schema of monads, which is the content of pattern. In addition to that, there is the introjected hyle, which is actually a contribution of the noumena that lays beyond the projection proper, which was originally something in the external world we may be aware of beyond our consciousness of the schematized object. That introjected hyle has its own

¹²⁵ Ibid Eco, U. p. 86.

organization, and its own qualities and quanta, which may or may not match up with the projected schematic hyle. In fact, many times there is a mismatch that is only revealed in experiment, i.e., comes out only scientific intervention that separates our projections from what lies *beyond* our projections. Unfortunately our vocabulary for this contribution of the noumena is very sparse and our understanding of it very limited because we are continually taking our finer grained projections as the external content.

Another key point that Husserl assumes is that of *full* formalism. Husserl thought of form in terms of shape, such as the shape, or form (morphé), imposed upon a completely malleable material (hyle) such as clay. Instead, we should think of these levels of formality as a spectrum from unhewn, to rough hewn, to smooth hewn, to finely formed homogeneous contents. In other words, sometimes the higher level schema is only *roughly imposed* upon the lower level schema and the introjected hyle. In the case where the schema is only roughly imposed on the lower level, there is more leeway toward understanding how the introjected hyle affects the schematization, rather than merely seeing how the schematization completely envelops the introjected noumenal hyle.

Once we have corrected these assumptions on the part of Husserl, then we can proceed to build a picture of how we might apply his phenomenological vocabulary more generally. Husserl talks about the spectrum of noesis and noema, although we have learned that what he calls noema is of a lower level and more refined schematization, and thus, more of the projection, or, an introjected hyle, which is representative of the noumena with its inscriptive impact on this lower level schematization. Be that as it may, Husserl defines what he calls the *noematic nucleus*, as the nexus of the object in consciousness as it presents itself phenomenally. And the key discovery that Husserl makes is that when an object is real, then it has an almost infinite horizon of explorability connected with its phenomenal appearance in consciousness. We can walk around it, see it from different angles, and impinge on it with different parts of our bodies, and allow it to impinge on us. Things that are not real have limited horizons of explorability. Just because a horizon of explorability exists for something does not mean it has actually been explored. It can remain explorable in principle. Things that are not real have only limited explorable horizons. The noumena is the limit at infinity of those explorable horizons.

Now we must note that the various schemas are different thresholds of the explorability of something in our experience that appears phenomenally in a coherent way. The phenomenal identity appears in terms of the unity and totality of that thing as seen from various perspectives in terms of ‘gatherings of differences.’ The *truth* of a thing comes

from the accuracy of the descriptions and categorizations that we make, and how these are named in our speech. The *presence* of the thing relates to the *showing and hiding* of its features as we come up to it from different angles and explore it. There is a play of presence and absence as we see the thing from different sides and at different angles. Reality has to do with the depth of the horizon of explorability and real things tend toward infinite horizons of explorability. In a sense, reality is not a problem for phenomenology because we have a test for the reality of things based on the depth of their horizons of explorability. Thus, advocates of Analytic Philosophy may criticize Phenomenology for not being realist, but their criticism is unfounded. Analytic Philosophy concentrates on identity, truth, and reality but forgets about presence. Phenomenology *starts* from presence and moves to encompass truth, reality, and identity. So Analytic Philosophy and Phenomenology are duals except that Analytic Philosophy discounts presence and is less complete and ungrounded because it does not give Phenomenological descriptions of how its concepts appear in consciousness, and this is seen as a defect from the viewpoint of phenomenology. From the viewpoint of Analytic Philosophy, Phenomenology is caught up in appearances and does not give its full allegiance to reality.

The aspects of Being, i.e., reality, identity, presence, and truth are all intimately related to each other when we test something within our phenomenal field. The relationships between these aspects give us the fundamental properties by which we understand our *standing* toward things, which is completeness, consistency, clarity, validity, verifiability, and coherence. Tests for these properties also can be made for the noematic nucleus. The noematic nucleus tends to become a focus where there are nested schemas in our experience. These schemas are mediating our experience of the noumena, which is the limit of the horizon of exploration. In that exploration the relationship of one schema to the next lower schema may be rough, or finely finished in terms of the rough hewn nature of the fit between the schemas. And when the fit is rough hewn, more of the introjected hyle are available within the presentation of the noematic nucleus. However, that also means that things appear more obscure, vague, ambiguous, and amorphous. Thus, the picture that presents itself is that one could live in a world that is almost completely schematized with little input from the introjected hyle, or one could live in a more open world with more input from the introjected hyle and a less regimented schematization, i.e., a looser fit between the schemas. It is almost as if we can imagine that the pores in our projections can be more open, or less open, within the various granularities of the different scales.

So, let us discuss the Introjected Hyle, since most of what we see at the level of the schematization is an encapsulation that is difficult to grasp a clear picture of. That picture first becomes clearer by its categorization into a *kind* of thing, because, after categorization, we can more easily see individual differences once they are embodied by a particular kind of thing. Then, we can assign meaning – especially the meaning of its particularity¹²⁶. For the most part at the schematic level, when we assign meaning, we are really seeing our *imposed* organization rather than what is organized by itself. What is organized by itself becomes clearer when we move from the noematic nucleus to the essence. The essences are internal constraints on the attributes of a thing. The noematic nucleus is the external constraint, which is set by the schematization. But, at the point in our exploration where we decide *what* something is, and, *what kind of thing* it is, then we are suddenly dealing with a specific organized *introjected* content, rather than the *external* content that is actually just a further projection at a finer point of granularity. Yet, the key to understanding this process of how we assign meaning, is the fact that we leap to conclusions as to *what something is*, which is what Husserl calls *essence perception*, or *eidetic intuition*. Now, this eidetic intuition is different from the process of abstract thoughts that leads to ideas. Eidetic intuition happens when we grasp something as a particular kind of thing *all at once* and *as a whole* thereby recognizing the coherence of its internal constraints on its own attributes. Husserl's great contribution was to explicitly separate *essence perception* from *ideation*. He did not consider essences as simple ideas (as was done previously). In the process of eidetic intuition, the coherence of the whole has more impact on our grasping of the essence than does the introjected hyle, which are attributes that are constrained by that essence. We really only begin to see the attributes and their internal differences from other things of the same kind in the third stage where we see individual differences. Based on those individual differences we see what brings out the attributes that are unique to that particular thing, and based on that, we begin to assign meaning, distinguish differences, and give significance or relevance to the thing. So, we are saying that, perception does not work the way we might have imagined, or at least as Locke¹²⁷ imagined. We are *not* empiricists who see differences between things first, and then proceed to formulate an idea of the sort of thing that we are looking at before we finally enclose it into a distinguishable container in spacetime. In fact, we do the opposite, we assign the spacetime encapsulation that comes with an assumed ordering that includes its nesting into other schemas, then we determine what kind of thing we have encapsulated,

¹²⁶ Op. cit. Kagan, J.

¹²⁷ Locke, John. An Essay Concerning Human Understanding (London; New York: Routledge, 2000).

and then we see the individual differences. So, we progress from spacetime (first), to essence (second), to attributes (third), and finally to their significance and relevance (fourth). We do this because the order is necessary for survival. If we can locate movement in spacetime, then we can react before we know what it is that we are reacting to. Knowing *what kind* of thing we are dealing with is more important than knowing *which one*¹²⁸ of *that kind* we are dealing with. Husserl seems to recognize that essence perception is more important than attributes. And because he places intentional morphé at the basis of his system, he also recognizes that schematization comes first before either of these. In this he is following Kant implicitly. So, essentially, Husserl has it right in terms of the layering of the various levels of perception. We have added the idea that the intentional morphé is really an *intentional schematization* first, and this is mostly an unconscious process of rough spacetime classification into the templates of understanding of the schemas from which the recognition process begins. We leap from there to the essence perception, and ideation occurs at an even higher level where we have the leisure to conceptualize what we have recognized.

But, we have also added the idea that schematization can be either tight (relatively constrained) or loose (relatively unconstrained). If it is tight, the schema provides most of what we know about the thing encapsulated in a spacetime envelope, but if it is loose then we have a greater idea about what is inside that envelope and its own organization, which might be different from the projected schema. In addition, we are adding the idea that schematization can be wrong, or ill fitting at least, so that re-schematization may, at times, be necessary. At each dimension there might be two or more schemas available to encapsulate a spacetime eventivity. We jump to conclusions as to which schema is appropriate, but then later we may have an experience that may contradict our initial schematization, and we may have to retract our first reaction and reconsider its schematization. Re-schematization as well as the acceptance of a new schematic framework is difficult, so we avoid it as much as possible in the processing of our experience.

When we are thinking about the noematic nucleus and how it relates to the essence, we can relate that to the system or any other schema. We can think of the noematic nucleus of a phenomenon as a System (rather than a Form), or as a Pattern, or as a Meta-system (open-scope), or as a Domain, or as a World, etc. This means that there can be noematic nuclei of

¹²⁸ An individual with a signature of specific attributes.

different scales and nestings. All of those noematic nuclei can be resolved into an essence, and then resolved into individual differences in terms of their attributes, and then into different significances and relevancies as well as different semantic concepts. The noematic nuclei of the System sits on the edge of intentionality, which it shares with awareness. Awareness is not a projection, it is a receptiveness to the environment and oneself. We are aware of what we find in Existence but we project our intentionality as a means of bestowing Being. Schematization is different from an acceptance of what is found in its brute or archaic physiognomy¹²⁹. Schematization, in all cases, imposes an ordering that is external to the thing itself that is being imposed upon. Schematization projects a template of pre-understanding onto something prior to its being understood as a certain kind of thing. These pre-understandings are important for our ability to attune ourselves to our surroundings. If we relax our intentionality and allow ourselves to become aware, then we tend to merge into the background instead of becoming a player on the stage of the environment who commands each thing to be what we believe it to be. Prior to doxa (opinion or belief), there is the limit of paradox in Plato's divided line¹³⁰. Opinion and Appearance are simply pure projection based on little evidence. 'Well-founded opinion' and 'considered opinion' attempt to refine conclusions that originate from assumptions based on a process of exploration and the discoveries made in that exploration.

In general, we are saying (with some caveats) that we can easily substitute the System schema for the Form schema into the terminological framework developed by Husserl. Things get more difficult though, when we begin, as Gurwitsch did, to add gestalt ideas to those of Husserl. In that case, Gurwitsch describes the field of consciousness, and in the context of his vision, we see that each schema has its own 'gestalt-like' qualities. In our own interpretation, we see the System as the conceptual counterpart of the gestalt. And so, the move into the realm of the gestalt approach can be seen as a move similar to that of understanding the System in the context of Husserl's phenomenology. Yet, we still need to be able to convert from conceptual to perceptual apprehending modes of intuition. We do that by recognizing that there is a duality between the *gestalt* and *flow*. This is seldom noted in the academic literature that we can find. We found one mention of a term that we

¹²⁹ Ballard, Edward G. Principles of Interpretation (Athens, Ohio: Ohio University Press, 1983) p. 4; See also Sallis, John. Philosophy and Archaic Experience: Essays in Honor of Edward G. Ballard (Atlantic Highlands, N.J.: Humanities Press, 1982).

¹³⁰ Plato The Republic.

have referred to in the past which is: *a temporal gestalt*¹³¹. A temporal gestalt is a gestalt that takes time to become what it is, rather than appearing to be what it is *all at once* as it springs from its background. But there is a more general phenomenological idea that we need to explore, which is the idea that a gestalt and a flow are duals. In one there is a figure on a background, in the other there is a foreground flow against a reference point. If we recognize that the gestalt and flow are perceptual opposites, then we can see conceptually that this is the same as the System and the Process. A process is a conceptualization of perceptual flows, and a system is a conceptualization of a perceptual gestalt. In consciousness, all four are happening together at any one time. In a way, this is how we experience persistence in relation to the ever changing nature of consciousness. There are gestalt snapshots taken in a flow of eventities¹³². We conceive of the figures in these gestalt snapshots as the objects in a system, along with their relationships to each other and their boundaries that delimit the system. But we also conceive of the flow in terms of process steps, stages, and phases in the lifecycles of the things within the flow. This perception and concept of persistence and flux, come together in a concrescence¹³³ that is a ‘system conceptualization’ of how the things in a process are related to each other. Each of those things have a temporal relationship to each other and are flowing through the process, although, in spite of their mutual flowing, a persistent structure of maintained relationships still exist between the different things that make up the System. We see each of the eventities in the System as figures on their backgrounds. But each of these eventities are flowing differently in time in their relation to the others, and we throw out reference points in order to gauge their mutual flows. But once we conceive of them as having a static structural relationship to each other, then we can pull that structure out and consider it a System at a more abstract level. Thus, we develop our concept of the system as we process *ideas*, i.e., illusory continuities. These ideas approximate representations of the perceptions that we have of a situation. And once those ideas are formed, then we will use *them* instead of referring to the actual perceptual changes. We use ideas as a means for controlling our relationships to phenomena. We express those ideas in language as

¹³¹ “Temporal Gestalt Perception in Music” Journal of Music Theory, Vol. 24, No. 2. (Autumn, 1980), pp. 205-241. See also Johansson, Ingvar. Ontological Investigations: An Inquiry into the Categories of Nature, Man, and Society (London: Routledge, 1989; Ontos Verlag, 2005) p. 95.

¹³² First use I encountered was probably Bahm, Archie J. Metaphysics: An Introduction (New York: Barnes & Noble Books, 1974); but see also Schalley, Andrea C. Cognitive Modeling and Verbal Semantics: A Representational Framework Based On UML (Berlin: Walter de Gruyter, 2004) p. 2, and by the same author an edited collection of articles called Ontolinguistics: How Ontological Status Shapes the Linguistic Coding of Concepts (Berlin: Mouton de Gruyter, 2007) p. 267.

¹³³ Whitehead uses this term. See Whitehead, Alfred North, David Ray Griffin, and Donald W. Sherburne. Process and Reality: An Essay in Cosmology. Gifford lectures, 1927-28. (New York: Free Press, 1978).

descriptions, explanations, or as formalizations of our understanding of the state of affairs being played out in a given phenomenal arena. The System and its dual Process is just one of several schematizations we can project on phenomena. At the level of ideation we have the freedom to project free-form boundaries on systems and processes that do not exist in terms of the gestalts and flows that we experience. Gestalts and flows, tell us about the essences that are contained in the schematizations, which are more fixed and responsive to the outside world when they are informed by introjected hyle from the noumena. However, the objections that we have had from the beginning that concern the problems of intersubjectivity and the noumena, have not yet been solved. Husserl began with those problems too, and over the course of his career he found ways to mitigate those concerns but could not solve them all together; that will have to wait for the work of Heidegger who not only carried on but transformed the work of his teacher, Husserl. Yet, Husserl did give us a richer and clearer and perhaps a more precise vocabulary with which to define what we see as the central concepts surrounding the problem of the phenomenology of the System. That gives us a baseline framework for considering the problem of defining the System in phenomenological and hermeneutical, as well as ontological and dialectical, terms.

A Bridge to the Unconscious: Incorporation versus Introjected Hyle

‘Introjected’ are the aspects of the hyle that come from the noumena, and these aspects differ from the organization of the projected schemas. This is more likely to happen if the grid of the schemas on the phenomena are looser and rough hewn. However, we do not consciously distinguish between introjected hyle and the normal hyle of the projection, which is merely a finer level of projection. Introjected hyle are mixed in with lower-level nested schemas and are not distinguished overtly. But we can, following Abraham and Torok¹³⁴ distinguish *incorporation* from introjection. Incorporation means that we distinguish what is taken in as something foreign from what naturally can become a part of us. So, we do not necessarily distinguish what is part of our projected identity from what is foreign to it. Projecting the schemas establishes our identity as the source of an ordering of our conscious experience. When we recognize and incorporate, we then see the ‘noumena as Other,’ embodied as different from ourselves. This, according to Abraham and Torok, causes the ego to split producing a ‘phantom’ that also causes a split in the unconscious

¹³⁴ Abraham, Nicolas and Torok, Maria The Shell and the Kernel: Renewals of Psychoanalysis (Chicago: University Of Chicago Press, 1994).

producing an alien unschematized “thing” to appear. Incorporation means we have incorporated, or taken in a foreign object that cannot become part of ourselves, thus splitting our ego and producing an unconscious nexus called a “thing”. This “thing” as the Other, or an Alterity¹³⁵, defies our projected schematizations and this cannot be located consciously among our recognized projections. It also causes a ‘phantom’ split in the projecting ego as well, and both ‘phantom’ and ‘thing’ lead a life below the radar of consciousness, unless they are recognized in consciousness as an anomaly, in which case there is some attempt to schematize them. The attempt to perceive the incorporated thing and its phantom is called an *anagoric swerve* and this is treated in the author’s “The Anamorphic Cycle”¹³⁶. Such objects, when located, may become axes that resolve paradoxes in experience. These are called *anamorphic objects* and they provide a pivot between contradictory, paradoxical, or absurd perspectives. We do not just suppress unschematized entities in our experience, we also incorporate them into experience as anomalies, or as exceptions that prove the rule. This gives us access to other perspectives where the schematization of the unschematizable contents of experience are possible. The key is to understand that if an unschematizable thing exists, then subjectivity as the origin of intentionality breaks apart and shatters into corresponding phantoms causing a mirroring of alterity in the exterior, as well as within the interior of the subject, which remains unconscious and sealed off from the rest of the subject’s experience. The ‘Self’ then experiences this splitting of the subject as trauma, which includes all the phantoms of the ego as well as what is left of the ego itself.

Husserl did not recognize the unconscious as playing an important role underpinning the framework of Transcendental Phenomenological Philosophy. Now we can take a wider view that allows for the unconscious that is beyond awareness to play a role in the recognition of the noumena. Even Schopenhauer¹³⁷ shows us that the noumena exists within ourselves as “trieb”, i.e., instincts, desires, needs, and archetypal patterns that determine our concepts and behavior within consciousness in ways that we are hardly aware. A human being is more than a unified and totalized consciousness that intends objects autonomously, and the whole framework of transcendental phenomenology is immersed in a deeper unconscious framework that determines the relationship of phenomena and noumena in often unknown, but significant ways. We will examine the

¹³⁵ Taylor, Mark C. *Alterity*. (Chicago: Univ. of Chicago Pr, 1987).

¹³⁶ By the author, see <http://holonomic.net>

¹³⁷ Op. cit. Schopenhauer *World as Will and Representation*.

relationship of 'consciousness' to this 'unconscious background' and come to understand it as a *Meta-system, which is actually the inverse dual*¹³⁸ *of the System.*

We recognize the work of Abraham and Torok who tried to "fix" the work of Freud. Their work is consistent while avoiding the mechanistic excesses of Freud¹³⁹. However, ultimately we prefer the work of Jung¹⁴⁰ except that his theory is phenomenologically inconsistent¹⁴¹ due to its overloading of terms. Therefore, Jungian studies and observations, which are Apollonian, must be balanced with the Dionysian psychology of the unconscious that is implicit in Nietzsche¹⁴². But, since we are generally discussing schemas that border on awareness and intentional consciousness, we will have little need to explore the underworld of the unconscious¹⁴³ within this study. However, we must mention it because it becomes more and more central to the development of Continental thought, especially the Lacanian¹⁴⁴ interpretation of Freud in terms of Semiotics, which takes language to be the structure of the unconscious. Language is a major product of schematization and the dual of all the schematized projection on spacetime. Although we do not thematize the unconscious, it is never far from our concerns.

¹³⁸ Dr. Rudolf Kaehr from the University of Glasgow critiqued my use of "inverse dual" in the distinction between System and Meta-system in "Are Kent Palmer's diamonds obvious? Possible parallels between meta-systems and diamonds". My idea of using "inverse dual" as a way to think about this is the fact that for both systems and meta-systems and sets and masses there are both sets, and systems as well as set_{op} and $system_{op}$ and both masses and meta-systems as well as $mass_{op}$ and $meta-system_{op}$ as duals, and yet the system/meta-system and $system_{op}/meta-system_{op}$ or set/mass and $set_{op}/mass_{op}$ are inverses of each other. But I recognize that this is non-conventional use of both the term "dual" and "inverse" together. Fortunately, Dr. Kaehr's own idea of the difference between category and saltatory helps, in that we can see the relation of set/ set_{op} and mass/ $mass_{op}$ as category duals, but the relation between set/mass and $set_{op}/mass_{op}$ as saltatory inversions. A category has a morphism while a saltatory has a jump. Thus there is an inversion jump between system and meta-system or between anti-system ($system_{op}$) and anti-meta-system ($meta-system_{op}$). Similarly with Sets and Masses. Set and Set_{op} are categorical dualities. Masses and $Mass_{op}$ are also categorical dualities. But the relation between Set and Mass or between Set_{op} and $Mass_{op}$ are saltatories, i.e. involve a jump or discontinuity that I picture as an inversion. It is very helpful that Dr. Kaehr has given this dual that the category, i.e. the saltatory, which describes a jump or discontinuity rather than a contiguous morphism can be used to better define the difference between System and Meta-system or Set and Mass. See Dr. Kaehr's English works at <http://www.thinkartlab.com>. These works of Dr. Kaehr and the correspondence with him occurred after the dissertation was submitted for examination."

¹³⁹ Freud, S. The Complete Psychological Works of Sigmund Freud (New York: Vintage, 1962 to 1989), Ed. James Strachey.

¹⁴⁰ Jung, C. Collected Works (Princeton NJ: Princeton U.P., 1953 to 1979) Bollingen Series. Translated by R. F. C. Hull

¹⁴¹ Cf. Brooke, Roger. Jung and Phenomenology Op. cit.

¹⁴² See author's manuscript Primal Archetypal Wholeness (unfinished) which works out the relations between these different psychologies.

¹⁴³ Hillman, James. The Dream and the Underworld. (New York: Harper & Row, 1979).

¹⁴⁴ Lacan, Jacques. Ecrits: The First Complete Edition in English Trans. Bruce Fink (New York: W.W. Norton & Co., 2006); See also Chiesa, Lorenzo. Subjectivity and Otherness: A Philosophical Reading of Lacan (Cambridge, MA: MIT Press, 2007).

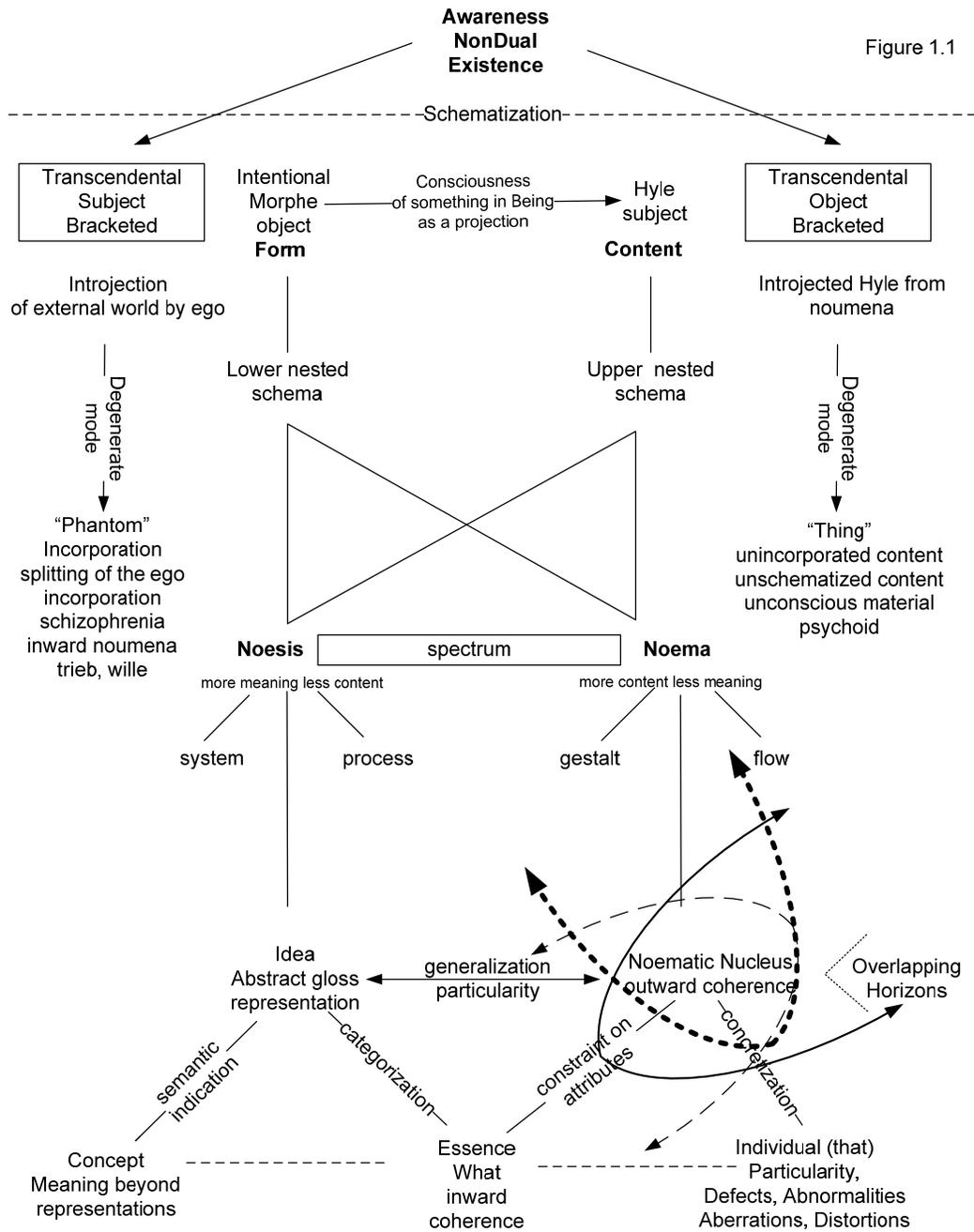


Figure 1.1. Summary Diagram.

Notes

This chapter originated as a tutorial for members of the System Science Enabler Group of the International Council of Systems Engineers, which met at the INCOSE 2007 conference in San Diego. The introductory texts mentioned are meant to help the reader who has not encountered some of the names associated with Continental Philosophy before. My own work on Husserl was based on reading most of the original works, and some secondary literature available in the seventies and early eighties, although my work has been updated over the years by reading more recent secondary sources. At one time I considered myself a Husserlian scholar based on my study of Logical Investigations, Cartesian Meditations and Ideas (volume one), as much as one may be by reading translations only. I started with a course in Husserl taught by Alfonso Verdu¹⁴⁵ at the University of Kansas and continued my study of Husserl when I was in London doing my first Ph.D. I was particularly interested in the problem of Intersubjectivity¹⁴⁶ from the point of view of the philosophy of Sociology, then known as Reflexive Sociology¹⁴⁷. I have continued that interest over the years and became particularly interested when E. Fink's Sixth Cartesian Meditation was published¹⁴⁸. Recent scholarship of Husserl's unpublished works by D. Walton¹⁴⁹ has been a large influence on my current research on Husserl for this dissertation. That unpublished material makes it clear that Heidegger and Merleau-Ponty's work are based closely on Husserl's later works. I have always thought that an understanding of Husserl was the best basis of understanding Heidegger and later phenomenologists. The effort in this chapter is to establish a framework for understanding the concept of the 'System' schema within a Husserlian context. This theme has been developed in several of my working papers and earlier work. If you look up the terms, system and phenomenology, it will become clear that no one has previously developed a *systems phenomenology* of any depth. Thus we are introducing the idea here. A study of the Figure 1.1 will show how I envision the various major ideas relating to each other that would place the term 'system' within a Husserlian phenomenological context. However, the creation of a fully fledged Systems Phenomenology is not the aim of this dissertation. Rather, we are merely bringing the possibility to light, in preparation for a deeper consideration of the nature of design.

¹⁴⁵ Verdu, Alfonso. The Philosophy of Buddhism: a "Totalistic" Synthesis (The Hague; Boston: M. Nijhoff; Springer, 1981).

¹⁴⁶ Op. cit. Husserl's Cartesian Meditations which is the basis of this line of research.

¹⁴⁷ Ashmore, Malcolm. The Reflexive Thesis: Wrioting Sociology of Scientific Knowledge (Chicago: University of Chicago Press, 1989).

¹⁴⁸ Fink, Eugen and Husserl, Edmund. Sixth Cartesian Meditation: The Idea of a Transcendental Theory of Method (Bloomington: Indiana University Press, 1995); See also Bruzina, Ronald. Edmund Husserl & Eugen Fink: Beginnings and Ends in Phenomenology, 1928-1938 (New Haven, CT: Yale University Press, 2004).

¹⁴⁹ Op. cit. Walton. D.

World Horizons and Other Horizons

Augmenting Husserl's Great Discovery

Husserl began by bracketing everything that was not an appearance. Eventually he discovered that he could solve the problems of solipsism, the noumena, and intersubjectivity by positing a World Horizon that could serve as a visual backdrop for perceiving the forms that appear in the world. E. Husserl's discovery of the World Horizon as an alternative to his previous method of bracketing was taken up by his student, M. Heidegger who continued to explore these concepts more deeply. Once we understand how the World Horizon can be used to provide a background for all the forms, then we may consider the intermediate horizon of the System between these two extremes. We propose that other schemas such as the Meta-system (Open-scape) and the Domain fill the gap between the System and the World Horizons. We will examine the cultural blindspots that we encounter when dealing with environmental horizons, which we refer to here as the Meta-system as we will discuss the phenomenology of complementary relationships in order to discern the internal structure of these horizons at the System and Meta-system levels.

From Bracketing to World Horizons

Husserl made a great discovery, which appears in his later work although much of it has not yet been published¹⁵⁰. We begin to see this new direction in Krisis¹⁵¹, which is Husserl's response to Heidegger's Being and Time¹⁵². Husserl realized that the bracketing¹⁵³ that isolated phenomena was not necessary if he used the *world horizon* as the basis of phenomenology instead of a *reduction to appearance*¹⁵⁴. With a *reduction to*

¹⁵⁰ Welton, Donn. The Other Husserl: The Horizons of Transcendental Phenomenology (Bloomington: Indiana University Press, 2001); See also by Steinbock, Anthony J. Home and Beyond: Generative Phenomenology After Husserl (Evanston, Ill.: Northwestern University Press, 1995).

¹⁵¹ Husserl, Edmund, Crisis of European Sciences and Transcendental Phenomenology (Evanston: Northwestern University Press, 1970) called Krisis.

¹⁵² Op. cit. Heidegger, M.

¹⁵³ Bracketing was a method developed by Husserl to isolate phenomena from imputations of noumena behind the scenes. Everything that was not immediately apparent was bracketed in relation to its status as a reality, and so phenomenology was established as a science based wholly on what appears to consciousness. This makes phenomenology apodictic because the phenomena cannot be denied. Instead of, "I think therefore I am", Husserl substituted "There is Phenomena in presence and therefore, that is something that cannot be doubted." Unfortunately, this opened Husserl up to criticism concerning the role that absences play in our lives was and the issue that these absences are not taken into account, a problem that Heidegger sought to remedy. See Pollio, Howard R., Tracy B. Henley, and Craig J. Thompson. The Phenomenology of Everyday Life. (Cambridge, U.K.: Cambridge University Press, 1997) pp. 46-48.

¹⁵⁴ We see this move in Heidegger's Being and Time but it was not clear until recently that this move had already been made by Husserl, and this calls for a re-evaluation of the relationship between Husserl's later work and Heidegger's apparent innovations in Being and Time.

appearances through bracketing, one still has all the problems of isolation from other subjects as well as from the noumena that existed in Kant's philosophy and proved problematic in early Husserl¹⁵⁵. But, if one realizes that the same technique that allows one to approximate reality at the level of form, i.e., the uncountable horizons of exploration, then it is also clear that a boundary can be used at some upper threshold to eliminate a separation from the other subjects and from the noumena. This indicates that the way to resolve the inherent problems in phenomenology become clear through the repetition of the boundary horizon at a higher level. This is a new generative phenomenology, which takes precedence over the older static phenomenology, which did not take into account the significance of *time*. With the older phenomenology, the subject is viewed as a form *outside* of the horizon of the object, but with *generative* phenomenology, the subject is *inside* the horizon and therefore subjected to the *showing and hiding*¹⁵⁶ of the horizon of the world. Thus, you give up a subject that is *unaffected* by time, and you gain immediate access to the noumena and other subjects that are within the compass of the horizon of the world. We must pick another high level scale threshold, such as the World schema, which is still within experience but also uncountable (approaching the infinite) and explore that horizon as well. When we specify a high level scale horizon, then we see that all other subjects and all other objects appear in relation to that horizon, which is explorable, but uncountable, or indeterminable in its extent, and thus confers a reality collectively, rather than individually on the intersubjective group, or the noumena. Here the noumena are defined as the infinite endpoint of the horizon of explorability for any given thing. Thus, the noumena are converted into a limit *within* the field of consciousness rather than something outside the field of consciousness. Using the *Form schema* alone as the only basis of our exploration tends to isolate single forms, whether they are objects or subjects, but when we consider those same forms against a broader horizon, then we have a criteria for judging between them in terms of their *communal properties*, which tends to ameliorate the problems of isolation. Husserl showed that when you have an upper boundary horizon of discovery, as well as the lower boundary horizon, then the two together allow you to get rid of the bracketing that isolates phenomena, because one can merely say that phenomena

¹⁵⁵ Phenomena without noumena tend to lead to calling into question the objectivity of Phenomenology by realists. The word transcendental tends to have opposite meanings for Kant and Husserl. For Kant, transcendental means beyond experience. For Husserl, transcendental means completely phenomenal with no noumenal mixture. Experience is still coherent either way. That inexplicable coherence of experience is called transcendental by both but for opposite reasons, one because there is a substrate and the other because there is no substrate.

¹⁵⁶ Showing and Hiding is a term for the Dynamics of Presence and Absence in Process Being, as opposed to the static nature of Pure Being as only Presence, Truth, Reality, and Identity.

is what appears in the world rather than simply under the bracket. This leads to a great simplification of Phenomenology that Husserl hinted at in *Krisis* with the use of the term lifeworld¹⁵⁷. Yet, this also means that we have to consider the constitution of subjects and objects in the course of time within that world horizon, and thus the Phenomenology becomes generative, i.e., dynamic and *interior* to the world, rather than static and *exterior* to formed things.

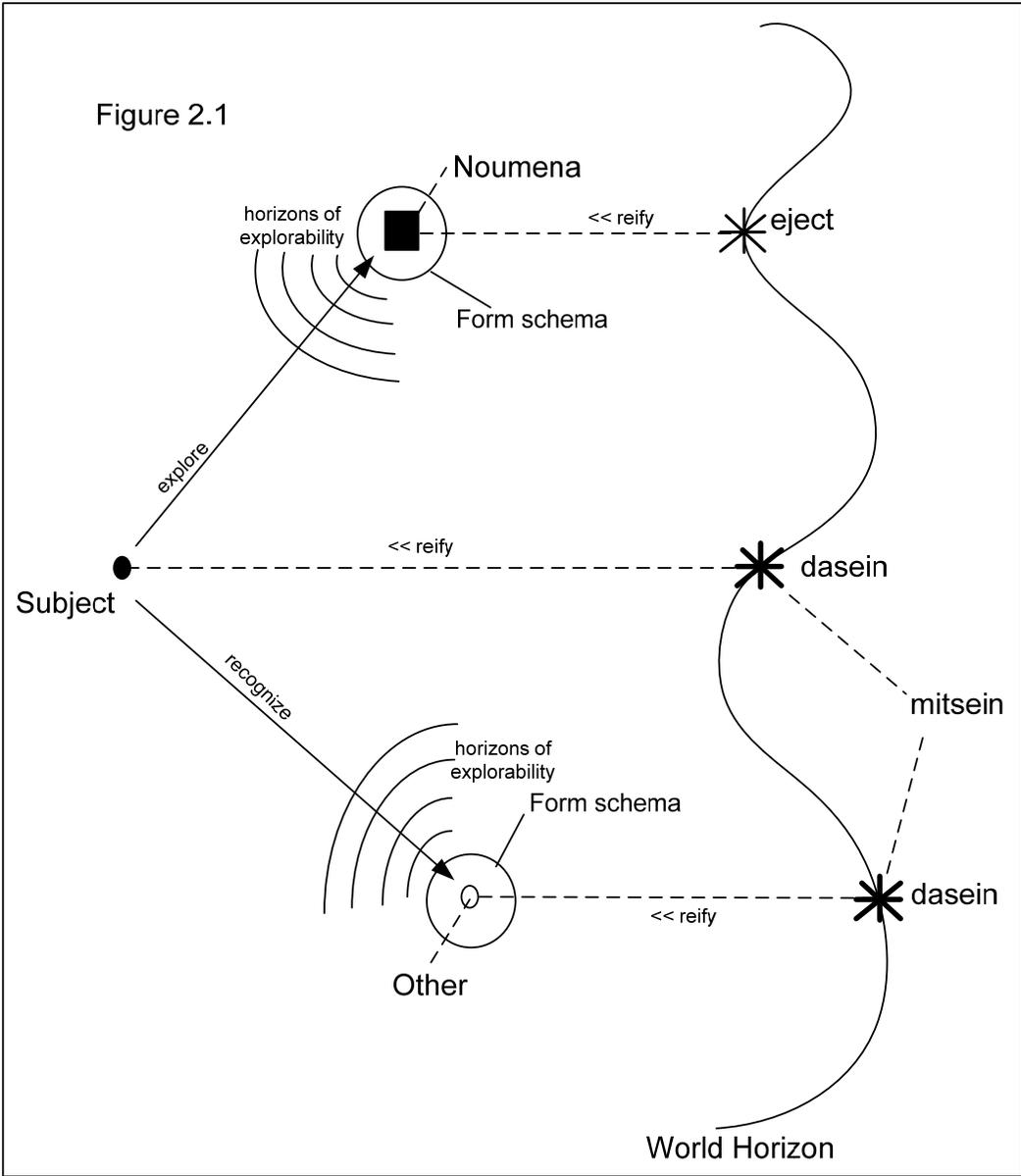


Figure 2.1. Embedding in the World Horizon

¹⁵⁷ Schutz, Alfred. *The Structures of the Life-World* also by Luckmann, Thomas and Zaner, Richard (Evanston, IL: University Press, 1973-c1989) Volume 1; See also Brand, G. "The structure of the life-world according to Husserl" *Continental Philosophy Review*, 1973, Springer, Volume 6, Number 2 / May, 1973, pp. 43-162.

The System as a Horizon between the Form and World Horizons

When we take the introduction of higher level horizons into consideration and relate them to the System schema, then we realize that the System schema lies somewhere between the World horizon and the Form horizon. Yet, it is important to note that the system is a *meso*-horizon of explorability rather than a micro-horizon or a macro-horizon. Once we identify a System schema as a generative phenomenological horizon, we can begin exploring its horizon. In terms of Systems Engineering we can say that if all we have merely constitutes a requirement set, then our ability to further explore the horizon of the System will be very limited. If we have a systems design, then we can continue to explore although our ability to do so is still somewhat limited. If we have a systems implementation, our ability to explore will be expanded but is still not complete. If we have an implemented system in a test environment then our ability to explore its horizon is much more complete, but still not exhaustive. If we have an implemented system deployed in its target environment, then our ability to explore the System horizon is completely exhaustive and nears being infinite, because the system, with its emergent effects, is in the operational environment being used and depended upon in actual missions that can be observed. So, in a sense, the constraints on explorability tend to indicate how much the system has been developed into a *real* system functioning in the world. The system, as well as the forms, show up upon the broader world horizon and the system contains forms as figures within its gestalt. Thus the framework of Husserl's horizons gives us a picture of at least two limiting horizons on *either side* of the system horizon. These are the macro-horizon (world) and micro-horizon (form). They border the system, which acts as an intermediate or meso-horizon. We think this is a very important perspective on the system and we do not think this has been previously developed phenomenologically. In other words, we know of no phenomenological development of the *horizon of the system*. Rather, we have many conceptual developments, i.e., definitions of the system based on the definitions of other terms in a series of interlaced ideas. A phenomenological development of the term is different because it means that a system can be defined in terms of *a conscious experience of the system as a horizon*. Within this newer phenomenological framework provided to us by the later works of Husserl, forms that are viewed as micro-horizons are seen on the background of the system's meso-horizon, which is, in turn, seen on the background of the world macro-horizon. Thus, there is a nesting of horizons and an interplay between them that we can understand phenomenologically. The differences in the horizons are noted in terms of their scope and scale and their nesting relationships. This means that we are looking for both *differences* and *continuity* between horizons. By understanding the system

as a gestalt, we can immediately understand the form as the figure on the background of the gestalt, which allows us to see that there is a direct nesting, between the System and the Form schemas. However, *between the System schema and the World schema there is no direct nesting* and that means that we must begin looking for intermediary thresholds, which *do* nest with each other. Previously, as part of our S-prime¹⁵⁸ General Schemas Theory, we have identified these intermediary thresholds as Open-scape (Meta-system), and Domain. And we have also identified a lower level experiential horizon in the Pattern schema that is below the scale of Form. We believe that there are six experiential schemas that nest with each other. Each one is different from the others, and their interfacing is fitted together as differences that interlock. Then, by stepping from one threshold to another, we believe that the entire range between the pattern schema and the world schema is covered and has no gaps. This is a phenomenological hypothesis that each of us should test phenomenologically since it expands the concept of phenomenology to embrace the idea that *intermediate thresholds of scale become horizons that are nested within horizons, and again nested within further horizons ad infinitum*. Horizons *do not*, as Husserl believed, appear at the largest and smallest scales with nothing in between, rather, there exists a series of horizons and they nest with each other through their differences and this can be verified phenomenologically by each of us. Thus, each horizon *is what it is* based on its *difference*, or in other words, its different internal organization.

Let us try to be more specific about what we mean by *horizon*, or *threshold of scale*. We are talking about a nested extension of the *noematic nucleus*. In other words, surrounding each thing that we identify as a form, there is a series of thresholds of organization that we construe as templates of pre-understanding that allow us to discover their intelligibility in the context of spacetime. Everything is caught in these thresholds of scale, which we deem to be projections. They are at the lowest layer of intentionality just above awareness where we already find ourselves in a world that is differentiated. We only realize that these are our projections when we begin formulating a critical philosophy that responds to skeptics, such as Hume, who deny at a fundamental level, all presuppositions of naive dogmatic philosophies¹⁵⁹. Prior to that we thought that these projections were actually ‘what things

¹⁵⁸ Op. cit. Theory of General Schemas Theory developed by the author. This is the first of a series of hypotheses relating to the structure of the field of schemas. See author’s papers on General Schemas Theory, the CSER conferences 2004 and 2005 at <http://holonomic.net>

¹⁵⁹ Dogmatic Philosophies are those that make claims about unseen aspects of reality that cannot be verified and thus are points of contentions around which controversies flourish but cannot be resolved. Normally these dogmatic philosophies have common presuppositions that cannot be proved, such as the idea that causality exists. Hume attacks these common fundamental presuppositions and it is to this skeptical attack

are' as they inhabit spacetime. The key point here is that there must be a nesting with no gaps. In other words, we demand more than what Husserl's phenomenology was prepared to give us, we want to know *how each schema nests into its adjacent schemas without the gaps that Husserl leaves between the form and the world*. In other words, Forms must be inside a System, which is also inside a Meta-system, and so on, until we get to the *World threshold*, which both Husserl and Heidegger think is the ultimate horizon for humans.

As a result of extensive consideration we have formulated the S-prime hypothesis of General Schemas Theory that states that there are ten schemas in all and that six of them are experiential. The experiential ones are: Pattern, Form, System, Open-scape (Meta-system), Domain, and World¹⁶⁰. Open-scape has two names because it is, in fact, a blindspot in our culture and we have difficulty seeing it. We coined the name *meta-system* while searching to see if there was an English term, or name, for that schema, and it turns out that there is, but it is less than satisfactory, so we still use *Meta-system* as interchangeable with *Open-scape*. Our phenomenological contention is that these six schemas cover all of experience with no gaps between all the possible experiential scales. There are four other schemas that are *not directly experiential*, and these inhabit each end of this spectrum of scales. These are: *Facet and Monad on the micro end, and Kosmos and Pluriverse on the macro end*. The non-experience-able schemas are conceptual scaffolding for the experiential schemas. Experiential schemas are nested with different emergent properties at each level. Each is unique and must be understood in reference to their adjacent schemas in the schematic hierarchy, and this makes them mutually defining. Their meaning is derived by their contextual relationship within the set of schemas, and in phenomenological terms, each mediates all experience at their scale as well as being complete in the sense that there is no "cognitive dissonance"¹⁶¹ between them. Thus, each fits perfectly with the next in sequence with no gaps in experience or in the conceptual

that Kant's Critical Philosophy invented and responded to. Hume is in the tradition of the Skepticism of Sextus Empiricus. That tradition differentiates between Dogmatic Philosophies and so called Academic Philosophies that deny everything. The Humian skepticism tends toward the Academic end of the spectrum. See Bailey, Alan. *Sextus Empiricus and Pyrrhonian Scepticism* (Oxford: Clarendon Press, 2002).

¹⁶⁰ This hierarchy of schemas is different from the ontic hierarchy of natural emergent levels that are variously conceived in the literature. An example of an ontic hierarchy might be a quark, particle, atom, molecule, one cell organism, multi-cell organism, social organisms, or Gaia. The hierarchy of schemas is ontological instead of ontic, in as much as they are projections of Being onto things that bring with them an inherent organization, which is derived from our biology and culture and not from the natural phenomena themselves. Multiple ontological schemas can be projected on the same ontic natural hierarchical emergent level.

¹⁶¹ Harmon-Jones, Eddie (Editor). *Cognitive Dissonance: Progress on a Pivotal Theory in Social Psychology* (Washington, DC: American Psychological Association (APA, 1999); See also Portugali J, Benenson I, Omer I, "Spatial cognitive dissonance and sociospatial emergence in a self-organizing city" *Environment and Planning B: Planning and Design* 24(2), 1997, pp. 263- 285.

comprehension of their fit. They are what, in Old English, would be called “Meet” (fitting) with each other. And this fittingness is a phenomenological requirement, which is why we are developing a phenomenology of the System, or more precisely, a phenomenology of all the experienceable schemas as intermediate thresholds of experience. The System is one among several intermediate horizontal thresholds. These thresholds must be understood in their relationships to each other. They can only be understood through their organizational differences, which arise out of the same experiential field¹⁶², but at different scales of applicability.

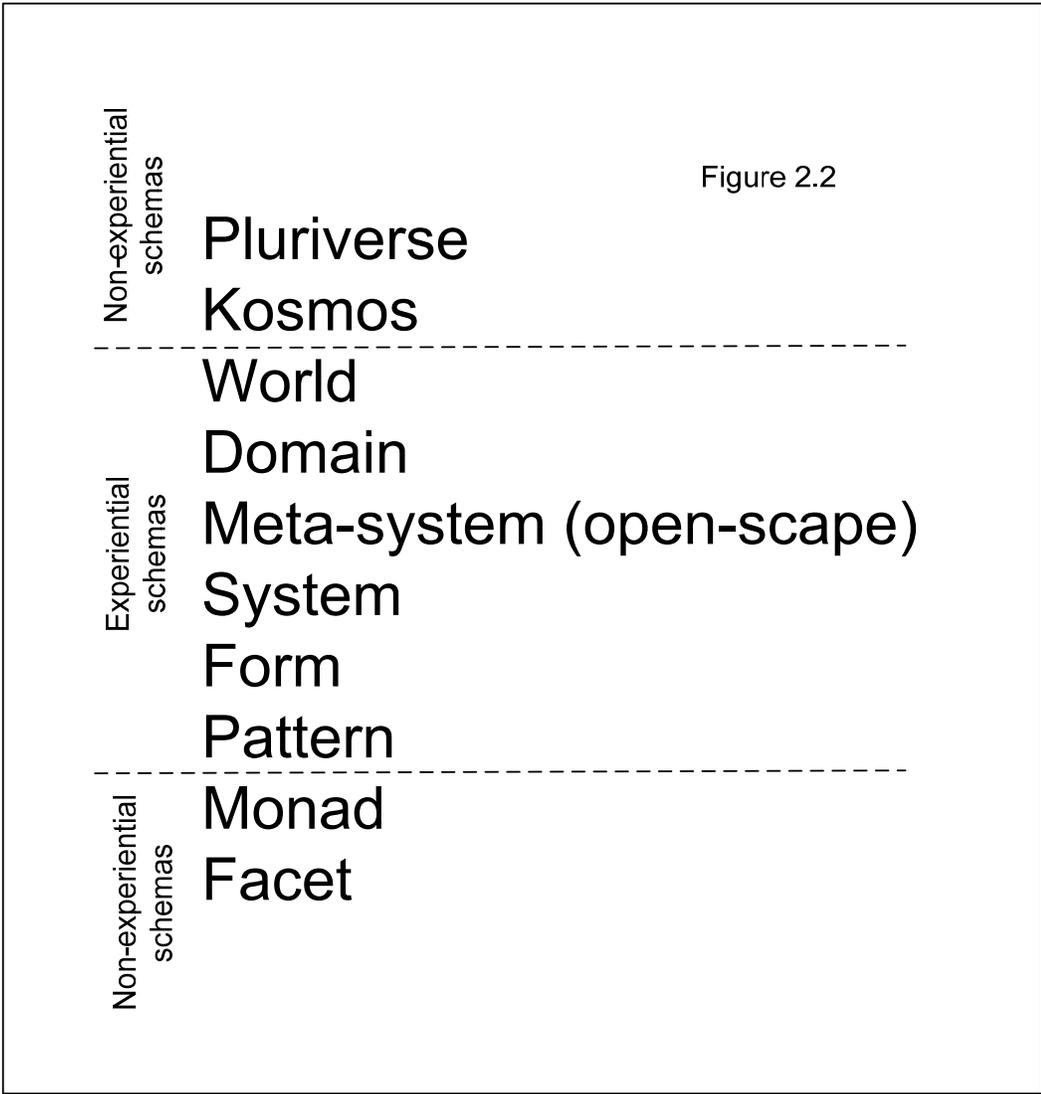


Figure 2.2. Hierarchy of S-prime Schemas

¹⁶² We will call the field out of which the schemas arise the “meta-schematic field” See “Schematization of the Schemas in the Meta-schematic Field” in Foundations of General Schemas Theory at <http://holonomic.net> by the author.

This definition of the System threshold is useful because it allows us to be very precise about what a System is from a phenomenological perspective. It is something that is *not* a Pattern, Form, Open-scape (Meta-system), Domain, or World, but can, as *a result of its specific differences*, fit into this series of threshold scales precisely *between* the Form and the Open-scape (Meta-system).

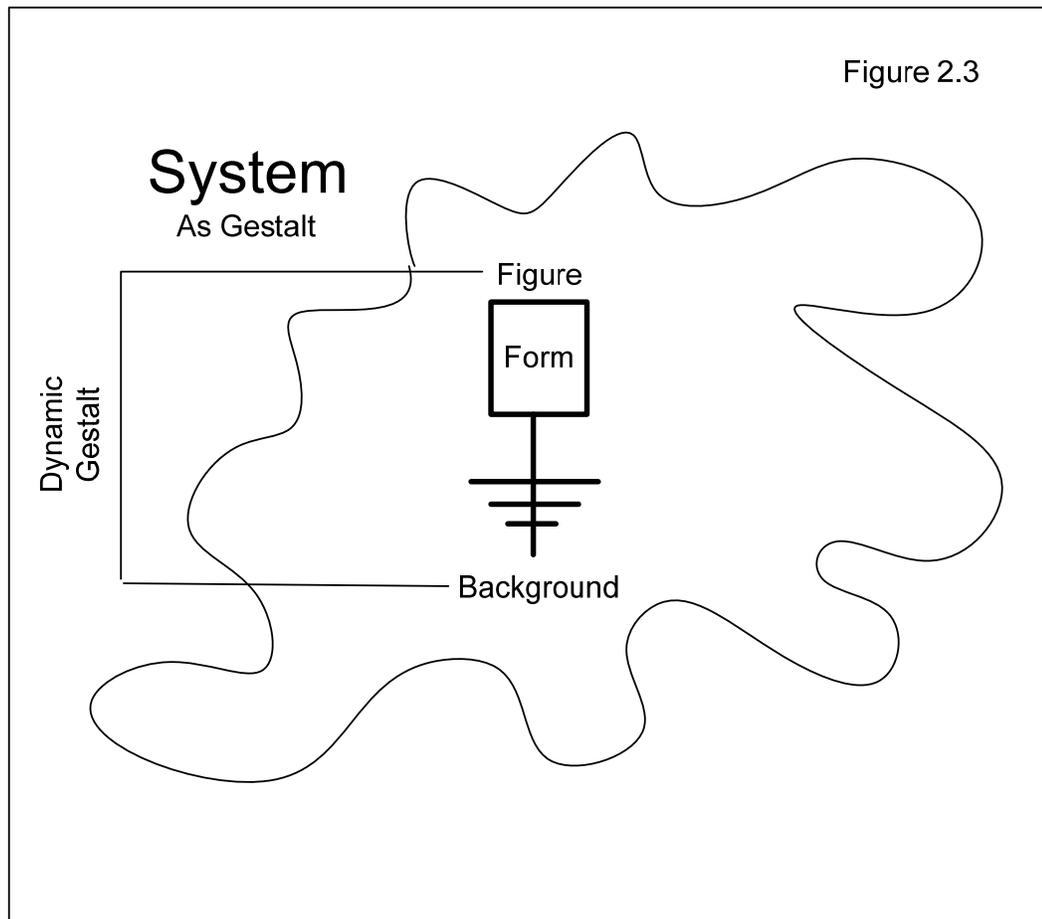


Figure 2.3. System as Gestalt

So, let us attempt to give a phenomenological description of how this fitting occurs. All forms have (as their content) patterns of monadic hyle¹⁶³. However, it is well known that we never see the monadic hyle in isolation¹⁶⁴, which causes the pattern to be what is seen

¹⁶³ Peirce called the monadic hyle “Firsts” in his Philosophical Categories. But because the monadic hyle have different qualities there must be a schema prior to the Firsts, which we call the facet schema.

¹⁶⁴ A point made by William James along with the point that we never know an absolute moment of the present but rather only a “specious present.” Varela, Francisco J. “The Specious Present: A Neurophenomenology of Time Consciousness” in J.Petitot, F.J.Varela, J.-M. Roy, B.Pachoud and (Eds.), Naturalizing Phenomenology: Issues in Contemporary Phenomenology and Cognitive Science, (Stanford, Calif.: Stanford University Press, 1997); See also Pockett, Susan. “How long is “now”? Phenomenology and the Specious Present” Phenomenology and the Cognitive Sciences 2: 55–68, 2003.

at the lowest limit of what is experiential, although, we posit that the monad exists¹⁶⁵ in order to be able to describe the pattern. But, as we have said, systems are gestalts, which means that they are figures on a background held in some sort of internal tension. In this case, the forms are the figures. We formulate a system by viewing the figures in succession within a certain background as we attempt to understand their differences and the relationships between them. There is a certain visitation rate for the various figures in a background situation that is needed to produce the System. *When we draw a boundary between those forms inside the System and those outside the System, then we have a System defined as a schematic whole.* That whole is normally seen *as a whole greater than the sum of its parts*, and thus emergent¹⁶⁶. But, if we look at our own behavior when we enter a new environment, for example, a city square that we have not been before, we will glance about and look at different things and take in the gestalts all around us as we attempt to acquire a sense of the whole environment from our standpoint. Many times we will do this from one particular spot as we survey the scene within the square. Gestalts are visited in a particular order and each are surveyed and lingered over for a particular amount of time, and each view we take can be classified as either just a glance or as a more steady look. With the glance we tend to try to pick up marginal and background information, but with a steady look we tend to focus on a particular form within the city square and take it in as a whole gestalt rather than seeing it as fringe or marginal phenomena¹⁶⁷. Our point is that the System schema is conceptualized in terms of its existence in, and its relation to, a wider background environment than that of the Form schema. And normally that background environment is surveyed from a single place, so that we can detect motion in it. Moving things are what we look at first, and, the overall *context* for the systems that we single out in this wider background environment is the Open-scape (or Meta-system). The Open-scape is what can be seen from a particular spot in the environment in a 360 degree survey of the situation. We refer to it as a land-scape, or a sea-scape, or many other kinds of X-scape. Here we will call it an *open*-scape, leaving *open* what kind of scape it is. *All systems are seen on the background of the open-scape.* This is a deeper background, which is actually the background for all the individual systems within a particular open-scape. Each

¹⁶⁵ The scale of the monad keeps getting pushed back from molecule, to atom, to particle, to quark, and perhaps to string.

¹⁶⁶ But we can see supervenience instead, i.e. homeomorphism without emergent excess or de-emergent lack. Supervenience means there is exact matching between one level of phenomena and another. See <http://plato.stanford.edu/entries/supervenience/> See also <http://en.wikipedia.org/wiki/Supervenience> accessed 090105

¹⁶⁷ Gurwitsch, Aron. Marginal Consciousness. Ed. Embree, Lester. (Athens, Ohio: Ohio University Press, 1985).

system has its contextual background, but the *context of those contexts* is the open-scape, and like the gestalt, any given system that we see is like a proto-figure on this deeper proto-background. That is why we call the meta-system (or open-scape) a proto-gestalt when we are referring to it in perceptual terms¹⁶⁸. In particular, the proto-gestalt is the *implicate order* (cf. David Bohm¹⁶⁹) of the gestalts that we unfold when we look around at the environment based on our tacit knowledge (cf. Michael Polanyi¹⁷⁰). When we stand in one place and look at the various gestalts that make up a system, and then transition our view from a coherent gestalt system to another, we are making a transition to the open-scape. The difference between Systems and Meta-systems (Open-scapes) is this: We may view forms as figures on a background, which appear to be a gestalt, or, we may view “systems as gestalts” on a deeper proto-background, i.e., a Meta-system or Open-scape. Thus, there is a snug fit between the *System* and the *Meta-system/Open-scape*, i.e., what is beyond (outside) the System¹⁷¹.

¹⁶⁸ “Proto” here means what is established prior to the gestalt as the wider context for the gestalt. There must be an ambience to look through in order to see the gestalt, and that ambience must be something more original than the gestalt that we pick out and look at.

¹⁶⁹ Bohm, David, Wholeness and the Implicate Order (London; Boston: Routledge & Kegan Paul, 1981, c1980; Routledge, 2002).

¹⁷⁰ Polanyi, Michael, Tacit Dimension (Gloucester, Mass.: Peter Smith, 1983).

¹⁷¹ It is the next horizon past the systems boundary.

Figure 2.4

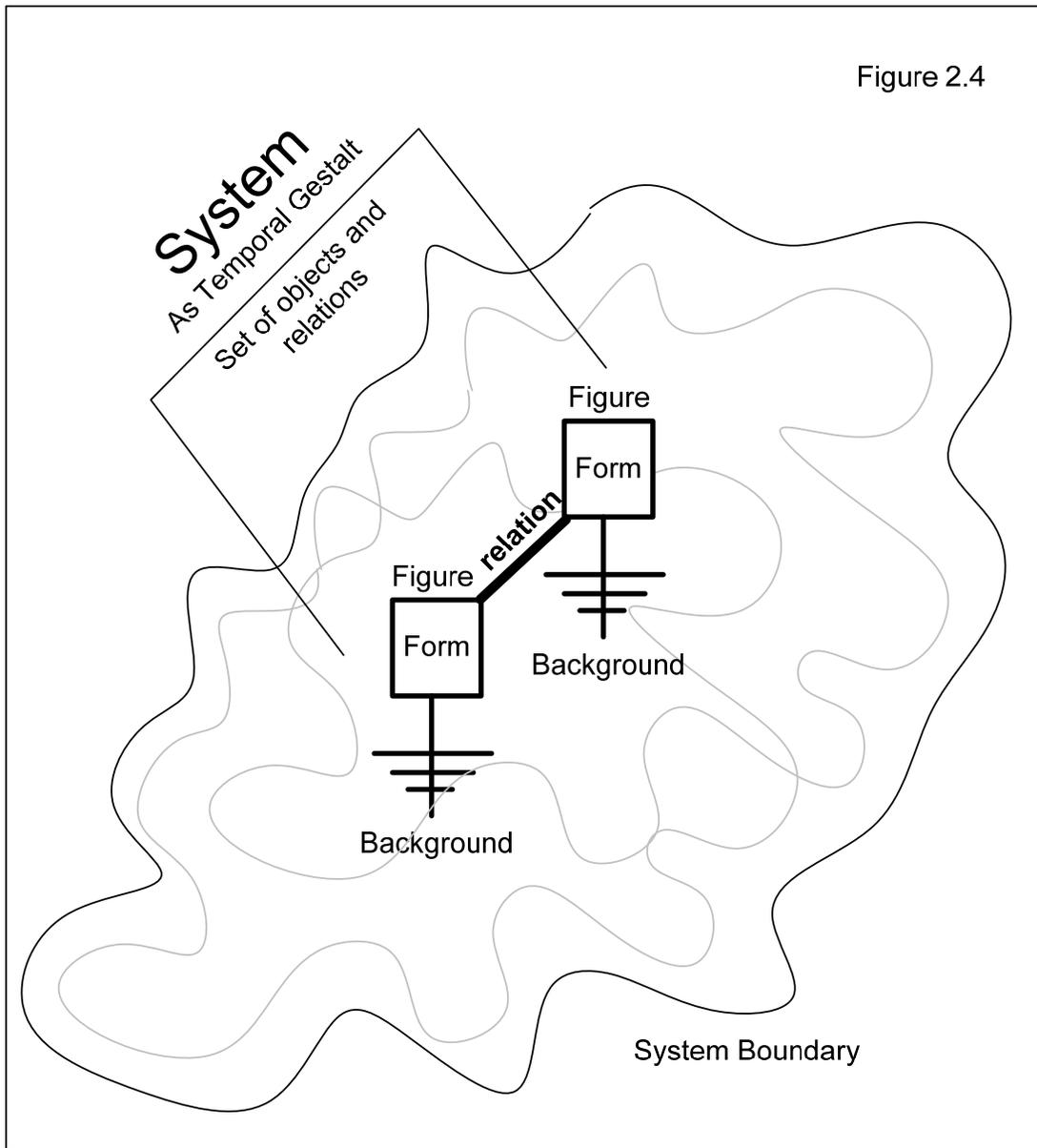


Figure 2.4. System as Temporal Gestalt

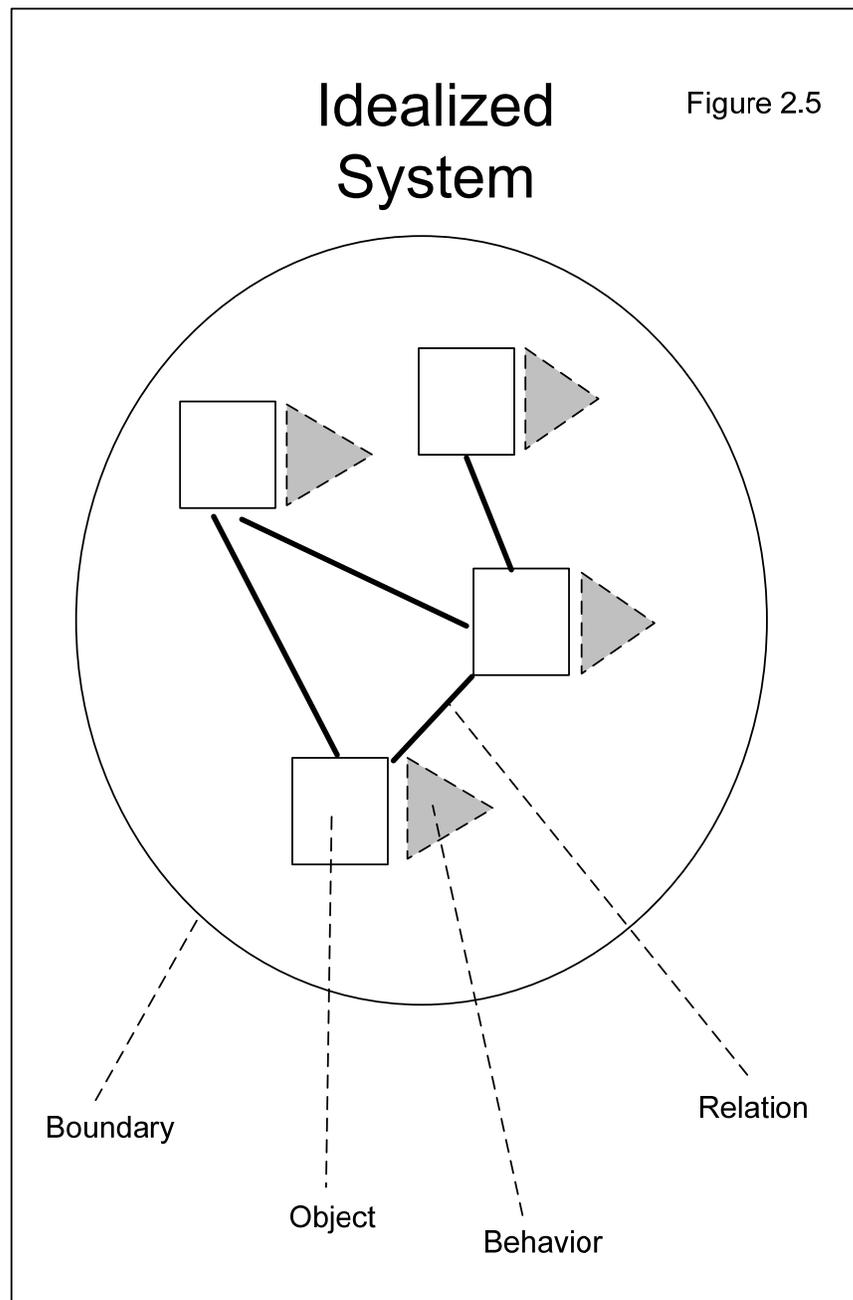


Figure 2.5. Idealized System

The next higher schema beyond the meta-system happens when the observer moves. At that point multiple perspectives come into effect. We can move to another position and look back to where we were standing, or we can imagine someone else looking at us from a particular place and then switch positions so they see what we see, and vice versa. That is where the *Domain schema* starts, and again there is a snug fit because all we changed is the ability to move around the landscape. The open-scape is primarily the horizon of everything that can be seen from a particular position in the landscape (or whatever kind of scape). The Domain is the horizon of all the static horizons of all the subjects that are

interacting at any synchronic moment, or across diachronic time. In other words, we can follow a single subject to different places, or we can move from subject to subject to see what each of them sees in turn. Domains can be defined as perspectives concatenated into rigorous disciplines. A *world* then becomes all the perspectives that are given credence from all the domains that are recognized and designated as relevant, for example, the University contains all the recognized academic disciplines, and thus defines the known world. Beyond the world we have the background that constitutes our perspectives, which is the nature of what we conceive of as the kosmos¹⁷². Note that in each case we are not only looking very carefully at the transition between these phenomenological thresholds, but we are also looking for a gap that might give us an indication of another threshold hidden between them, especially at the upper level where there may be something between the domain and world – although we have not discovered any gap there yet. *World* is the ultimate experienceable horizon of perspectives, which is why Husserl used it as his ultimate horizon, and the same is true for Heidegger. They could not conceive of any further intersubjective horizon¹⁷³. Husserl came close by calling it the “lifeworld” and Heidegger defined his proto-subject “Dasein” in terms of it. Yet, we *can* think of non-intersubjective wider horizons, and we will refer to these as the kosmos¹⁷⁴. The kosmos *is experienceable* by all living things in an intersubjective way as far out as it we can reach¹⁷⁵, and this causes it to act as a limit to intersubjective experience. In a generative phenomenology, phenomena are only considered to the extent that they are *intersubjective* phenomena. Someone has to *perceive* a phenomenon for it to have the status of phenomena. And since the phenomena are conceived on the background of a world horizon, all phenomena are seen as existing within that world horizon for someone in some social group. Humans exist in social groups with common language¹⁷⁶. All phenomena that

¹⁷² In other words, the ultimate set of ‘perspectives on perspectives’ eventually runs up against the ‘perspectiveless container of all perspectives’ that it considers as the Other (we call it Nature).

¹⁷³ Of course, Teilhard de Chardin, Pierre. [The Phenomenon of Man](#) (New York: Harper Perennial, 1975) posits the Noosphere, and there is also the meta-phenomenology of Desan, Wilfrid. [The Planetary man](#) (New York: Macmillan, 1972). Also Desan, Wilfrid. [A Noetic Prelude to a United World](#). (Washington, D.C.: Georgetown University Press, 1961), but those ideas of what may be beyond the world are not mainstream.

¹⁷⁴ Notice that Pre-Socratic philosophy was directed at understanding the Kosmos, and the major contribution of Socrates was to bring speculation on moral issues within the world of the city-state. See Nietzsche, Friedrich Wilhelm. [The Pre-Platonic Philosophers](#) (Urbana: University of Illinois Press, 2001). Today the field of Cosmology deals with the Kosmos. Cf. Coles, Peter. [Cosmology: A Very Short Introduction](#) (Oxford; New York: Oxford University Press, 2001). See also Drexler, Jerome [Discovering Postmodern Cosmology: Discoveries in Dark Matter, Cosmic Web, Big Bang, Inflation, Cosmic Rays, Dark Energy, Accelerating Cosmos](#) (Boca Raton, Fla.: Universal Publishers, 2008).

¹⁷⁵ There seems to be a fundamental limit to our reach, which is determined by the speed of light according to Einstein’s Theory of Relativity.

¹⁷⁶ Except in rare circumstances where there are Wolf Children. World and Language go together. Heidegger says that Language is the “House of Being”, that house is a world.

we can experience are contained in one way or another in a world. A *world* is a linguistic and cultural entity that encompasses all domains for a group of people acting as subjects, whether they are looking at *each other*, or at *objects*. It is a moot point to claim that there is an objective external world that is *beyond* what is phenomenal and that this world, per se, is bracketed by Phenomenology. In other words, we are only interested in the appearances that *present themselves* as well as the absences that balance those *presences* of phenomena that we come to know about through the workings of generative time. These appearances have a quality of *being-in-the-world* and they appear at a particular moment on the horizon of the world schema. Across time, it is the coherence of these appearances within the consciousness of the social group that interests us. The inner coherence of all that appears on the horizon of the world is called *a worldview*. The significance of the concept of the world horizon as the basis of the phenomenology of the lifeworld, means that we no longer need to methodologically bracket objects or other people in order to get rid of the taint of the transcendentals of Kant. Everything that was transcendental, such as noumena, other objects and God¹⁷⁷ become an internal limit at a possible infinite horizon of explorability within experience. This is because we can see and interact with each other on the backdrop of a world horizon that is based on a structured worldview, which is established as a synthesis by our society, language, culture, and the dominant mythos¹⁷⁸. We can understand the inner and mutual coherence of things in our lifeworld in ways that would be impossible if we looked at each one individually, i.e., from the old non-generative phenomenological viewpoint. In formulating the generative phenomenological viewpoint¹⁷⁹, Husserl throws off stasis and frees history and time from the former Kantian transcendental way of looking at things. Early phenomenology was a departure from transcendental philosophy, but was still based on it. However, later phenomenology became completely embedded in the world and isolated the coherence of the worldview based on the world's inherent dynamism, which gave up both the disconnection of the transcendentals from the world, as well as stasis, (which is a *disconnection* from time, social history, and cultural history).

¹⁷⁷ For instance, God, as a Kantian transcendental, becomes the internal coherence of the entire world rather than the magical connection between the transcendental subject and the transcendental object. And, as Durkheim contended this view of the Kantian Transcendentals (Self, Object and God) and the A-prioris (Space, Time and Categories) become social and cultural norms underlying the projection of the world based on a particular worldview. See Durkheim, Emil. The Elementary Forms of the Religious Life, (1912, English translation by Joseph Swain: 1915, The Free Press, 1965; Oxford; New York: Oxford University Press, 2001).

¹⁷⁸ Barfield, Owen. Poetic Diction: A Study in Meaning (London: Faber and Faber, 1952; Wesleyan U. P., 1973).

¹⁷⁹ Steinbock, Anthony J. "Generativity and generative phenomenology" Husserl Studies. Springer, Volume 12, Number 1, February, 1995, pp. 1-109.

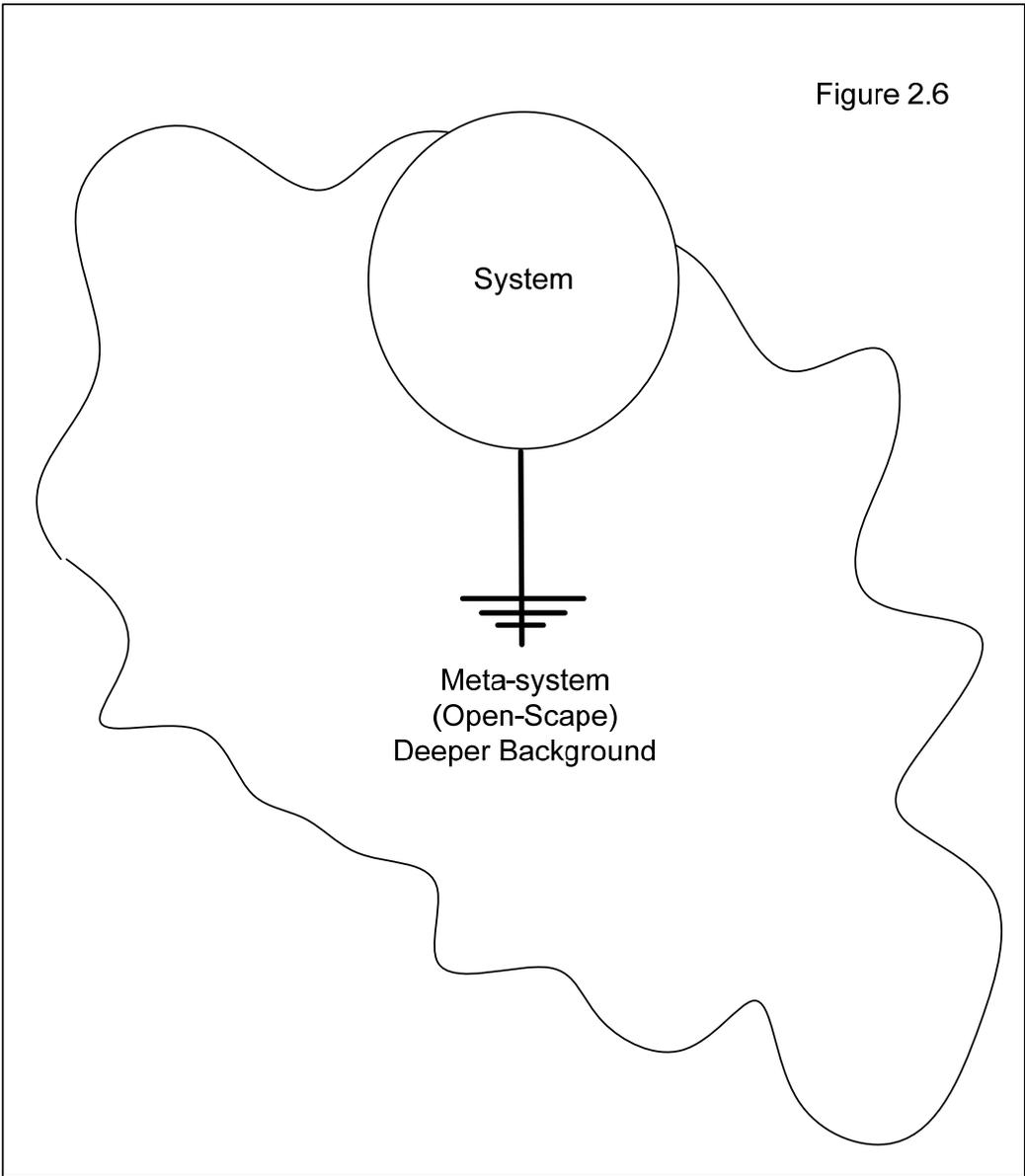


Figure 2.6. System on Deeper Meta-system Background

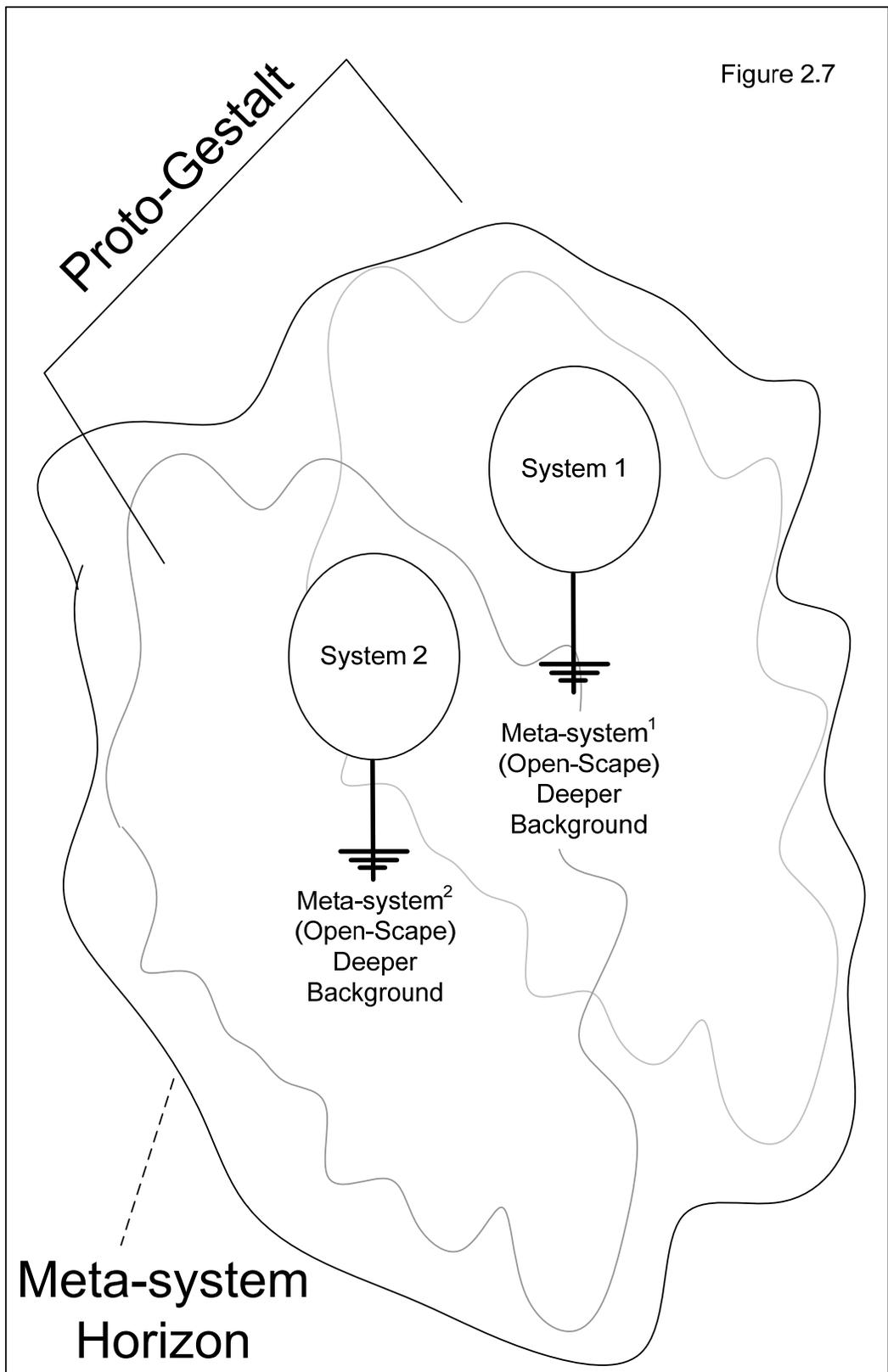


Figure 2.7

Figure 2.7. Proto-gestalt of Systems within Meta-system Horizon

What is missing from Husserl's phenomenological story, is the idea that there are other thresholds between the Form and the World such as the System, Open-scape (Meta-system) and Domain, and the phenomenological specifications of those thresholds within experience. Now, each lower scale region is seen against the deeper and deeper backgrounds of the higher scale region. And their 'meet' nesting is tested continually in our experience as we look for gaps between these intermediate horizons. We cannot find any gaps, so it is up to others to point out the gaps if any can be found. *Finding gaps has to do with testing the phenomenological hypothesis against actual experience in different realms of endeavor.* In other words, a gap may show up in a particular kind of experience, which would then have to be tested against other kinds of experience to see if it is local or global. We are trying to define global horizons, and we make no claims as to whether there are other local horizons that show up in particular situations, which are either between the ones we name, or in a dimension beyond the human scale of experience.

The important thing is that once we have a hypothesis such as S-Prime, which indicates how many schemas there are that act as phenomenological horizons, then we can test it in our experience. And by further positing intermediate thresholds of various types between the Form and the World, which include System, Open-scape and Domain, we can then assign meaning to the System schema from the differences between it and the other schemas. Furthermore, we can move beyond the *Systems schema* to *Schemas in general*, which affect our experience at every scale. Scale does not mean an absolute scale of size, but rather the relative scale of one schema to that of another schema measured in terms of the fitting together of the schemas in experience. Our focus here is the System schema and how the Form schema fits into the System schema and into the Meta-system (Open-scape) schema as its adjacent schemas. We have noticed in the last century that both the Pattern and System schemas became alternatives to the Form schema as ways of looking at things. Thus, our historical development, we have moved both from the Form schema up to the System schema and also down to the Pattern schema. In other words, we have moved out from the Form schema to its adjacent schemas in the hierarchy of the scales of the schemas. The System schema became significant because it is wider in scope than the Form schema. Now that we have become interested in the System schema, we must consider the Open-scape (Meta-system) schema as the next higher schema and the boundaries that it defines. And this is where we run into a profound problem in our culture.

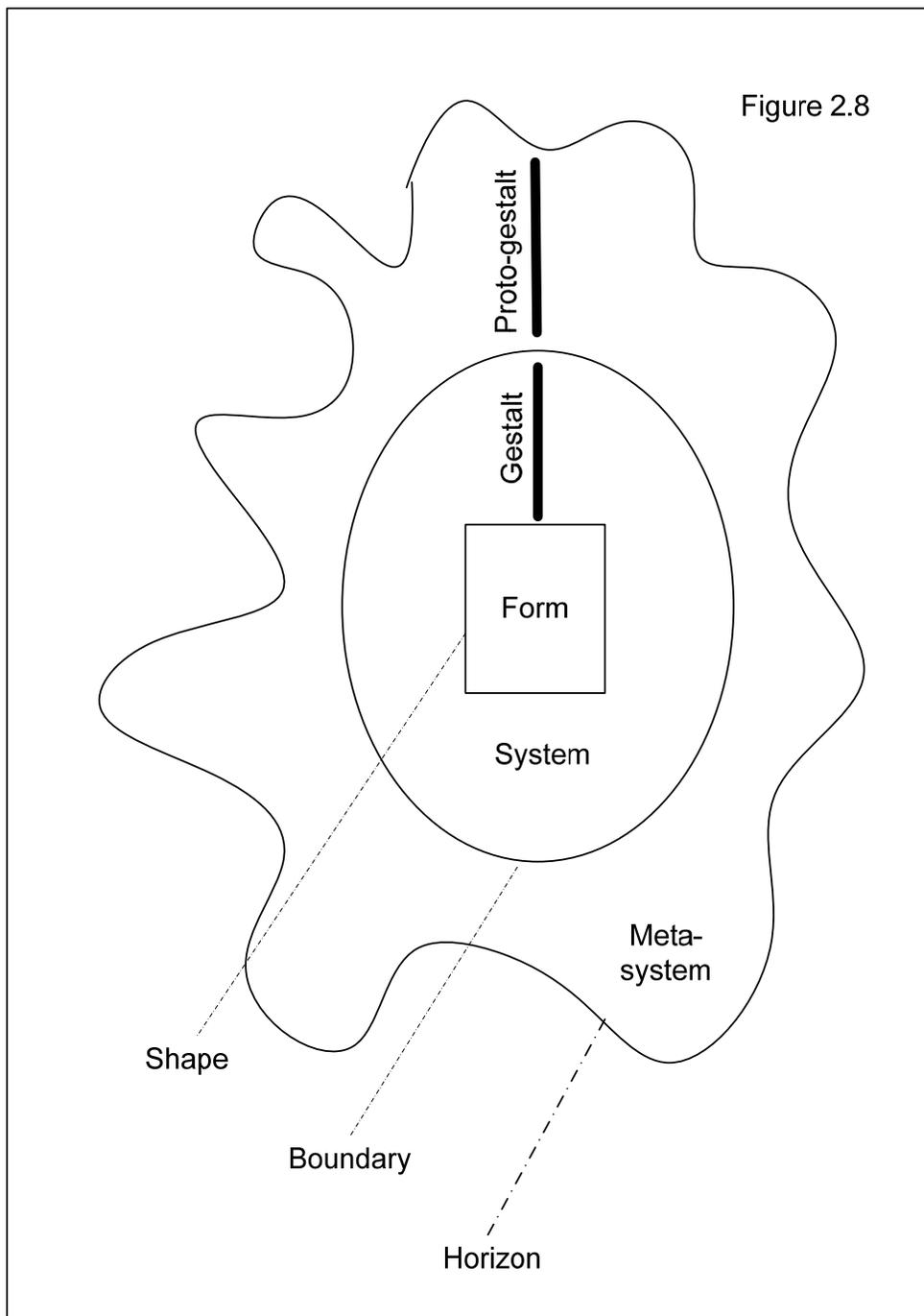


Figure 2.8. Nesting of Form, System, and Meta-system

A Cultural Blindspot

The Open-scape (Meta-system) schema seems to be a cultural blindspot for us. In other words, unlike the other schemas in our series, we do not have a standard name for the Open-scape schema. Thus, when we first recognized the gap between the Domain and the System, we simply called it a Meta-system schema, recognizing that it was what was

beyond the System schema. Eventually we realized that the Meta-system schema was also the dual of the System schema. The duality of the System schema and the Meta-system schema interconnect, or *fit*, through *complementarity* and *nesting*. This duality has many interesting properties, but triggers some unusual implications as well. The system schema and the meta-system schema are situated at the midpoint in the hierarchy of the set of schemas (as posited by S-prime theory). This set of schemas actually bifurcates and folds into a series of duals: System/Meta-system, Form/Domain, Pattern/World, Monad/Kosmos, and Facet/Pluriverse. So, besides the fact that the Meta-system seems to be a blindspot to us, the Meta-system is also the dual of the System, and the difference between the two dual schemas seems to have special properties in relation to being the *fold* for the whole set of schemas producing dualities between macro-schemas and micro-schemas at each level.

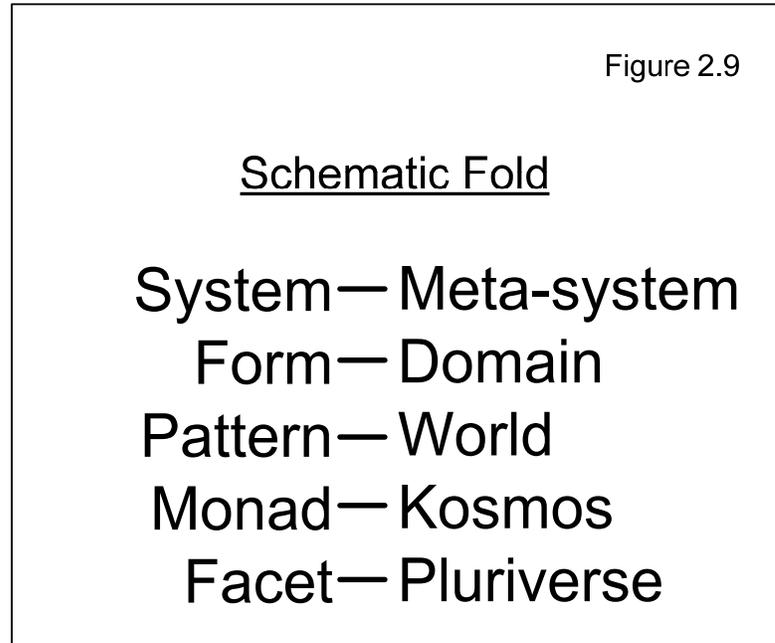


Figure 2.9. Schematic Fold

At this point we could examine the properties of the meta-system as the dual of the system. But much has been made of that in other works by the author¹⁸⁰. And here our goal is to bring what we have learned about the other schemas to bear upon the system schema, which will hopefully help us to better focus on the possibility of a systems phenomenology

¹⁸⁰ Reflexive Autopoietic Dissipative Special Systems Theory by the author. See also Meta-system Primer briefing at CSER 2008 called “Meta-systems, Complexity and Emergence”

that will naturally lead to a meta-systems phenomenology. Another treatise could be written on meta-system phenomenology.

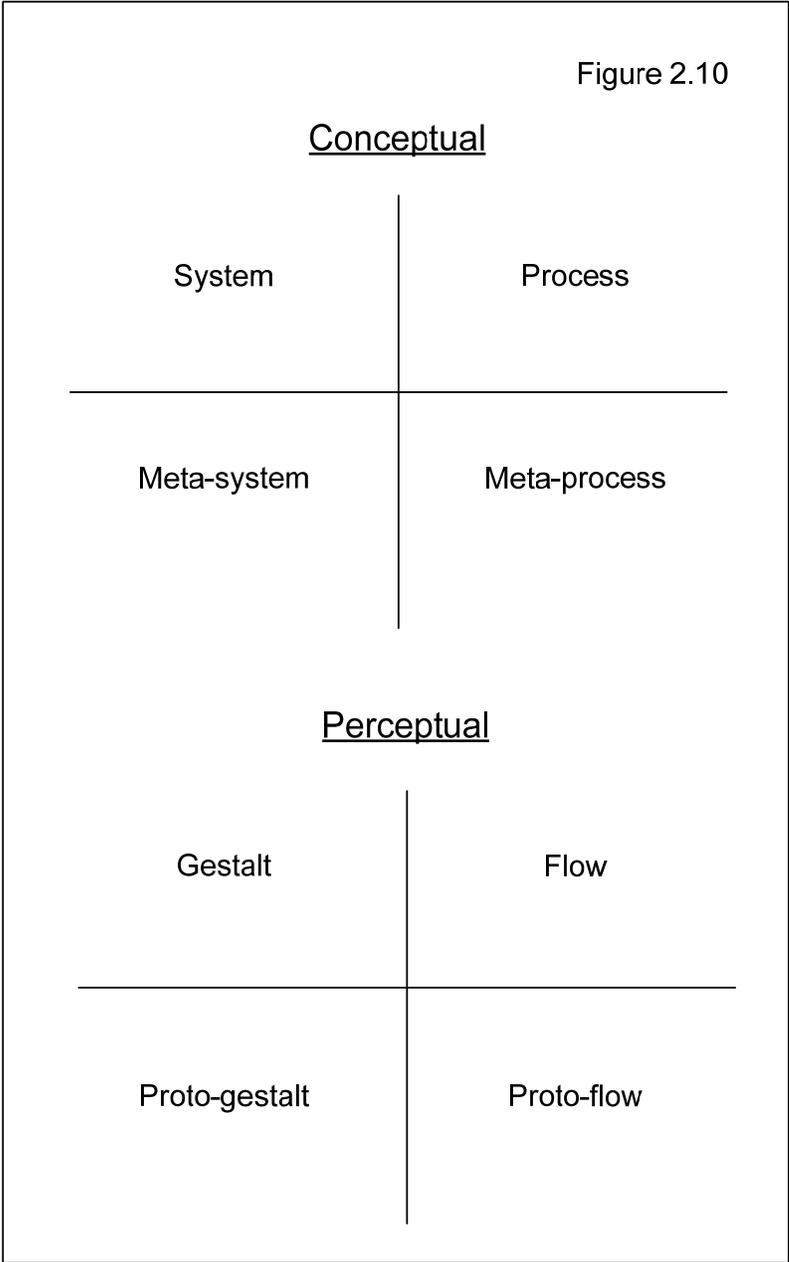


Figure 2.10. Conceptual and Perceptual views of System and Meta-system

Let us begin by discussing the difference between gestalt and proto-gestalt. Many psychological text books talk about gestalts¹⁸¹, but we are never told about proto-gestalts.

¹⁸¹ See <http://sharp.bu.edu/~slehar/references/gestalt-refs.html> accessed 080531. See also Albertazzi, L. (Editor) Shapes of Forms: From Gestalt Psychology and Phenomenology to Ontology and Mathematics (Dordrecht; Boston: Kluwer Academic Publishers, 1999).

Gestalts and proto-gestalts¹⁸² are duals in the perceptual noematic realm just as systems and meta-systems are duals in the conceptual noetic realm. But then, we also have flows and proto-flows, and these are the perceptual opposites of a conceptual process and a meta-process. We also need to point out the difference between the synchronic and the diachronic¹⁸³. We have already stated that there is a temporal gestalt, i.e., a diachronic, rather than a synchronic gestalt. Therefore, we expect this distinction to move across from the gestalt to the proto-gestalt and also from the flow to the proto-flow. The way that these various distinctions interact has been worked out previously in our summary paper on Special Systems Theory¹⁸⁴. Here, as an example, we will consider the relationship of the synchronic and diachronic distinction to the gestalt and flow distinction as well as the proto-gestalt and proto-flow distinction. That means there are both synchronic gestalts and diachronic gestalts, as well as synchronic flows and diachronic flows. The same is true of the 'proto-' level of gestalt and flow¹⁸⁵.

¹⁸² Brown, Stuart; Collinson, Diané and Wilkinson, Robert. Biographical Dictionary of Twentieth-century Philosophers (London; New York: Routledge, 1996) pp. 213-214. Entry under Christian Frelherr von Ehrenfels, "He argued that complex Gestalts were related hierarchically to simpler Gestalts, and speculated on the nature of a 'proto-Gestalt,' a simple undifferentiated form from which all others were built up (although he regarded Gestalts at every level of complexity as atomistic in the sense that they were not reducible to some combination of their parts)." This is a slightly different concept equal to my concept of the Primal Archetypal Whole. But this idea of the "proto-gestalt" relates to microgenesis as the origin of the series of gestalt transformations. My use of the idea of the proto-gestalt considers the perceptual meta-system as the origin of gestalt differentiation. Thus there is not just a hierarchy of gestalts but hierarchy of the various schemas, one of which is the Meta-system which has its perceptual equivalent in the "proto-gestalt", which is the environment out of which the various gestalts arise. However, it is good to find a precursor in the use of the term among the original German Gestalt psychologists. For "microgenesis" see Bachmann, Talis. Microgenetic Approach to the Conscious Mind (Amsterdam; Philadelphia: John Benjamins Publishing Company, 2000).

¹⁸³ Saussure, Ferdinand De. Course in General Linguistics (Chicago: Open Court Publishing, 1986) p. 89. synchronic/diachronic distinction mentioned. Another edition (London; New York: Oxford University Press, 2006).

¹⁸⁴ Reflexive Autopoietic Dissipative Special Systems Theory by the author. See also CSER 2008 presentation on "Meta-systems, Complexity and Emergence" which is a primer on Meta-systems theory.

¹⁸⁵ From Reflexive Autopoietic Dissipative Special Systems Theory at http://works.bepress.com/kent_palmer by the author.

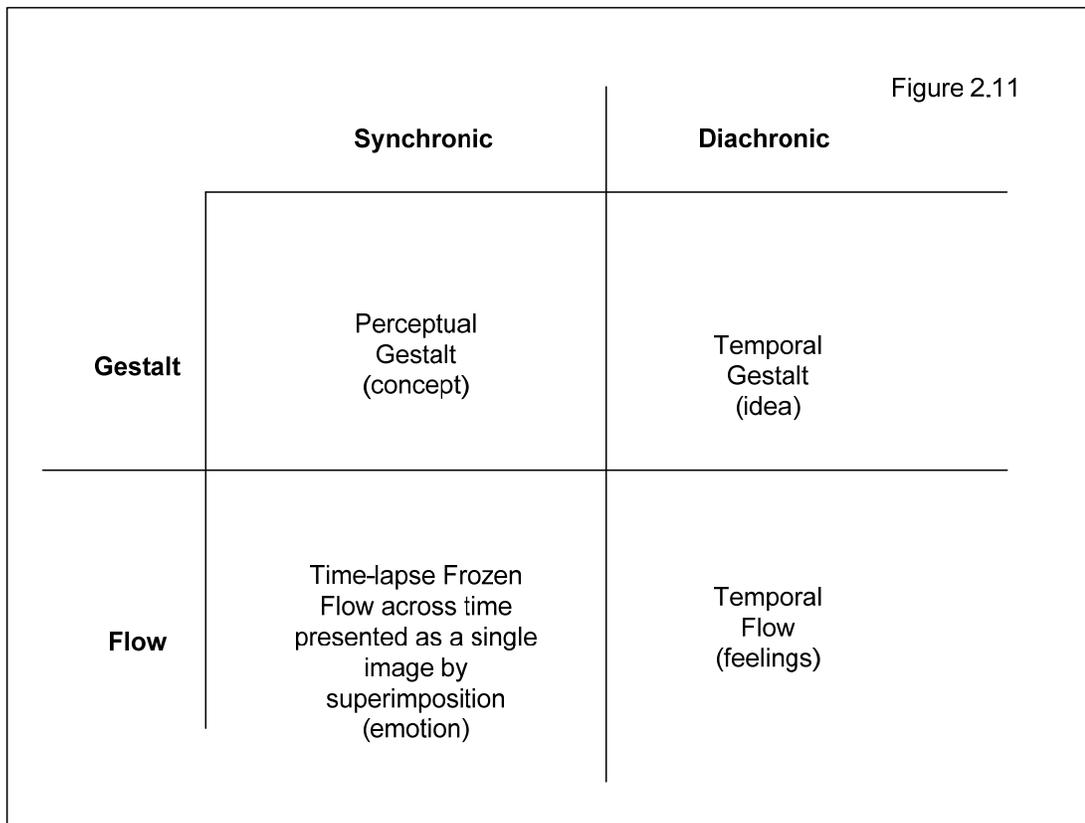


Figure 2.11. Duality of the Gestalt and Flow

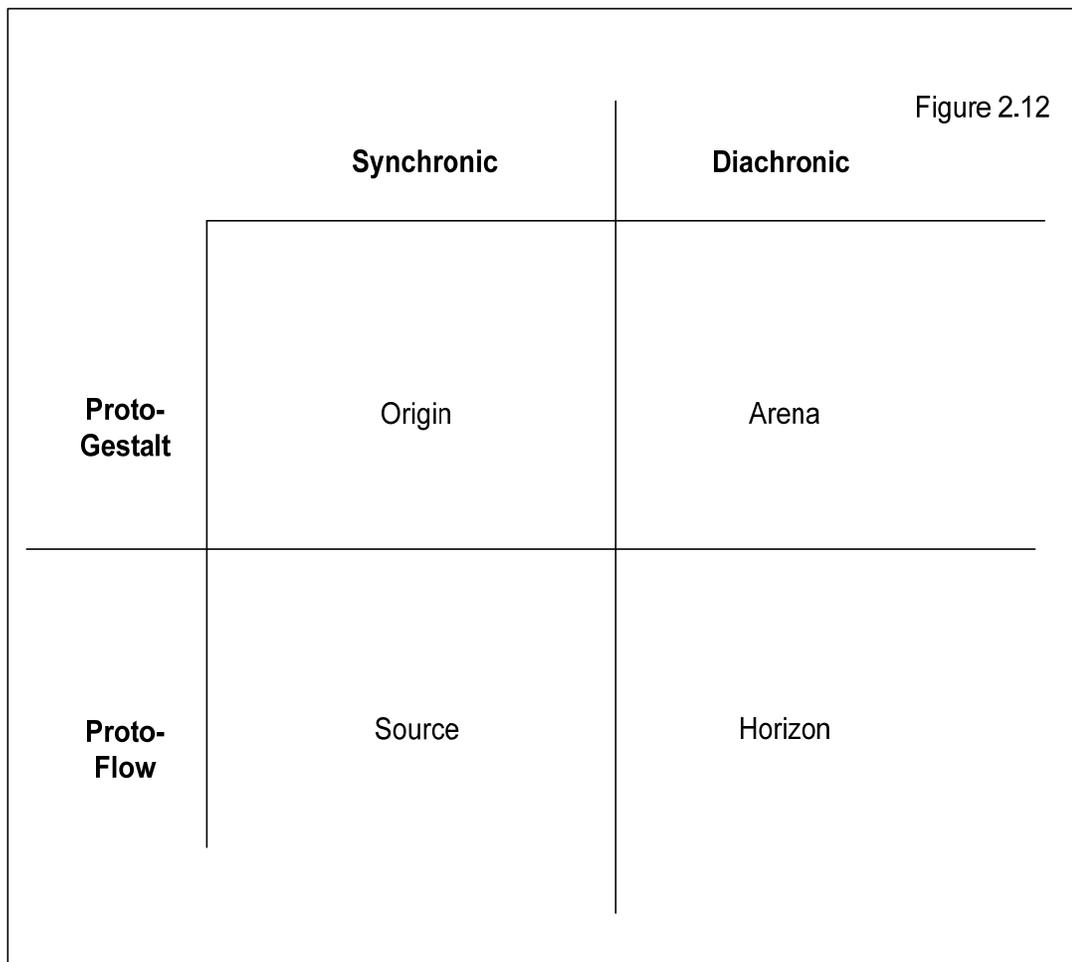


Figure 2.12. Duality of the Proto-gestalt and Proto-flow

Once we realize that these permutations are different from each other we can then begin to look for them in our experience and understand them phenomenologically. And we should be able to take these perceptual examples and translate them up to the conceptual level and relate them to systems and meta-systems and processes and meta-processes. By contrasting the synchronic/diachronic dimensions with the gestalt/flow and proto-gestalt/proto-flow, we generate a difference in our experience that we might not notice otherwise, such as the way time operates in our experience. Here we assume the model of time that Husserl and Heidegger created, which is called Internal Time Consciousness¹⁸⁶. It is a model of the contents of consciousness through the sedimentation of time. The synchronic only deals with the *present in time* as in what is *immediately* present, while the diachronic deals with

¹⁸⁶ Husserl, E. (Author), Heidegger, M. (Editor), Phenomenology of Internal Time-Consciousness (Bloomington: Indiana University Press, 1964).

the comet's tail of fading apprehension¹⁸⁷ as we move through time, or as it moves through us. What we recognize is that there are certain phenomena, which take the time to be what they are, and thus they became diachronic gestalts, or temporal gestalts¹⁸⁸. In our opinion, *ideas* are something like that. They take time to be what they are because they are *illusory continuities based on abstraction*. When we look at a flow, then our baseline becomes a diachronic flow of something akin to a feeling or sensation. Strangely, there are also snapshots of flow, which are like 'time-lapse photos of flow' that capture a whole period of time and its flow in a single static image. An example of this is an emotion. It is interesting that ideas and emotions are either *gestalts in time* or *flows out of time*, in other words, they represent countervailing states, and these countervailing states are intersubjectively transmittable. We do not transmit our feelings or our thoughts very easily, but if we package them as emotions or ideas, then it is possible to transmit these strengthened and countervailing states more easily.

A similar thing can be said at the conceptual level. There are diachronic and synchronic systems, i.e., four-dimensional (4d) and three-dimensional (3d)¹⁸⁹. Likewise, there are diachronic and synchronic processes, i.e., normal temporalized processes and frozen processes. In terms of work, let's call a normal temporalized process, *non-routine*, and a frozen process *routine*. Routine work has its causal relations fixed, while non-routine work is such *that even the changes change*, i.e., its causal relations are not fixed. *It is out of non-routine work that emergent events appear*.

Now let us apply this to our understanding of the system/process. One thing we are learning is that every system always comes with a dual process whether we recognize it or not. So, for example, when we build a system product there is always a process that we must go through to produce that product. We call this process *work*, and it is just as important as the system product itself. Processes and systems are equally important and are always complementary to each other¹⁹⁰. The process is more than just the *system in time*.

¹⁸⁷ Apprehension has two meanings. For our purposes, apprehension means to take hold of, especially mentally, and not the meaning related to fear and dread. There isn't another word that comes to mind that is better suited and does not have the extra baggage of implied negative meaning.

¹⁸⁸ Cassirer, Ernst. The Philosophy of Symbolic Forms (New Haven: Yale University Press, 1996) Volume 2, p. 108. Mention of the concept of Temporal Gestalt. See also Matthews, Eric The Philosophy of Merleau-Ponty (Montréal; Ithaca, NY: McGill-Queen's Press, 2002) p.141. Film as a temporal gestalt in Merleau-Ponty's work.

¹⁸⁹ Nb. In '3d' and '4d' we have an abbreviated usage "#d" where # is a number then "d" stands for "dimension"

¹⁹⁰ This is the underlying idea behind the Capability Maturity Model Integrated (CMMI) from the Software Engineering Institute. Chrissis, Mary Beth; Konrad, Mike and Shrum, Sandy. CMMI: Guidelines for Process

The system in time is the four-dimensional system as opposed to the three-dimensional system, which is a configuration of the system without any dynamics. The *process of the system* is its manner of constitution, and this *process of constitution of the system* has two modes. One mode is the non-routine mode in which meta-changes¹⁹¹ are always occurring many times discontinuously, which is *true flow in time*. But there is also a degenerate mode where we take a time lapse photo of the changes and we freeze them in a global view across time. In that view of superimposed changes frozen in time, such as pictures of waterfalls where we see the water as a fuzzy flow that has flowed past over a period of time, we grasp the idea of the physiognomy of the entire flow, and we see it as a statistical flux frozen in time, which gives us *an impression* that the flow is, in fact, routine in some way, although the *actual* flow is not. Thus, our work always needs to be distinguished into routine and non-routine work¹⁹² whether it is *a system configuration*, or a *dynamic system*. We gave the example of the *temporal gestalt* as being an Idea, and the *atemporal flow* as being an Emotion. But in terms of system and process, we can see that the temporal gestalt, i.e. the diachronic system, is always an idealization based on illusory continuity, while an atemporal flow, i.e., the synchronic process, is always an abstraction based on an illusory discontinuity. This is to say, perfect diachronic systems and perfect synchronic processes are anomalous states that are separated from reality and are illusory. We use these illusions effectively to view the system or its associated processes in ways that are abnormal for the actual state of the system or the process. This is to say, a system is normally a product (which is a configuration) but the *dynamism of its operation* is abnormal. On the other hand, processes, which represent the dynamism of the system, are normally 'changing changes', that are sometimes continuous and other times discontinuous. Processes are represented by *non-routine work*. It is abnormal to freeze these processes (that are 'changing changes') even though we may wish to have a global picture of them. We often behave as if the dynamism of the process were made of something frozen in a span of time.

Notice that by dissecting these different states of process and system in terms of time or stasis, we can derive a more precise phenomenological picture of the system (within this context) than we would get if we viewed it separately and *outside* of the duality of process, or outside of its relationship to time. Systems are naturally static configurations. If we want

Integration and Product Improvement (Upper Saddle River, NJ: Addison-Wesley Professional; 2 edition, 2006) Version 1.2.

¹⁹¹ Meta-changes are “changes of change” similar to acceleration for motion, but with respect to change.

¹⁹² Pava, Clavin. Managing New Office Technology: An Organizational Strategy. (New York: Free Press, 1983) Chapter 5 on Nonroutine Office Work.

to talk about them when they are moving, we say “Dynamic System”, but in that case it is unclear as to what this dynamism adds to the system. In our case, we understand that such a system is a temporal gestalt, conceived as a diachronic system, which is something that *takes time to be what it is*. In that ‘time period’ it is becoming. So we have moved from Pure Being¹⁹³ in the synchronic case to Process Being¹⁹⁴ in the diachronic case. Things are changing in the configuration of the system in the diachronic case. But as a temporal gestalt, there are certain emergent effects we only expect to see after a span of time has passed that cannot be directly inspected at any time¹⁹⁵. That same system, as a configuration, must be constituted by a process, and that process is extremely dynamic as a diachronic process, which we interpret as '*changing changes*' through time by which the frozen configuration of the product is produced as an effect. To some degree we can try to control those 'changing changes' by trying to picture the process as if it was synchronic (in a time-lapse fashion) so that we can see the broad outlines of the *probable* process by which constitution occurs. Thus, we try as much as we can to reduce the full process to a probabilistic subset, which we can more easily control. That subset can be conceptualized and represented, and then aligned to by different people in the production process. We call this the *repeatable part* of the process but it lacks the dynamism of the full process. We prefer to call it the synchronic time-lapse slice of the full process, which is more dynamic and less predictable than the process representations suggest.

Normally we do not think about the constitution of the System along with the System itself, yet, Phenomenology considers this because it says that everything in consciousness is intentional. So the System becomes something we have intended in every case, although the *intention* of the System and the actual *constitution* of the System are different. To understand the constitution element we have to consider the flow and process side.

N. Rescher has encouraged us to build a bridge between Process Philosophy and Systems Theory¹⁹⁶. We see them as duals of each other at the conceptual level, but on a perceptual

¹⁹³ What Heidegger called the *present-at-hand* modality of Dasein, which is related to *pointing* according to Merleau-Ponty.

¹⁹⁴ What Heidegger called the *ready-to-hand* modality of Dasein, which is related to *grasping* according to Merleau-Ponty.

¹⁹⁵ As in the case with a piece of music. It is only *of a piece* in the moment when it is grasped as a totality. As Van Cliburn said, “One must grasp the last note from the beginning of the piece in order to play it properly.” (paraphrased) Television Interview on PBS Jim Lehrer News Hour. “Van Cliburn Reflects on 1958 Tchaikovsky Competition” Report on April 11, 2008 “See http://en.wikipedia.org/wiki/Van_Cliburn

¹⁹⁶ Rescher, Nicholas. Process Philosophy: A Survey of Basic Issues (Pittsburgh: Univ. of Pittsburgh Press, 2000). Also Process Metaphysics: An Introduction to Process Philosophy (Albany: SUNY Press, 1996) and Seibt, Johanna Process Theories: Crossdisciplinary Studies in Dynamic Categories (Dordrecht; London:

level, we see Process Philosophy and Systems Theory as the duality of a gestalt and a flow. Once we realize the existence of these two dualities, then we can translate our perceptual experience of phenomena to a conceptualization of those experiences. A System does not show up alone at this conceptual level, but it appears with its dual process, and it does not simply exist in static snapshots, but within the dynamism of the flow of time as well. When we bring these two perspectives (taken from these dualities) together, we have a much better picture of the System in relation to the other things that it encompasses, and this clarified picture is a result of the complementarity within the dynamics of experience, either in relation to the Pure Being (static modes) or the Process Being (becoming modes).

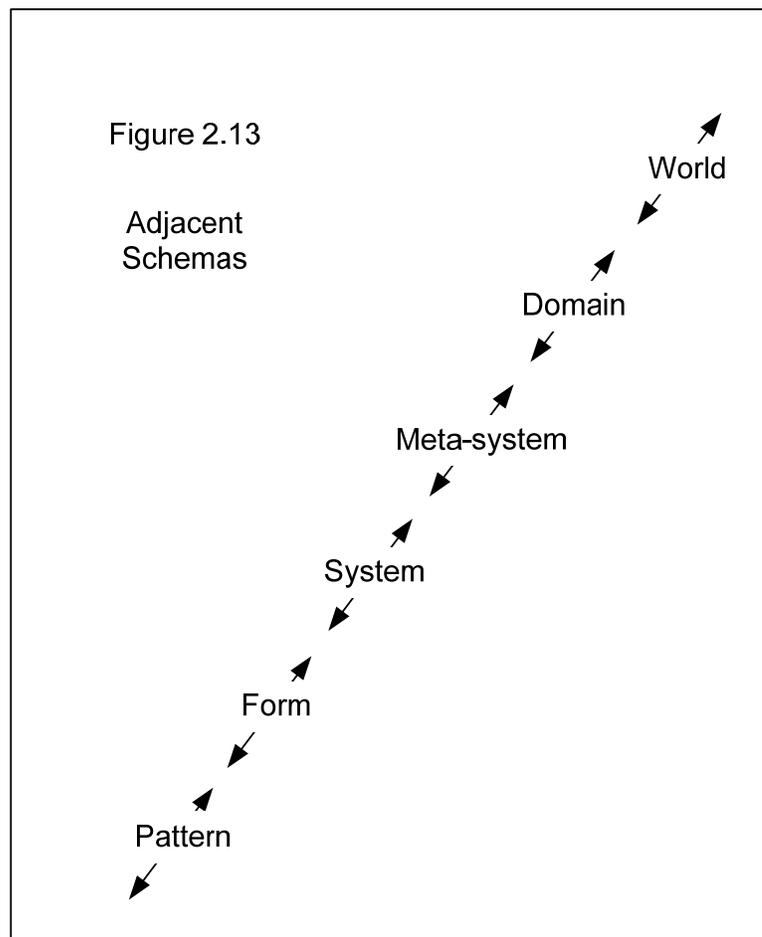


Figure 2.13. Adjacency of Schemas

Once we understand this picture in terms of the system and its dual, (which is the process), then we can try to understand it in terms of the deeper background of the proto-gestalt and

proto-flow, or, as the meta-system and the meta-process. To do that we need to be able to transition from one schematic level to another, and the rule in this regard is conjunctive. A particular schematic level is merely a juxtaposition of the two levels that are adjacent to it. We see this when we consider the system and see that it is a perceptual gestalt, which is the tension between a figure and the background that forms the whole. The figure is the form and the background is the meta-system or open-scape. If you bring together the form and the open-scape (meta-system) background, you then have a gestalt, which is made up of a background with less depth, as well as a form with less depth or, in other words, a *representation* of the form on a background. As a gestalt, the system is a conjunction of the form and the meta-system schemas. Normally we think of a system as a group of forms in a context that is common to all the forms in the system. But the minimal configuration of a system is to have only *one* form on a background. If we understand this fundamental principle in the construction of the schemas, then we can use this to understand the relationship of the System to the Meta-system, i.e., the deeper background. The system is bounded within an environment. Between the boundary of the System, and the horizon, i.e., everything you can see from a particular place in the landscape, there is the Meta-system. The Meta-system is a panorama of the horizon of all that is visible from the center of the System. The Meta-system is the environment, ecology, context, situation, milieu, and/or media, which goes beyond the defined boundary of the System to the horizon. The *background* of the System is actually all the backgrounds for *each figure in the system* as we form a gestalt picture of it. The System background is not the deeper background of the next horizon. We realize that just as there is a background that is local to the system, which makes up the normed gestalt background within the system, there is also: the *temporal gestalt of the system*, the *process of the constitution of the system*, and the *reified frozen process of the system*, and we could say the same thing about this process if we reversed all the terms. In effect, every system/process dual has a structure that is comprised of: its configuration (origin), the dynamics, which is the time that it takes for it to be what it is (arena), the generative or dynamic constituting horizon (boundary), and the frozen limit of the process element (source). The configuration is the set of elements and their relationships. The dynamics are the set of functions that will bring about an automorphism of the thing in relation to itself. *The generative element is the genealogy of the system from its kernel, which is a set of the kinds of things and their relationships to each other, which we call the design of the system.* The frozen process element is the statistical bound that

limits the movement of the elements and their changes within the system, which we take to be its normal behavior¹⁹⁷.

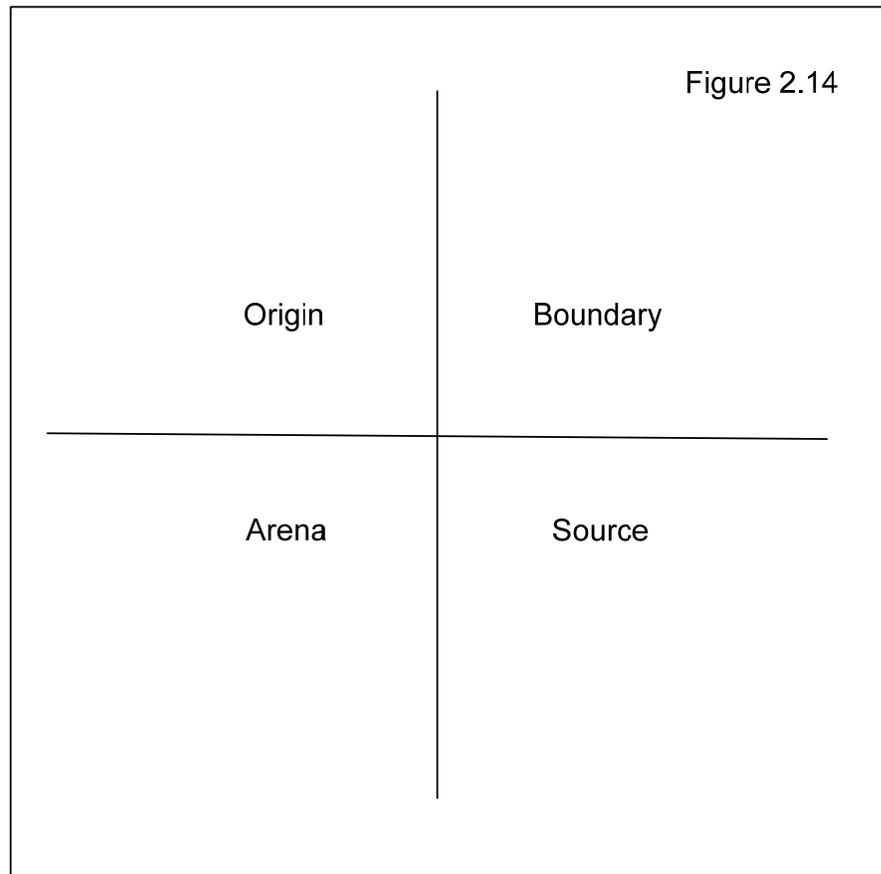


Figure 2.14. Complementary Structure of the Meta-system

But, now let us push this deeper into the background of the environment. The system is emergent, i.e., it has characteristics that make it a whole greater than the sum of its parts. But what if we treat it as de-emergent, i.e., as a whole *less* than the sum of its parts, in other words, what if we dismantle the system? In that case, the de-emergent system will be transformed into a meta-system, i.e., a deeper environment in which the *pieces* of the system are seen as part of the broader environment of the system.

¹⁹⁷ Note: These four could be related to the Quadralectic.

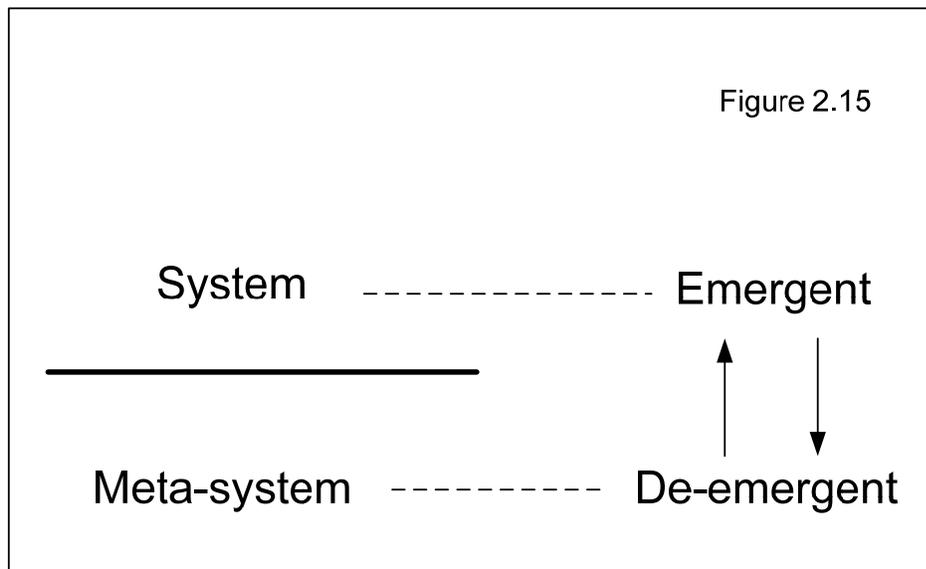


Figure 2.15. Emergence and De-emergence of the System and Meta-system

We do not give enough consideration to the de-emergent dual of the system, i.e., the meta-system, for what it can tell us about the system. When we de-emerge a system, we take it apart so that it no longer has its emergent properties, we turn its pieces into things scattered around the larger environment. Pieces are no longer wholes greater than the sum of their parts, but less than the sum. And the background is the deeper background beyond the normed background of the system so that all its parts can be seen when it is assembled. This deeper background has a structure, which is similar to that of the system in terms of its relationship to the proto-flow/meta-process and the proto-gestalt/meta-system and their relationship to the synchronic/diachronic distinction. As suggested above, this relates to the decomposition of the meta-system into its source, origin, arena, and horizontal boundary at the perceptual level. Every system and anti-system interacts in an arena, or in a niche provided by a meta-system. That arena has a horizontal boundary, which is the next relevant threshold past the boundary of the system. The system and anti-system arise from an origin point, go through their lifecycle, and end up at a sink point within the arena. The system comes from a source outside the arena and then enters into the arena and perhaps returns to that source or to some other ultimate end outside the arena of the meta-system. This is the way that the system interacts with the next higher threshold of organization beyond the system organization. It is important to know this in order to understand what a system is. The meta-system serves as a filter for the system and its behavior when the system is inside the arena of the meta-system. Within that arena, the meta-system provides resources to the system. The system is manufactured outside that arena, and is then introduced into it at an origin point, and is then taken out of the arena at a sink point. The

meta-system is inherently complementary because it is made up of a set of complementarities, some of which are complementarities to the system, and some of which are complementarities in relation to itself internally (the meta-system has twin complementary images within it¹⁹⁸). Then, there are also the complementarities that it generates between the system and the anti-system, or between a system and a non-system, or, between itself and other meta-systems. The meta-system can be seen as a field of complementarities relevant to the system. For instance, you can tell when the system is interacting with a meta-system because there will be complementarities at the interaction point, which will *affect* the interaction, such as reading and writing¹⁹⁹. Systems interact with either each other, or, they interact with the meta-systems that contain them through protocols made up of complementary states. Meta-systems normally have complementary resources such as food and drink²⁰⁰, or, CPU²⁰¹ cycles and memory²⁰² that are supplied to the system. In a certain organized way, meta-systems impose these complementarities onto the system while they are within the arena. That organization of the meta-system is different from the organization of the system, but they can both be formalized as *Turing machines*, although the system is a normal Turing machine, while the meta-system is always a universal Turing machine²⁰³.

If you understand that the system must fit into the meta-system and must be composed of forms, which are, in turn, composed of patterns, then you have a structural view of the architecture of the system. This is similar to the view that George Klir creates in his *Architecture of Systems Problem Solving*²⁰⁴, which is the handbook used here for the nature of the structural system. A structural system is one in which, not only the forms, but the structural patterns that make up the forms, are specified. In the case of Klir this is a structure consisting of data variables and their connections. Klir uses the structural level to approximate the formal level in terms of the dynamics of information within the system and its possible patterns within the system. Klir gives a very complete view of the

¹⁹⁸ The twin complementary images are similar to the two non-Euclidian geometries in relation to Euclidian geometry, or the two non-normal algebras (Lie and Jordan) in relation to normal algebra, or we could go so far to say the two incompatible physics Quantum Mechanics and General Relativity Theory in relation to Newtonian Physics or its transformation into Special Relativity Theory.

¹⁹⁹ In software applications the operating system serves as the meta-system to the application system. Disk and memory are resources that are accessed by 'read and write protocols' that have inherently complementary states.

²⁰⁰ In the case of an animal within an environment.

²⁰¹ Central Processing Unit (CPU)

²⁰² In the case of the application within an operating environment.

²⁰³ Herken, Rolf. *The Universal Turing Machine a Half-century Survey* (New York: Springer-Verlag, 1995).

²⁰⁴ Klir, George J. and Elias, Doug. *Architecture of Systems Problem Solving* (New York: Plenum Press/Kluwer Academic, c1985, 2003).

structural system from this vantage point. That means that he is combining three schemas to give a picture of the internal mechanism of the system. This is a model of the formal structural system²⁰⁵ but he neglects to talk about the meta-system except to mention the environment, which he calls "background variables" of time, space, and population. What he does not consider is the idea that the environment is not just a plenum, but that it has a certain organization of its own, which is de-emergent in relation to the system. We need to think of the system and the meta-system as duals of each other and to consider emergence and de-emergence as dual operations. When the system de-emerges, it produces a deeper background pattern that we call an open-scape or meta-system. A good model of this is given by George Bataille in his book, Accursed Share²⁰⁶, where he calls it a *General Economy*, as opposed to the *Restricted Economy* of the System. Arkady Plotnitsky gives an excellent rendition of this argument when he combines concepts from Derrida and Bohr in Complementarities²⁰⁷ and In The Shadow of Hegel²⁰⁸. This strange and exotic organization of the Meta-system has been described in various working papers by the author such as "Meta-system Engineering" for INCOSE²⁰⁹. The meta-system is a wild landscape or stormy seascape full of singularities, miracles²¹⁰, blackholes²¹¹ and discontinuities in which the system tries to preserve its viability through negative feedback. It is an environment with mostly positive feedbacks (in either a negative or positive direction) in which the system is trying to maintain its viability against the odds and survive destruction. When we start to see the system against this next higher intermediate horizon, we can begin to grasp a fuller picture of the system's environment and how the organization of that environment affects the internal structure of the system as it is described by Klir.

²⁰⁵ Salthe, Stanley N. Evolving Hierarchical Systems (New York: Columbia University Press, 1985); Wilden, Anthony. System and Structure: Essays in Communication and Exchange (Harper & Row Publishers, 1972; London; New York: Tavistock, 1980).

²⁰⁶ Bataille, Georges. Accursed Share (New York: Zone Books, 1991, 1993) Two volumes.

²⁰⁷ Plotnitsky, Arkady. Complementarity: Anti-epistemology After Bohr and Derrida (Durham: Duke University Press, 1994).

²⁰⁸ Plotnitsky, Arkady. In the Shadow of Hegel: Complementarity, History, and the Unconscious (Gainesville: University Press of Florida, 1993).

²⁰⁹ See <http://archonic.net> by the author INCOSE 2000.

²¹⁰ Positive feedback in the positive direction.

²¹¹ Positive feedback in the negative direction.

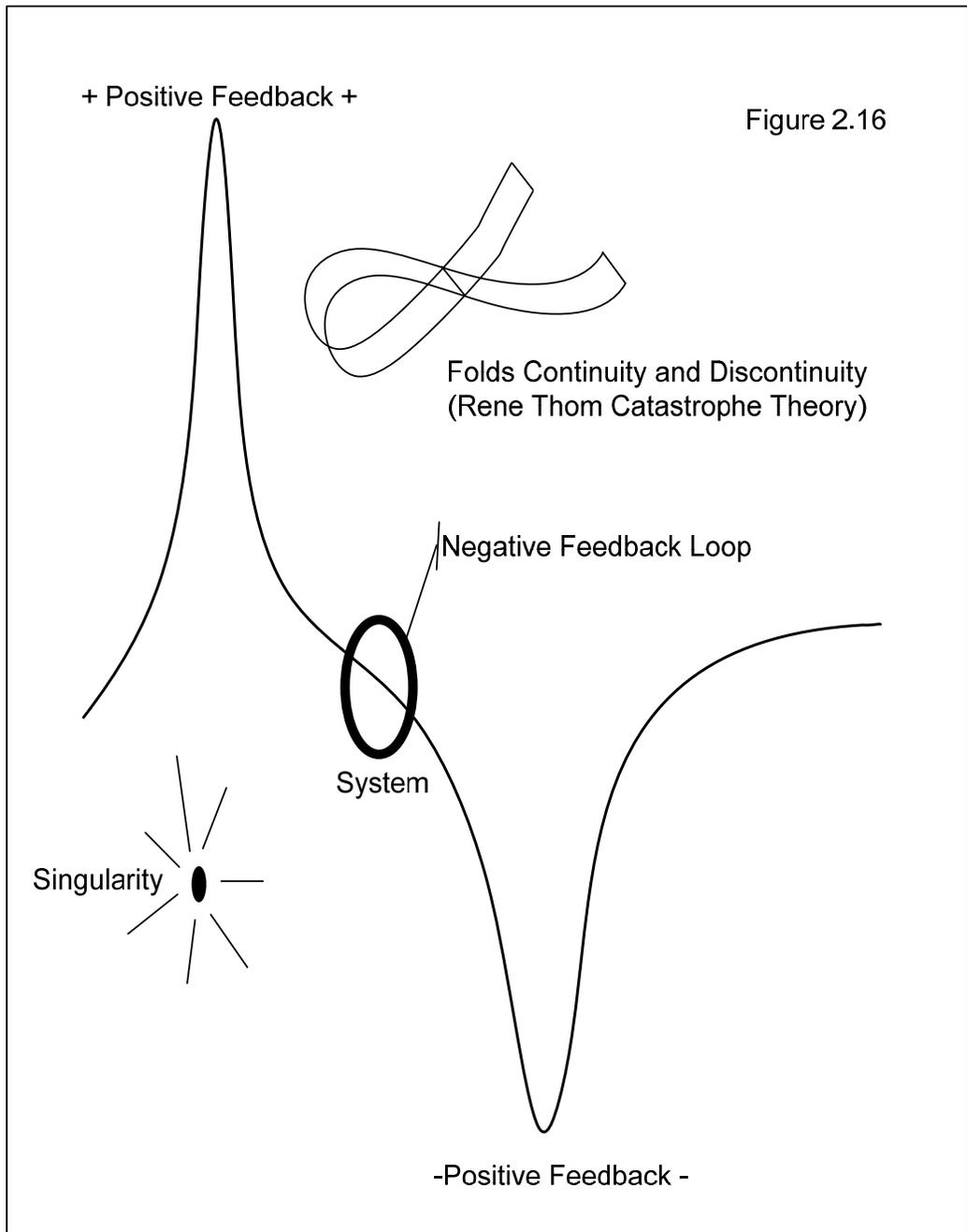


Figure 2.16. Landscape of the Meta-system

Notes:

This chapter is an attempt to describe the outline of a systems phenomenology in terms of the horizons of successive scales based on the reported works of the later Husserl. It raises the possibility of a Schemas Phenomenology by including the discussion of the Meta-system, which could be generalized to other schemas as well. A presentation²¹² was given to the CSER 2008 describing much of this perspective, and that briefing contains slides that give pictures of some of the relationships described. This perspective was first developed in papers on the Special Systems²¹³, but the view has been enhanced by an understanding of the Schemas. Reading the work of Don Welton²¹⁴ (on the later Husserl) was pivotal in understanding how Phenomenology is related to Schemas Theory via the nesting of horizons. Up until then it was thought that the use of the term, world horizon, was an innovation of Heidegger since the work of Husserl was obscured by the lack of published material on that aspect of his thought. Now we can see that Heidegger's work is a direct extension of Husserl's later works. Developing this sketch of a Systems Phenomenology into a fully fledged work would be a major undertaking if it were to take into account the many followers of Husserl and their contributions, as well as Systems Theory literature. The most we can do is to suggest the outline of such an approach so that we can use it as a means to study the transformation of the System at the higher meta-levels of Being.

²¹² See "Meta-systems, Complexity and Emergence" CSER 2008 at <http://holonomic.net>

²¹³ See [Autopoietic Reflexive Systems Theory](http://works.bepress.com/kent_palmer) at http://works.bepress.com/kent_palmer

²¹⁴ Op. cit. Welton, D.

Philosophical Categories and the Schemas

Encountering Trans-Peircean Categories

C. S. Peirce was another key figure in the development of phenomenology but his approach was very different from Husserl. He developed a theory of Philosophical Categories that was quasi-geometrical in nature. We will introduce the concept of the Schema as a way to understand the organization of entities in spacetime and connect the schemas to the dimensions of geometry. In geometry there are multiple images of the System, which we will introduce and relate to the sub-schemas. These various forms of the System appear as minimal solids in higher dimensional spaces and are the origin of the design landscape. The design landscape is a Meta-system that is actually an 'open clearing' for the realization of possibilities. The articulation of the Schemas is related to the unfolding of the trans-Peircean Philosophical Categories and the Foundational Mathematical Categories that are based on them. The Foundational Mathematical Categories include all possible foundations for all of the mathematical categories.

Another Phenomenology

Husserl was not the only one to re-invent Phenomenology²¹⁵ after Hegel. Charles Peirce²¹⁶, the most original American philosopher, previously re-invented Phenomenology as part of his thrust into Semiotics²¹⁷ as an underpinning to his studies of Logic. Peirce was the one philosopher to innovatively think about Logic²¹⁸ in ways that no one before him had. He

²¹⁵ See Herbert Spiegelberg, "Husserl and Peirce's Phenomenologies: Coincidence or Interaction", Philosophy and Phenomenological Research 17 (Dec 1956) pp.183-84. See also Bourgeois, Patrick L. and Rosenthal, Sandra B. Thematic Studies in Phenomenology and Pragmatism (Amsterdam: Grüner Pub. Co., 1983); See also Rosensohn, William L. The Phenomenology of Charles S. Peirce: From the Doctrine of Categories to Phaneroscopy (Amsterdam: Gruner, 1974); See also Savan, David. "On the origins of Peirce's phenomenology", in: Wiener, P. & Young, F. (Eds.). Studies in the Philosophy of Peirce. (Cambridge: Harvard University Press, 1952).

²¹⁶ Peirce, Charles Sanders. S. (1839-1914), Charles Hartshorne, and Paul Weiss. Collected Papers. (Cambridge: Belknap Press of Harvard University Press, 1958, 1955; also Charlottesville, Va.: InteLex Corp., 1994) a series of volumes, the first appearing in 1931. Peirce, Charles Sanders. Writings of Charles S. Peirce: A Chronological Edition (Bloomington: Indiana University Press, 2000); 5 Volumes; See also <http://www.peirce.org/> accessed 080531; see <http://www.pragmatism.net/index.htm> accessed 080531.

²¹⁷ Peirce, Charles Sanders. Peirce on Signs: Writings on Semiotic (Chapel Hill: University of North Carolina Press, 1991).

²¹⁸ For example, Peirce, C. S. Logic of Relatives: A Notation for the Logic of Relatives, Resulting from an Amplification of the Conceptions of Boole's Calculus of Logic (Welch, Bigelow, 1870); See also Peirce, C. S. "On the Algebra of Logic" American Journal of Mathematics, The Johns Hopkins University Press, Vol. 3, No. 1, (Mar., 1880), pp. 15-57. See also in The Essential Peirce: Selected Philosophical Writings (Bloomington: Indiana University Press, 1998). See also Houser, Nathan and Roberts, Don D. and Van Evra, James. Studies in the Logic of Charles Sanders Peirce (Bloomington: Indiana University Press, 1997); See also Hintikka, Jaakko. "The Place of C.S. Peirce in the History of Logical Theory" in Brunning, Jacqueline

was intent on challenging our traditional ideas of what logic was and could be²¹⁹. He was reacting against Hegelianism²²⁰. He introduced the Existential quantifier to modern logic²²¹. He added abduction²²² as a separate logical function to induction and deduction, which specifically supported hypothesis building in Science²²³. (See Figure 3.1.) He produced a robust semiotic theory, which was more fundamental than the one developed later by Ferdinand de Saussure²²⁴. But central to his thought on logic was the development of a system of Philosophical Categories²²⁵ that were based on his understanding of the inherent truth of Logic and this gave support to Semiotics. He used cardinal numbers to represent three fundamental Philosophical Categories called *First*, *Second*, and *Third*. *First* is the *isolata*²²⁶, which are the monadic hyle of experience. *Second* is the *relata*²²⁷, which are the relationships between the Firsts. And the *Third* is the *continua*²²⁸, which is the continuity between events and the binding of relationships. Peirce thought he had proved²²⁹ that there could only be three fundamental philosophical categories and that all ideas were

and Forster, Paul. The Rule of Reason: The Philosophy of Charles Sanders Peirce (Toronto; Buffalo: University of Toronto Press, 1997).

²¹⁹ Brady, Geraldine. From Peirce To Skolem: A Neglected Chapter in the History of Logic (Amsterdam; New York: North-Holland/Elsevier Science BV, 2000).

²²⁰ Townsend, H. G. "The Pragmatism of Peirce and Hegel", The Philosophical Review, Vol. 37, No. 4, (Durham: Duke University Press, July, 1928), pp. 297-303; See also Stern, Robert. "Peirce on Hegel: Nominalist or realist?" Transactions of the Charles S. Peirce Society: A Quarterly Journal in American Philosophy 41:11, pp. 65-99; See also Shapiro G. "Peirce's Critique of Hegel's Phenomenology and Dialectic" Transactions of the Charles S. Peirce Society 1981, vol. 17, no3, pp. 269-275; See also Petrick, Joseph A. Peirce on Hegel (University Park, PA: Pennsylvania State University, 1972) Thesis; See also Fisch, Max H. "Hegel and Peirce" Peirce, Semeiotic, and Pragmatism: Essays by Max Fisch, eds. Ketner, Kenneth L. and Kloesel, Christian J.W. (Bloomington: Indiana University Press, 1986).

²²¹ Roberts, Don D. The Existential Graphs of Charles S. Peirce (Ph. D. Thesis, University of Illinois, 1964; The Hague, Mouton, 1973) p.18; See also Johnson-Laird, P. N. "Peirce, Logic Diagrams, and the Elementary Operations of Reasoning" Thinking & Reasoning, Volume 8, Issue 1 February 2002, pp. 69- 95; See also Sowa, John F. Knowledge Representation: Logical, Philosophical, and Computational Foundations (Pacific Grove: Brooks/Cole, 2000); See also Dipert, Randall. "Peirce's Deductive Logic: Its Development, Influence, and Philosophical Significance" in Misak, Cheryl.C. J. The Cambridge Companion to Peirce (Cambridge, U.K.: Cambridge University Press, 2004) Chapter 12, pp. 287-324.

²²² Burks, Arthur W. "Peirce's Theory of Abduction Philosophy of Science", Philosophy of Science Vol. 13, No. 4 (Chicago: The University of Chicago Press, 1946), pp. 301-306; See also Anderson, Douglas R. Creativity and the Philosophy of C.S. Peirce (Dordrecht; Boston: M. Nijhoff, 1987) p.13ff.

²²³ Olsen, Scott A. "Plato Proclus and Peirce Abduction and the Foundations of the Logic of Discovery" in Harris, R. Baine. Neoplatonism and Contemporary Thought (Albany: SUNY Press, 2002) p85.

²²⁴ Krampen, Martin and Oehler, Klaus and Posner, Roland and Sebeok, Thomas and A Von Uexkull. T. Classics of Semiotics (New York: Plenum; 1987) Chapters 1, p. 1 and Chapter 3, p. 59.

²²⁵ Peirce, Charles S. "On a New List of Categories" Proceedings of the American Academy of Arts and Sciences 7 (1868), 287-298; See also Freeman, Eugene. The Categories of Charles Peirce (Chicago: The Open Court, 1934); See also Esposito J. L. "The Development of Peirce's Categories" Transactions of the Charles S. Peirce Society 1979, vol. 15, no1, pp. 51-60.

²²⁶ *Isolata*: an ideal isolatable element such as an atom, fundamental particle, quark, string, etc.. When discussing these concepts in terms of the schemas it is generally called a monad.

²²⁷ A relation of any type, generally covered by Mathematical Category Theory maps, sometimes described in terms of reactions.

²²⁸ Any sort of continuum. This has been explored in depth in mathematics in terms of the 'continuum hypothesis.' See http://en.wikipedia.org/wiki/Continuum_hypothesis accessed 080531; Sometimes thought about in terms of mediation.

²²⁹ It seems that this proof itself was never given in his works even though Peirce refers to it several times.

built from these²³⁰. Peirce built upon these categories to such an extent that they became overdetermined in his thought. The categories began to take on different meanings in the various contexts of his thought and, as a result, they became hard to interpret. But we need not fret about their interpretation so much as their limitations and how there is a need for added categories beyond those that Peirce identified, which we will call the trans-Peircean categories, i.e., those beyond the ones that Peirce thought were enough. (See Figure 3.2.) His phenomenology has to do with the Firsts, which appear as phenomena pure and simple, although they are never seen and are only implied by what we already see in relationships and in the continua of experience. Peirce, like Husserl, starts with phenomena and tries to build toward an understanding of Logic, but he, unlike Husserl²³¹, built his construction from materials taken from logic. *For Peirce, logic is the system that is the kernel of experience and it is through this system of logic that experience must be understood.* That understanding comes by using the *functions* of logic to connect phenomena until one can develop symbols that can be manipulated by logic itself. Because Logic *is* a system, we can understand a system through logic and its structure, and especially through the philosophical principles that emanate from logic.

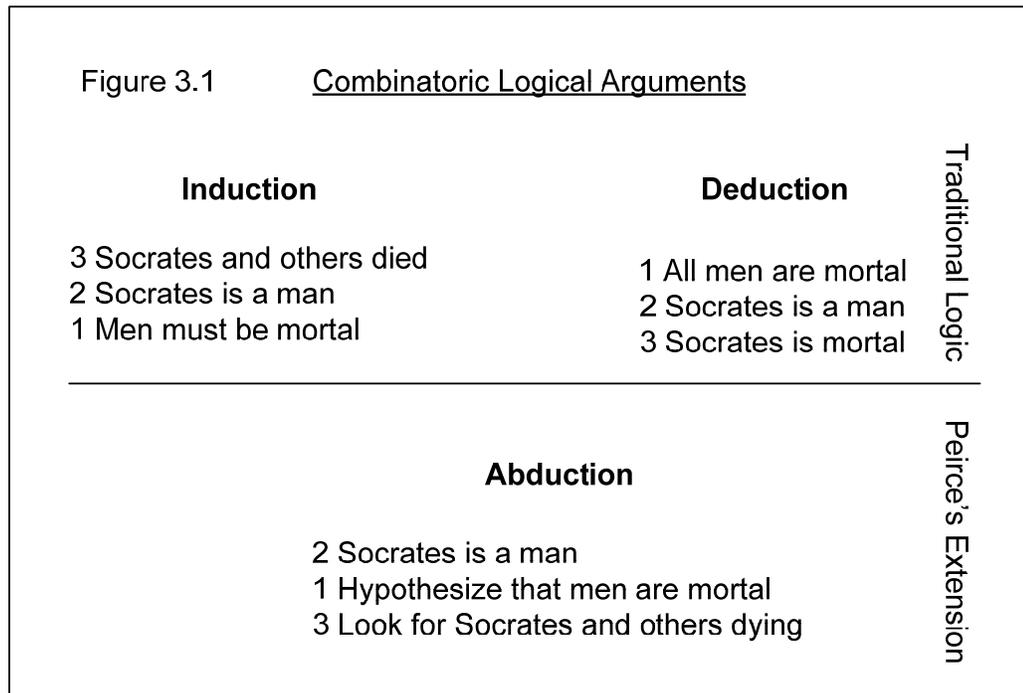


Figure 3.1. Combinatoric Logical Arguments

²³⁰ Spinks, C. W. Peirce and Triadomania: A Walk in the Semiotic Wilderness (Berlin; New York: Mouton de Gruyter, 1992) p. 9.

²³¹ Mullin, Albert A. "C. S. S. Peirce and E. G. A. Husserl on the nature of logic" Notre Dame J. Formal Logic Volume 7, Number 4 (1966), pp. 301-304.

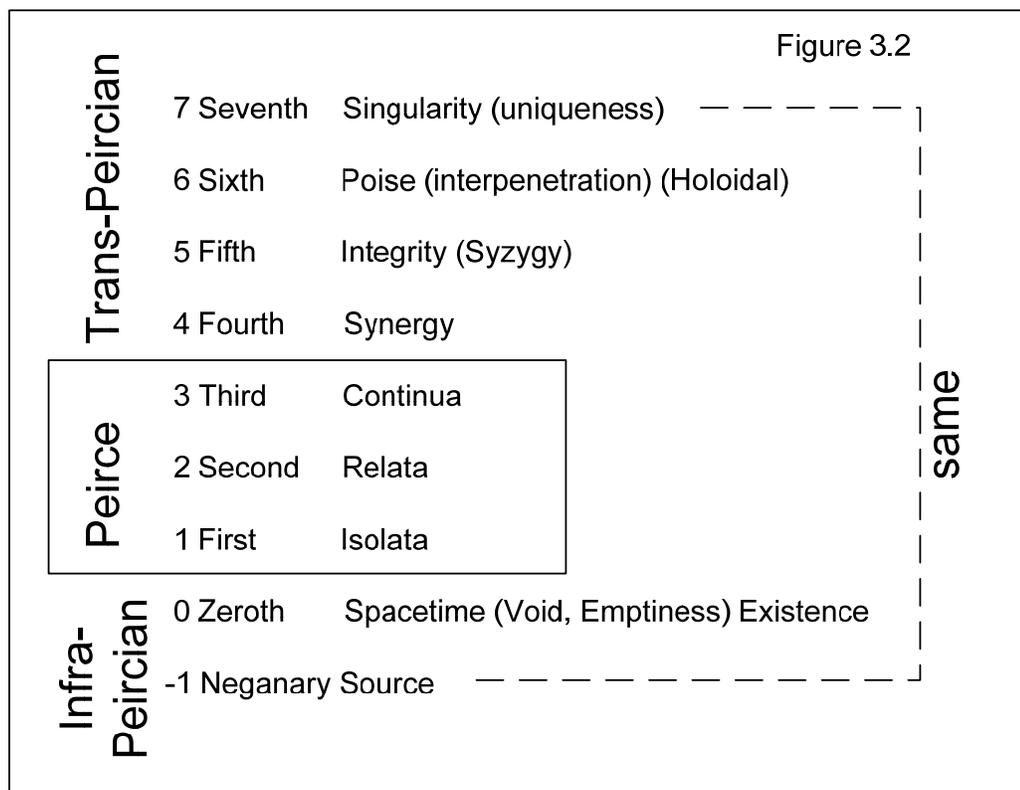


Figure 3.2. Trans-Peircean Categories

It is interesting that there is a parallel between the Peircean categories and the undefined terms in Geometry²³² i.e., the point, line, and surface, which are defined by Euclid²³³, but

²³² Peirce, Charles S. New Elements of Mathematics (Hague: Mouton Publishers, 1976; Berlin: Walter De Gruyter Inc, 1980) Peirce wrote several volumes on mathematics. This four-volume set covers Arithmetic (Vol 1), Algebra and Geometry (Vol 2), Mathematical Miscellanea (Vol 3) and Mathematical Philosophy (Vol 4). See also Kauffman, Louis H. "The Mathematics of Charles Sanders Peirce" Cybernetics & Human Knowing, Vol.8, no.1–2, 2001, pp. 79–110

²³³ Peirce, Charles S. "The Essence of Mathematics" in Newman, James Roy. The World of Mathematics (Mineola, N.Y.: Courier Dover Publications, 2000) p. 1773; See also Peirce, Charles S. "The Non-Euclidian Geometry", in Collected Papers of Charles S. Peirce, vol 8. Ed. Arthur W. Burks (Cambridge, Mass.: Harvard University Press, 1996), p. 72. mentioned in Crowe, Michael J. "Then misconceptions about Mathematics and its History" in Aspray, Wm. and Kitcher, P. History and Philosophy of Modern Mathematics (Minneapolis: U of Minnesota Press, 1988); Notice the quote from Stein, Howard. "Logos, Logic, and Logistike: Some Philosophical Remarks on Nineteenth-Century Transformation of Mathematics", p. 238, "Riemann's wonderful habilitation-lecture beginnings with a characterization of an "n-tuply extended magnitude" in terms that it would not be unreasonable to describe as belonging to "logic": the points of such a manifold are "modes of determination [or "specification"] of a general concept"; examples of concepts wholes modes of specification constitute such a manifold are found both in "ordinary life" places in sensible objects (colors); and within mathematics (e.g., in the theory of analytic function). In the concluding section of that paper, Riemann considers the question of the bearings of his great generalization of geometry upon our understanding of ordinary physical space; this, he says, is an empirical question, and must remain open, subject to what developments may occur in physics itself: "Investigations which, like that conducted here, proceed from general concepts, can serve only to ensure that this work shall not be hindered by a narrowness of concepts, and that progress in the knowledge of the connections of things shall not be hampered by traditional prejudices." If I may paraphrase: Geometry is not an empirical science, or part of physics; it is part of mathematics. The role of a mathematical theory is to explore conceptual possibilities -- to open up the scientific logos in general, in the interest of science in general. One might say, in the language of C.S. Peirce, that mathematics is to serve, according to Riemann, among other interests (e.g., that of facilitating

generally left undefined by later Geometers. But it is this parallel that immediately calls into question Peirce's claim that there is a proof that there is no category beyond the Third²³⁴. Instead, we believe that there are other Philosophical Categories, the next amongst them would be the Fourth, which would be an overdetermined Synergy of a higher dimensional geometrical object that B. Fuller illustrates in Synergetics I & II²³⁵. There, he discusses three-dimensional geometrical objects and their relationships to each other. For B. Fuller, the minimal system is a tetrahedron of events²³⁶. We do not explicitly see *Synergy*²³⁷ as a philosophically emergent category at work until we start looking at higher dimensional minimal solids such as the pentahedron²³⁸, which, with just five points and ten lines, produces five intertwined tetrahedrons that exist in four-dimensional space. Such synergies do not appear in logic, but they show themselves clearly in geometry, especially higher geometries. Thus, the first trans-Peircean category is the 'Fourth' of Synergy. The next that we should consider is the Zeroth, which can stand for Emptiness or Void²³⁹. Firsts must appear from somewhere, and it is fairly clear that they should appear out of void²⁴⁰. If we are considering consciousness, Firsts must appear from spacetime or emptiness²⁴¹. It is also clear that they should arise from some source, and thus there must

calculation), the interest of "abduction" -- of providing the means of formulating hypothesis or theories for the empirical sciences." p. 251-252.

²³⁴ Because beyond surfaces there are whole three-dimensional shapes in Euclid. So, by analogy we would expect further Philosophical Principles corresponding to the higher dimensional minimal figures. His proof says that once you have produced the Third Category then all other higher levels can be created from that. This is an argument from Supervenience. It does not take into account that there are emergent properties that appear and are also basic beyond the Third.

²³⁵ Fuller, Richard Buckminster and Applewhite, E. J. Synergetics: Explorations in the Geometry of Thinking (New York, Macmillan, 1975, 1979, 1983) Two Volumes.

²³⁶ Minimal System in Fuller's Synergetics is the tetrahedron, which minimally defines which is inside and outside within the three dimensional universe. Sections 400.01-403.03, page 95 - 108

²³⁷ An example of Synergy is found in Fuller's Synergetics Vol. 1, Section 255.00, pp. 56-57, "Principle of Design Co-variables" in which the angular change of all the Platonic solids are divisible by 720 so that they can be seen as multiples of the tetrahedron. So, the Octahedron is equal to two tetrahedrons, the Cube is three, the Icosahedron is five and the Dodecahedron is nine. This is an excellent example of the type of Synergy that B. Fuller brings out in relation to three-dimensional solids in his books. We are extending this idea to the higher dimensions beyond three dimensions where the Platonic solids display an even greater degree of synergy.

²³⁸ See http://en.wikipedia.org/wiki/Convex_regular_4-polytope accessed 080531; Sometimes called a Pentachoron See <http://en.wikipedia.org/wiki/Pentachoron> accessed 080531

²³⁹ depending on the context, i.e., whether the zero is considered even or odd. Void is associated with spacetime and is a basic category in Taoism. Emptiness is linked with consciousness and is a basic category in Buddhism.

²⁴⁰ See G. Spencer-Brown's Laws of Form (Portland OR: Cognizer Press, 1994), where a distinction appears on a blank background and that blankness is taken as an element, like the null set. <http://www.lawsofform.org/> accessed 080531. See Kauffman, L. Op. cit. who links the work of Peirce to that of Spencer-Brown in his article on the "Mathematics of C. S. Peirce."

²⁴¹ In other words, there has to be some non-marked blankness out of which the Firsts appear, which has been speculated to be either void or emptiness depending on whether we accept the existence of the physical world or have a completely phenomenological view. But this difference seems to also appear in mathematics where zero can either be even or odd depending whether it appears within the Pascal Triangle or prior to its

be a Neganary²⁴² Category (-1), which is the singularity that serves as the source of the Firsts²⁴³. Beyond the Fourth we would also posit a Fifth, a Sixth, and even a Seventh²⁴⁴. Those further trans-Peircean categories need to be introduced in the appropriate context, but at this moment we are trying to understand how the trans-Peircean philosophical categories can help us understand systems and meta-systems, which are the duals of systems (in terms of phenomenology). *And that can happen as long as we understand that, for Peirce, logic is the ultimate system.* Yet, his view has limitations, which can be seen when we add geometry to logic, i.e., when we produce a complete Model Theory²⁴⁵ in modern terms. Logic traditionally assumes that the Form schema is the basis of everything. Given the constraints of reasoning, logic excels in manipulating forms (as predicates) in a systematic way²⁴⁶. Logic is a system based on axioms²⁴⁷ and geometry is also a system based on axioms²⁴⁸. The two together form a Model²⁴⁹.

appearance. It also appears to be related to physical versus coordinate numbers as in Martinez, Alberto A. Negative Math: How Mathematical Rules Can be Positively Bent (New Jersey: Princeton University Press, 2005).

²⁴² A neologism for the Negative Philosophical Category opposite the First beyond the Zeroth.

²⁴³ Once we have established that there is a Zeroth category there must also be a negative oneth category that is its opposite which we call "Neganary." This is the site of the appearance of the imaginary numbers and thus is a Singularity. The term "neganary" comes from an attempt to define a 'negative one arity operator,' which has no operands associated with it, and thus is a Singularity.

²⁴⁴ One of the interesting points is why is it that there is no Eighth or above. In other words, we use the fact that there is an analogy between the undefined elements of Geometry to attest that there must be Philosophical Categories beyond three, although we do believe there are limits on them. This limit is tied to the fact that there is a relationship between the Philosophical Categories and the Foundational Mathematical Categories. See Emergent Engineering at <http://holonomic.net> by the author. It should be noted that the seven categories are similar to Arthur Young's seven numerical categories, which descend to four and then ascend back to seven in four stages, which he relates to the seven color map on the torus except he gives an ontic rather than an ontological set of categories. See Young, Arthur M. The Geometry of Meaning. (New York: Delacorte Press/S. Lawrence, 1976).

²⁴⁵ A category (like geometry) plus a logic is a model. Chang, Chen Chung, Keisler, H. Jerome Model Theory (Amsterdam; New York: Elsevier North-Holland, 1977); See also Hodges, Wilfrid. A Shorter Model Theory (Cambridge; New York: Cambridge University Press, 1997).

²⁴⁶ Copi, Irving M. Symbolic Logic (New York, Macmillan, 1954).

²⁴⁷ Martin, Norman M. Systems of Logic (Cambridge; New York: Cambridge University Press, 1989); See also Meyer, Burnett. An Introduction to Axiomatic Systems (Boston: Prindle, Weber & Schmidt, 1974).

²⁴⁸ Vaisman, Izu. Foundations of Three-Dimensional Euclidean Geometry (New York: Dekker; 1980); Whitehead, Alfred North The Axioms of Projective Geometry (Cambridge tracts in mathematics and mathematical physics, no. 4. (New York: Hafner Pub. Co, 1960; Cambridge University Press, 1906); Hilbert, David. The Foundations of Geometry (London: K. Paul, Trench, Trübner & Co., 1902; La Salle, Ill: Open Court Pub. Co, 1959).

²⁴⁹ Macintyre, Angus. Connections Between Model Theory and Algebraic and Analytic Geometry (Roma: Aracne, 2000).

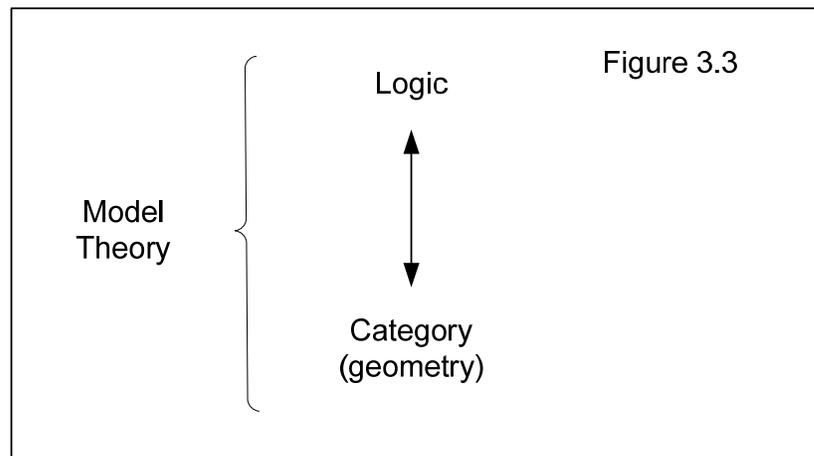


Figure 3.3. Model Theory

Peirce tried to do for Logic what Euclid had done for Geometry, which was to approach logic in a completely systematic way. This was not fully realized until Alexander Grothendieck²⁵⁰ produced Topoi Category²⁵¹, although Peirce had accomplished something similar when he applied combinatorics to Logic by giving all of its combinatorial aspects equal weight and meaning. He also used diagrams²⁵² to produce representations of the logical structures and their transformations. So, for instance, he noticed that the three statements in the syllogism can be permuted three ways, but only two had been given meaning traditionally, so Peirce wondered about the third permutation, and called it *abduction*, and connected it to hypothesis-projection in science. Thus, he came up with an idea at the root of Pragmaticism²⁵³. He posited that science was a fundamental function of reason in everyday life based on abduction, which means the projection of a hypothesis²⁵⁴. In a new way, this recognition of a third logical type of syllogism undercut the arguments of Hume²⁵⁵, and also supported the Kantian picture of reasoning based on projection. Here,

²⁵⁰ <http://en.wikipedia.org/wiki/Grothendieck> accessed 080531

²⁵¹ http://en.wikipedia.org/wiki/Topos_theory accessed 080531. See Goldblatt, Robert. *Topoi: The Categorical Analysis of Logic* (Mineola, N.Y.: Dover Publications, 2006). An elementary topoi is a category like a Set with a sub-element classifier, i.e. something like True/False flag added to each element. A topoi is a general category that covers all first order logics.

²⁵² Roberts, Don D. *The Existential Graphs of Charles S. Peirce*. Approaches to semiotics, 27. (The Hague: Mouton, 1973).

²⁵³ As distinguished from the “Pragmatism” of William James. See <http://en.wikipedia.org/wiki/Pragmaticism> accessed 080531.

²⁵⁴ Induction and Deduction are regressive and Abduction is progressive. This means that Abduction goes beyond the information given while Induction and Deduction do not. That is why abduction was not previously recognized as a logical relation in our tradition. Abduction only makes sense in relation to scientific reasoning that employs hypothesis.

²⁵⁵ Hume basically said that all induction does not prove anything, just because the sun has risen everyday does not mean it will rise tomorrow. Induction is weak and because of that, causality is weak. Kant solved this problem by making space, time, and the categories of the object all into projections that are ‘a priori’. By extending logic to include abduction, Peirce showed that projection was indeed part of Logic all along, and thus substantiated the claims of Kant that there were projections that were ‘a priori’.

in its inner workings, science is seen as based on projection, and this is not only in space and time and the categories, but also in the way that practical reason is applied in science, which is rooted in the syllogism in a way not previously recognized. Peirce went on to use the Philosophical Categories to classify the materials that logic worked with: signs, icons, and symbols. He also gave a three-fold interpretation stating that these elements were used by separating the object and the subjective interpretation from the representations that allowed a recursive definition of the sign within that structure²⁵⁶. This was radically different and a more sophisticated concept based on mediation than the simpler dualistic signifier/signified approach of F. de Saussure²⁵⁷. Peirce continued to develop his logic with an interpretation of the *sign* as it is represented in relation to its object. He perceived the sign in terms of a three-way relationship rather than as a binary one.

In this dissertation we will expand Peirce's concept to a four-way relationship and call that four-way relationship a *design*, which we will name the Quadralectic. If we accept that Logic can be treated as a system, and that it necessarily extends to geometry when we add the singular mass-like spacetime as a category, i.e., as a Zeroth background category²⁵⁸ to the other three, then we can see that with the addition of spacetime, we can allow an overdetermination of elements that will produce the Fourth of synergy. What is missing in Peirce's concept of the sign (as a three-way relationship²⁵⁹) is synergy, *and it is design that expresses this synergy*. Although forms are covered by logic, geometry goes beyond forms and demands that the monads have a substrate. This substrate is spacetime. In the Timaeus Plato calls spacetime the chora, but also referred to his concept of 'spacetime/chora' as the receptacle²⁶⁰. The points in the receptacle of spacetime can be overdetermined, and that overdetermination can lead to a separate category, the fourth of Synergy. The Zeroth and the Fourth categories are mutually intertwined, and cannot be considered completely separate because they imply a duality that exists between them. The Third allows the wholeness of the tetrahedron to appear. Within that wholeness of the minimal three-dimensional solid, which is the minimal regular solid of the space that we inhabit, there are

²⁵⁶ The three fold division of the elements of a signifying act (sign) into the signifying representation (representamen), object, and subjective interpretant. See <http://www.helsinki.fi/science/commens/> accessed 080531 where these terms may be looked up.

²⁵⁷ There is no indication that Peirce knew of the younger F. de Saussure's work in Linguistics, although he was aware of his family.

²⁵⁸ In early writings Peirce contemplated having another category he called Ground, but this was dropped in later writings. Cf. Mladenov. I.

²⁵⁹ Which we can now think of in terms of 'trinality', which is a three way complementarity that exists at the core of the octonion.

²⁶⁰ Plato. Timaeus 52a-53a.

four points and six lines and four faces that are triangular²⁶¹ and, according to B. Fuller, this is what makes up the whole minimal system. The triangles are two-dimensional forms as bounded shapes. The tetrahedron, as a *whole*, is a form that is three-dimensional in shape. The tetrahedron, as a *form*, is dependent on connecting the Firsts (isolata), which appear as the points where the lines converge through the Seconds (relata). Lines can form boundaries and thus determine the mass of dimensionless points within the minimal solid's shape whether it is two or three-dimensional. Points are dimensionless, and thus they are like the null element, which is the basis of Set theory. These dimensionless points must be marked in order to be distinguished from the mass of points in spacetime. Those marked dimensionless points are complemented by a negative point that they cancel with, rather than merely being a Zeroth point. The negative point serves as the marker for the dimensionless points that are Firsts, although there is some speculation that there must be at least a 'negative-one' dimension for geometry to exist²⁶². In other words, the dimensionless point has to be *placed* somewhere, and so the negative dimension must exist. The marked and unmarked points must be distinguished somehow, and the negative dimension can be a means of that marking, as well as a place for the superimposition of points. So, between placement and marking and superimposition, a negative dimension is needed to distinguish the two types of points, which are the marked and unmarked, or the intersecting zero dimensional points, or the superimposed points. Where a negative dimensional, or *Negany point*, cancels with a First point, there is a marked point that can *carry* the difference that *makes* a difference²⁶³ between the figure and the background of the geometrical object. The tetrahedral figure is different from the Zeroth of dimensionless points that makes up the space surrounding a figure. The Tetrahedron has wholeness and is synthetic, but the Pentahedron²⁶⁴ in four-dimensional space is synergistic, and that introduces the Fourth Philosophical Category, although, when we look at the Platonic

²⁶¹ With a lattice 1-4-6-4-1.

²⁶² Mandelbrot, Benoit and Frame, Michael. "A Primer of Negative Test Dimensions and Degrees of Emptiness of Latent Sets" February 27, 2007. See http://www.math.yale.edu/mandelbrot/web_pdfs/emptiness_of_latent_sets.pdf accessed 080531. Following Mandelbrot and his idea of co-dimensions, we can see that two two-dimensional planes cross in a one-dimensional line. Two lines cross in a zero-dimensional point, so two points must therefore cross in a negative dimensional nexus. Following this logic it is clear that there must be at least a negative one-dimensional substrate for geometry. Otherwise there would be no super-imposition possible, which Euclid uses without comment. This has always been doubtful in geometry and later geometers tried to eliminate it. This negative dimensional nexus is a sub-strata where two points can be superimposed on each other. See also Mandelbrot, Benoit B. "Selected Topics in Mathematics, Physics, and Finance Originating in Fractal Geometry" Ed. Novak, Miroslav Michal. Thinking in Patterns: Fractals and Related Phenomena in Nature (River Edge, N.J.: World Scientific, 2004) Section 3.4, p. 12 of pp. 1-35.

²⁶³ Cf. G. Bateson Steps to an Ecology of the Mind.

²⁶⁴ Op. cit. also called 'pentachoron' see <http://en.wikipedia.org/wiki/Pentachoron> accessed 080531.

solids of three-dimensional space, we do see *some* synergies between them and B. Fuller discusses this in his books on Synergetics²⁶⁵. Fuller primarily examines the various synergies between Platonic and Archimedean solids. However, when we move to the fourth dimension²⁶⁶, this synergy described by B. Fuller intensifies greatly.

Systems, as configurations, are synthetic like the tetrahedron in Fuller's minimal system. But, it is possible that there is a more complete 'Systemhood', which is synergetic as well as synthetic. 'Formhood' only needs wholeness and does not need synergy. But Formhood can minimally exist by producing a mere outline based on relata acting as the boundaries for a shape, such as the minimal shape of the triangle, or a set of triangles formed into a solid. If we look at form as being merely the network of relata, then we do not need synergy to explain its shape beyond that network. But as we move from two-dimensional, to three-dimensional, to four-dimensional shapes, the concept of synergy becomes more and more necessary for explaining the overdetermination of elements within the network of relata that takes us beyond a mere continua in our explanation of four-dimensional form. Synergy actually transforms the continua in four-dimensional space by causing the forms to interpenetrate.

Once we understand that there are two modes of a form and two modes of a system, or, in other words, if we could state that there is a *two-dimensional outlined shape* and a *three-dimensional configuration of the form* as bounding relata, then there is a *three-dimensional continuity of the tetrahedron (as a whole)*, as well as a *four-dimensional synergy in the overdetermination of the points, lines, and faces that you see in an interpenetrating pentahedron in four-dimensional space*. Synergy also shows up in the relationships between the different three-dimensional Platonic solids, which is more complex and difficult to show. However it exists in the icosahedrons with their golden sections, and Fibonacci sequence relationships, or in the sharing of the group A_5 ²⁶⁷ between the icosadodecahedron and the penta-hedron.

We could likewise make the argument that there are two versions of pattern. One version would be one-dimensional and made up of patterns of Firsts on lines, and another could be two-dimensional and made up of crossing lines on a surface. The degenerate type of pattern relates Firsts to a relata, and the more robust pattern relates relata to each other.

²⁶⁵ http://en.wikipedia.org/wiki/Platonic_solids accessed 080531.

²⁶⁶ Manning, Henry Parker. *Geometry of Four Dimensions* (New York: Macmillan, 1914).

²⁶⁷ Alternating Group with five elements. <http://brauer.maths.qmul.ac.uk/Atlas/v3/alt/A5/> accessed 080531.

Monads can be either firsts or Zeroths. Facets can be either zeroths or neganary.²⁶⁸ *What we are seeing here is that the schemas are related to the philosophical categories, which are, in turn, related to dimensionality and figures inscribed into dimensions.* This brings us to the S-Prime²⁶⁹ theory of General Schemas Theory, which states that there are at least two dimensions to a schema and two schemas to a dimension. Here we see that the Philosophical Categories are directly related to the Schemas, and so we can build our picture of the schemas one by one, by extending this conceptualization into the various Philosophical Categories, which, at the same time, will extend the geometrical minimal solids and their dimensions. For Peirce the Philosophical Categories were the minimal categories that he needed for constructing a system of logic, and we can see that it is naturally extended by the zeroth and the fourth categories as we extend logic into the realm of geometry by the addition of spacetime as a fundamental Zeroth projection. The Neganary is the needed sub-space or substrate that provides the possibility of continuity among Zeroth points.

Minimal System of Forms

But this is not all, because we now recognize that the tetrahedron, as a minimal system, is not the only geometrical object that can fulfill that role. Instead, we find that there are, in fact, four separate geometrical figures that can fulfill that role, because there are four geometrical figures with 720 degrees of angular change embodied within them²⁷⁰. Seven hundred and twenty (720) degrees of angular change is what is needed in order to stay standing still in spacetime²⁷¹. So, when we add spacetime²⁷² as the zeroth philosophical principle, we may refer to Relativity Theory, which gives us a basis for conceptualizing

²⁶⁸ Euclid did not define the point, line, or surface and thus we can substitute into the structure of Euclid the Philosophical Categories and deduce their relations as if they were these undefined elements of Euclid's geometry. However, Euclid did not look deep enough into his assumptions to see that *Neganary*, negative dimensional nexus, elements were necessary to support the superstructure of geometry. He merely assumes he can do superpositions without asking what substrate allows that to occur. See also Adams, Ernest W. and Suppes, Patrick (FRW). Surfaces and Superposition (Stanford, Calif.: CSLI Publications, 2001).

²⁶⁹ S-prime theory concerns the hypothesis by the author that there are at least two dimensions per schema or two schemas per dimension. Also we hypothesize that there are ten schemas from facet to pluriverse covering scales from -1 to 9. This is one of a series of hypotheses developed in the various working papers done as part of this research project. Two other hypotheses were developed called *S-double prime* that assumes three dimensions per schema, and *S-triple prime* that assumes five dimensions per schema. These hypotheses were developed in order to show the viability of General Schemas Theory as a way of approaching the question of how spacetime templates of pre-understanding are projected within our culture, which is a basis for all design activities.

²⁷⁰ Op. cit. Fuller, B. Synergetics I, pp. 52-54.

²⁷¹ Schumm, Bruce A. Deep Down Things: The Breathtaking Beauty of Particle Physics (Baltimore, Md.: J. Hopkins U. Press, 2004) pp.161-167 on Group SU(2) See also Harland, David M. The Big Bang: A View from the 21st Century (London; New York; Chichester, UK: Springer, 2003) p. 43 on spinor field.

²⁷² Wheeler, Edwin F. & Taylor, John Archibald. Spacetime Physics (San Francisco: W. H. Freeman & Co., 1966).

spacetime, thus, we may conclude that things standing still in spacetime must be spinors²⁷³. The four three-dimensional geometrical objects that comprise the equivalent of 720 degrees of angular change are the tetrahedron, the mobius strip²⁷⁴, the knot²⁷⁵ and the torus²⁷⁶. (See Figure 3.4.) Thus, there are *four* different views of the minimal system²⁷⁷ coming from geometry/topology. These four objects represent different fundamental features of the minimal system as a whole. But in order to realize the similarity between them we must ascend to an additional philosophical category: to the Fifth. The Fifth philosophical category is integral²⁷⁸, and represents Mathematical Category Theory²⁷⁹. This allows us to have a functor²⁸⁰ between objects of different mathematical categories²⁸¹ and the tetrahedron, mobius strip, knot and torus are examples of these objects. It is by a functor that we can recognize that these four embodiments of the 720 degrees of angular change are all different images of the same thing – *embodied stability in spacetime*. We have already seen that one picture of the system is the configuration of different things, but another is the dynamism of that configuration, and here the dynamism of the spinor is translated into a geometrical/topological²⁸² form. Interestingly, the pentahedron of four-dimensional space adds only one point and four lines to the three-dimensional minimal solid tetrahedron to push it into the fourth dimension. Similarly, the torus has a four-dimensional analogy called the hypertorus²⁸³ (3-torus)²⁸⁴, which is a super-torus composed

²⁷³ Benn, Ian M. and Tucker, Robin, [An Introduction to Spinors and Geometry with Applications in Physics](#) (Bristol; Philadelphia: A. Hilger, 1987); See also <http://en.wikipedia.org/wiki/Spinor> accessed 080531.

²⁷⁴ See also Pickover, Clifford A. [The Mobius Strip: Dr. August Mobius's Marvelous Band in Mathematics, Games, Literature, Art, Technology, and Cosmology](#) (New York: Thunder's Mouth Press, 2006); See also http://en.wikipedia.org/wiki/M%C3%B6bius_strip accessed 080531.

²⁷⁵ Adams, Colin Conrad. [The Knot Book: An Elementary Introduction to the Mathematical Theory of Knots](#) (New York: W.H. Freeman, 1994. AMS Bookstore, 2004); See also http://en.wikipedia.org/wiki/Knot_theory accessed 080531.

²⁷⁶ <http://en.wikipedia.org/wiki/Torus> accessed 080531.

²⁷⁷ I do not believe that B. Fuller realized this. However, I am sure that my realization of it was a direct inspiration from reading [Synergetics](#) and his treatment of the importance of the 720 degrees of angular change.

²⁷⁸ B. Fuller mentions the Integral but treats it as lower than the Synergetic. We believe that the Integral is a higher category than the Synergetic. See Section 1056.00, "Hierarchy of Generalizations" p. 692. We call this level Syzygy, which is an alignment between moments.

²⁷⁹ Arbib, Michael A. and Manes, Ernest G. [Arrows, Structures, and Functors: The Categorical Imperative](#) (New York: Academic Press, 1975); See also Lawvere, F. W. and Schanuel, Stephen Hoel. [Conceptual Mathematics: A First Introduction to Categories](#) (Cambridge, U.K.; New York, NY, USA: Cambridge University Press, 1997).

²⁸⁰ <http://en.wikipedia.org/wiki/Functor> accessed 080531.

²⁸¹ http://en.wikipedia.org/wiki/Category_theory accessed 080531.

²⁸² <http://en.wikipedia.org/wiki/Topology> accessed 080531.

²⁸³ I have used the term 'hyper-Kleinian bottle' previously. In those papers I meant the composition of Kleinian bottles along their lines of self-intersection using the figure eight form of the Kleinian bottle. In the "Reflexive Autopoietic Dissipative Special Systems" paper I discuss this model on page 115 and offer an argument based on the idea that the hypersphere of the universe and the torus (with a infinitely small hole) are the same size. This notion was developed by A. Young in the [Reflexive Universe](#). Op. cit. I use that argument to explore what I call the sphere of ambiguity where the two circles of self-intersection overlap in

of tori. The 3-torus is from a different space²⁸⁵ than the hypersphere (3-sphere)²⁸⁶, but the hypersphere foliates into toroidal shapes under certain conditions²⁸⁷. So, there is a relationship between the torus, the hypersphere, and the hypertorus.. Thus, in these two cases there is a direct extension into the fourth dimension where synergy is exponential for the figures that are being cited here. In the case of the mobius strip, the extension is to the Kleinian bottle, which, in four-dimensional space, does not have to pass through itself. For knots, it is in four-dimensional space that knots untie and fall apart effortlessly. *So, in each case there is an extension of the minimal system from three-dimensional space into a realm of four-dimensional synergy.* (See Figure 3.5.) Note also that the knots are one-dimensional within three-space²⁸⁸, the mobius strip is two-dimensional in three-space, but the torus and tetrahedron are full three-dimensional solids.

four-dimensional space. However, Kleinian bottles do not self-intersect in four-space. On page 198 I call this sphere of ambiguity between the two Kleinian bottle circles in four-space a 'hyper-torus'. I refer to the hyper-torus as the nesting of tori that appear in the hypersphere. This idea is different from the 3-torus as 3-manifold, except for the fact that the rotation of the identified opposite sides of the cube can generate Kleinian bottles. In fact, there are six such Kleinian bottles. In that paper the use of the term hyper-torus in a more notional in manner, while the use here is more in line with mathematical usage related to the structure of 3-manifolds in four-dimensional space. See Cervone D P, "Vertex-minimal simplicial immersions of the Klein bottle in three space", *Geo. Dedicata* 50 (1994) 117–141

²⁸⁴ animation: <http://www.lboro.ac.uk/departments/ma/gallery/hyper/torus.html> video:

<http://www.youtube.com/watch?v=i5MRtkKVZ5c&feature=related> See also

<http://streaming.stat.iastate.edu/~dicook/geometric-data/mobius/torus/> all accessed 091101 See also "The Poincare's conjecture and the shape of the universe" by Pascal Lambrechts at

<http://www.wellesley.edu/Math/pdffiles.d/lambrechts-colloq.pdf> accessed 091101 See also Lins, Sóstenes. *Gems, Computers, and Attractors for 3-Manifolds*. (Singapore: World Scientific, 1995) p. 204, Figure 170.

²⁸⁵ It is cubic in three dimensions but appears all 3-space filling.

²⁸⁶ video: <http://www.youtube.com/watch?v=5BF-ygCbmd8&feature=related> See also

<http://web.meson.org/hypersphere/> accessed 091101

²⁸⁷ videos: "Dimensions - 7: Fibration [Pt. 1] 1/2" <http://www.youtube.com/watch?v=fPKHkpvMfhk>

"Dimensions - 7: Fibration [Pt. 1] 2/2" http://www.youtube.com/watch?v=tBXb7CD_ZHU both accessed 091101

²⁸⁸ 'three-space' is just shorthand for 'three-dimensional space', also called '3d' space

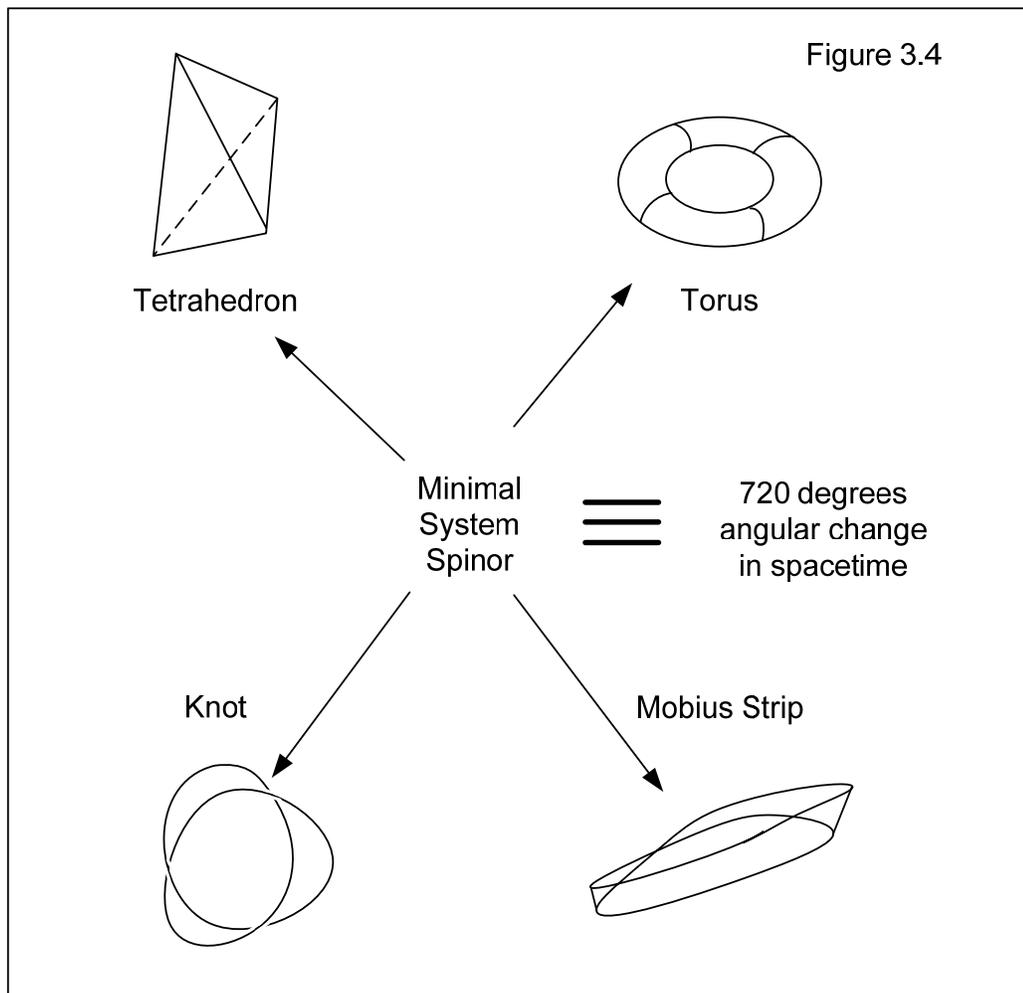


Figure 3.4. Minimal System Forms

We can relate these minimal system representations²⁸⁹ to the sub-schemas of the Form. The sub-schemas of the Form are the Picture, the Plan, the Model, and the Whole Form as a Construct. The picture is two-dimensional, the model is three-dimensional (but not a full form), and the plan is made up of two-dimensional slices of the model. The full form Construct is analogous to the torus, and the model is analogous to the tetrahedron. The analogy to the picture is the mobius strip, and the analogy to the plan is the knot. (See Figure 3.6.) The reason for this is that the Whole Form Construct connects indirectly to the super-synthesis of the hypersphere, as does the torus via the toroidal foliations of the hypersphere²⁹⁰. It can also connect directly to the more complex hypertorus, but that is a

²⁸⁹ These are representations of the minimal system that are actually conceptual. This is on the analogy of group representations. http://en.wikipedia.org/wiki/Group_representations accessed 080531.

²⁹⁰ <http://www.mathaware.org/mam/00/master/essays/SciAm/SA03.html> see also <http://www.fortunecity.com/emachines/e11/86/tourist4c.html> see also <http://www.youtube.com/watch?v=27af6000k9I>

singularity²⁹¹, which is not a synthesis.. The tetrahedron is a simpler topological object that is homeomorphic²⁹² to the sphere. The sphere is an undifferentiated object, and from a topological point of view, differentiation comes from adding toroidal handles²⁹³ to spheres or by having toroidal shapes with n-holes. In other words, topological differentiation comes from adding toroidal handles or otherwise differentiating the sphere, and that is why we connect the torus to the Whole Form Construct and not the sphere. We are assuming that the Whole Form Construct is more than merely homeomorphic to the sphere, i.e., it has an excess of differentiation. But the sphere is only one fourth of the hypersphere²⁹⁴. *The hypersphere is four spheres fused together in four-dimensional space*²⁹⁵. That is one sphere in each three-dimensional subspace of four-dimensional space. However, as we rotate the axes in four-dimensional space we see different spherical representations of the more complex synthetic figure. One representation is a sphere that turns inside out as it is rotated along the fourth dimensional axis²⁹⁶. So, the sphere is only a fourth of the hypersphere, while the torus surface $(4 \pi^2 r R)^{297}$ corresponds to a discrete modulo²⁹⁸ of the surface $(4 \pi^2 r^3)$ of the hypersphere²⁹⁹ in four-dimensional space. The torus also maps to the foliations of the hypersphere, so there is a direct analog of the torus embedded in the hypersphere³⁰⁰. The mobius strip is two-dimensional locally, like the picture, and the knot is one-dimensional locally, and produces an interference pattern with itself and thus demonstrates its own self-organization, an organization against itself.

<http://www.youtube.com/watch?v=BqfwPOvb7KA&feature=PlayList&p=74F7627597489BA4&index=12>
all accessed 091101

²⁹¹ It is a singularity because the series of the tori breakdown at the 3-torus which is a cubic projection on three-space of infinite extent.

²⁹² See <http://en.wikipedia.org/wiki/Homeomorphic> accessed 080531.

²⁹³ <http://mathworld.wolfram.com/TripleTorus.html> accessed 091101

²⁹⁴ There is a three sphere in each three dimensional space within four dimensional space that are projections of the hypersphere.

²⁹⁵ <http://www.youtube.com/watch?v=5BF-ygCbmD8&feature=related> accessed 091101

²⁹⁶ Pickover, Clifford A. *Surfing Through Hyperspace: Understanding Higher Universes in Six Easy Lessons*. (New York: Oxford Univ. Press, 1999) p. 86.

²⁹⁷ <http://en.wikipedia.org/wiki/Torus> accessed 091101

²⁹⁸ When Pi is squared, the radii are orthogonal in the torus. This means that there are not only two independent circles (S1) in the torus $(4 \pi r R)$ but that the radii are also orthogonal. Also in the hypersphere there are two independent circles $(4 \pi (r^2 * r))$. but the radii are not orthogonal and there is a third radii that is another power of the single radii. The hypersphere (S3) topologically is an addition of the circle (S1) and the sphere (S2). Our point is that there is a rational mapping between the torus and hypersphere (by the orthogonality or unity of the radii and the addition of another power to the unified radii) as well as between the sphere and hypersphere, which we can call the modulo by which the hypersphere super-synthesis is deconstructed to produce both the simplest undifferentiated form (the sphere), and the differentiated form (the torus), which we can identify with the Whole Form Construct. see

http://en.wikipedia.org/wiki/Modular_arithmetic see also [http://en.wikipedia.org/wiki/Modulo_\(jargon\)](http://en.wikipedia.org/wiki/Modulo_(jargon)) both accessed 091101

²⁹⁹ <http://thinkzone.wlonk.com/MathFun/Dimens.htm> accessed 091101

³⁰⁰ http://en.wikipedia.org/wiki/Clifford_torus accessed 091101

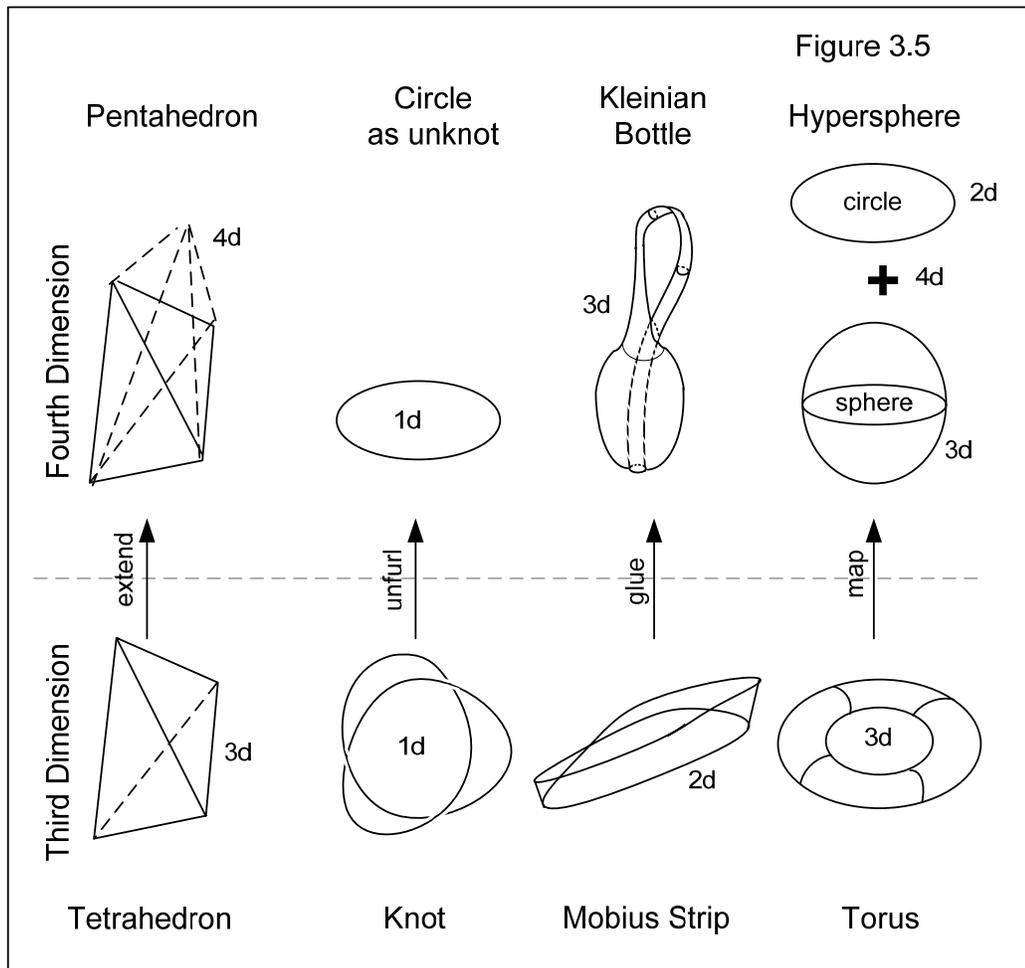


Figure 3.5. Three to Four-dimensional Mapping of Minimal System Forms

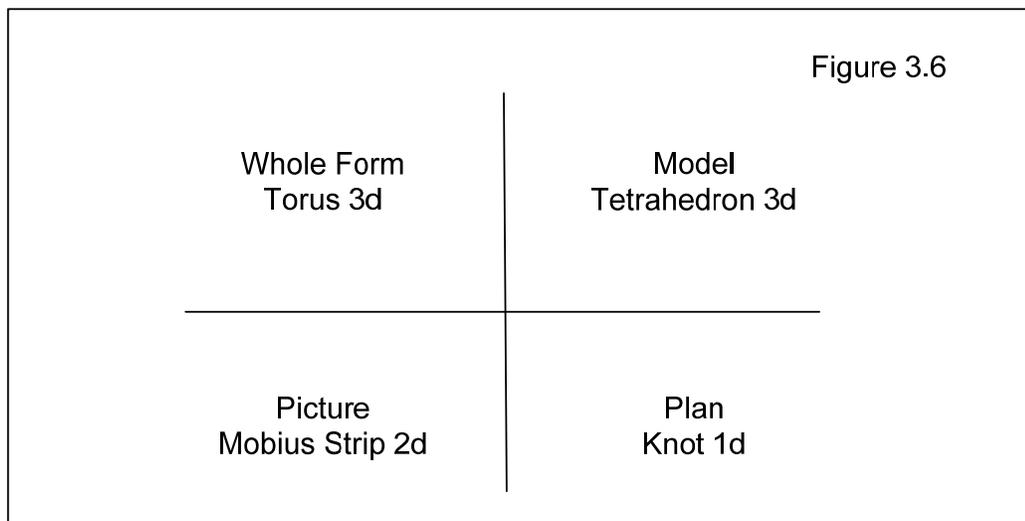


Figure 3.6. Sub-schemas and Geometrical Images of the Minimal System

When we look at these four different forms we realize that together they make a minimal system of differences and that this minimal system is held together by its functor that expresses stability in spacetime³⁰¹. And, as we see this in the connection between the lower and higher forms of the minimal system, we have features of configuration and synergetic dynamism. This configuration is a set of the different elements in their minimal system configuration that appear as articulations of the points of the tetrahedron of the minimal system. The various elements are ‘Firsts’ (isolata) in their differences, and ‘Seconds’ (relata), in their relationships with each other. The continuity they share is the continuity of the 720 degrees of angular change. The synergy they share as Thirds is their connection to the fourth dimension in each case. The Fifth, as an expression of the meta-system, is the functor that relates these very different kinds of objects to each other in spite of the fact that they are from different mathematical categories. Each of the objects is an independent shape that exhibits a whole synthesis. This pushes the minimal system into a conceptual realm that makes it distinct from its various different representations. It is strange to see that the hypertorus (3-torus) is related to these representations of the minimal system. The hypersphere has four different representations that are directly comparable to the various minimal system representations. The hypertorus appears as a three-dimensional super-torus, which is a torus composed of tori³⁰². The hypertorus has a representation, which is a cube where the opposite sides are identified, and by rotating those identified sides one can produce a Kleinian bottle³⁰³. The hypertorus has a representation that is three interlinked interfering circles³⁰⁴, which is similar to the knot but composed of different links intertwined. The hypertorus has a topological composition related to the 1-3-3-1 lattice³⁰⁵ of the triangle in which various zero through 3 cells are combined to make up the topology of the hypertorus and this is related to the differentiation of Pascal’s triangle. In effect, the hypertorus is a bridge between the third and the fourth dimensions, which integrates the

³⁰¹ Going beyond these, we can see the Fifth is an expression of the Meta-system and is higher than systemic synergy.

³⁰² <http://www.dr-mikes-maths.com/4d-torus.html#pictures> accessed 091101 See also Oliver, David A. *The Shaggy Steed of Physics: Mathematical Beauty in the Physical World*. (New York: Springer, 2004) p. 71.

³⁰³ Levin, Janna "Topology and the Cosmic Microwave Background" at <http://arxiv.org/abs/gr-qc/0108043> August 20 2001. Section 3.2.2 Flat three-dimensional manifolds p. 26 lists ten flat 3-manifolds which includes 3-torus and Kleinian Bottles. See Also Luminet1, Jean-Pierre And Roukema, Boudewijn F. "Topology of the Universe: Theory and Observation" section 3.3.2. Euclidean Space Forms p.13-14 at http://arxiv1.library.cornell.edu/ps_cache/astro-ph/pdf/9901/9901364v3.pdf both accessed 091101 See also Borel, Armand. *Intersection Cohomology*. Modern Birkhäuser Classics. (Cambridge, MA: Birkhäuser Boston, 2008) p. 39.

³⁰⁴ Gompf, Robert E., and András Stipsicz. *4-Manifolds and Kirby Calculus*. Graduate Studies in Mathematics, v. 20. (Providence, RI: American Mathematical Society, 1999) p. 159.

³⁰⁵ Gracia Bondía, José, Joseph C. Várilly, and Héctor Figueroa. *Elements of Noncommutative Geometry*. (Boston: Birkhäuser, 2001) p. 539.

minimal system forms by taking them toward a higher synthesis in the four-dimensional space that is represented by the hypersphere. Oddly, the hypertorus itself is unstable and is, in fact, one of the stages in the evolution of chaos. As 'toroidal chaotic cycles' move even closer to chaos they produce 'hypertorus cycles' in their evolution toward complete chaos as n-torus cycles³⁰⁶. The torus of tori is three-dimensional, but can only be a single surface in the fourth dimension. However, that surface is infinite. The cube of identified sides needs the fourth dimension to create that singular space where we can look out from windows that project that same space onto a three-dimensional universe where the repetition of the representations within the hypertorus cube occurs. Notice that repetition, representation, projection, and mimesis are all connected in the hypertorus cube with identified sides. This suggests that the singular space of the hypertorus as 3-manifold is the space of schematization, and also the space of sign production as a function of the logos³⁰⁷. This is the infinite surface in the fourth dimension that connected interlinked circles must fold through in order to remain coherent. Thus, the hypertorus appears as a bridge to the fourth dimension, which brings the four minimal system representations together although it does not provide a super-synthesis (of these representations), but merely a strange kind of additive connective tissue that allows them to transition into their four-dimensional counterparts. What is being demonstrated here is how the various independent shapes in the third dimension relate to the fourth dimension where the System appears and interfaces with the Meta-system. The hypertorus stands as a mediation between the System and Meta-system in this sense. And interestingly, the hypertorus has an inherent triality that appears as the intersection of the spaces of three tori that mimics three-space. In a sense, it is an embodied triality, which we experience as projected three-dimensional space. The hypertorus is another representation of the trichotomy that is the basis of the mediation of the sign. However, it is a representation that allows us to enter the topological space within the trichotomy³⁰⁸.

³⁰⁶ Kaneko, Kunihiko. Collapse of Tori and Genesis of Chaos in Dissipative Systems. (Singapore: World Scientific, 1986).

³⁰⁷ This will later be called the "theater of the mind" in a phrase used by David Grove and that appears in the work of Francis Yates as Renaissance mnemonic theaters on The Art of Memory. Op. cit.

³⁰⁸ This is similar to the way that the Icosaheptahedron, which is a cubic matrix, allows us to enter the space of reason and holoïdal interpenetration. However, interpenetration is based on mirrors not windows. It is not mere repetition of representations projected onto three-space but is self-reflection via the mediation of the other. One only looks outward, while the other looks inward via the outward. The 3-manifolds in four-space are split between the projection coverings of three-space like the 3-torus (with a half-turn, quarter turn, third-turn or sixth-turn of the projected space in its reflection outward) and the various relationships between Kleinian bottles that can be created by turning the identified opposite faces of the compact 3-torus cube (plain, swap cross-cap, invert cross-cap, swap and invert cross cap). There is one special 3-manifold that is unique and does not fit this pattern. It is called the Hantzsche-Wendt manifold. The Kleinian bottle is

Meta-systems are four and five-dimensional. So, the functors are the Fifth Philosophical Principle, while the four-dimensional aspect is found in the unique relationship of each figure to its fourth dimensional extension. The system of objects from different categories fits into the fourth dimension in different ways depending on their differences. For example, one-dimensional knots (and even separate links of the hypertorus) untie in the fourth dimension, while there are two-dimensional knots that tie in the fourth dimension. Mobius strips glue together to create Kleinian bottles but they do not self-intersect in the fourth dimension. Kleinian bottles are created by rotating one of the identified sides of the hypertorus. Tori have the modulo surfaces of hyperspheres, but hyperspheres have foliations that are toroidal, thus there is a connection between tori and hyperspheres, which represent a super-synthesis of the Whole Form Construct as a synthesis of a complex differentiated object in three-dimensional space. The sphere is always the simplest unified object. But the Constructed Whole Form is not just a mass, but is a differentiated object, and thus related to the torus. This super-synthesis is simpler than the extension of the torus into the hypertorus. The extension into the hypertorus assumes the connection to four-dimensional space, but the super-synthesis of the hypersphere allows for a simplification and unification rather than the mere multiplication of circles in the hypertorus. The hypersphere is a topological addition of the sphere and circle (that are also ultimately three circles), which has synthetic unity rather than a topological multiplication of three circles... Spheres are the three-spaces where tetrahedrons are articulated, and hyperspheres are the four-spaces where pentahedrons are articulated. Tetrahedrons need only be extended by one point to be the next higher dimensional minimal solid in the fourth dimension, which is the pentahedron. All minimal solids have the number of their dimension plus one as the number of points within them. It is interesting that the hypertorus is the bridge between the third and fourth dimensions for the minimal system representations. It is at a prior lower stage in the Pascal Triangle 1-3-3-1 than the tetrahedron 1-4-6-4-1 and it appears as a

described as a model of the Autopoietic Special System in the author's book, Reflexive Autopoietic Dissipative Special Systems Theory at http://works.bepress.com/kent_palmer. Thus, it appears that there are two fundamental ways of looking at four-dimensional space: one in terms of the projection of three-space outward from compact spaces that are infinite and the other, which is related intrinsically to the nondual structure of four-space via the variations on the Kleinian bottle. There is a third way to look at it but this is as a nil manifold, which embodies the nondual Emptiness or Void of four-dimensional space. See The Levin, Janna "Topology and the Cosmic Microwave Background" at <http://arxiv.org/abs/gr-qc/0108043> August 20 2001. Section 3.2.2 Flat three-dimensional manifolds p. 26 See also Conway, J. H. and J. P. Rossetti "Describing the Platycosms" <http://arxiv.org/abs/math/0311476v1> Hantzsche-Wendt manifold = didicosm (c22)] See also Miatello, R. J. and R. A. Podestá and J. P. Rossetti. " $Z^k(2)$ Manifolds are isospectral on forms" *Mathematische Zeitschrift* Volume 258, Issue 2, pp. 301-317, Figure 4 p.312 for graph. <http://www.springerlink.com/content/m3h38m5783nh667j>; See also Szczepański, A. "Properties of generalized Hantzsche–Wendt groups" *Journal of Group Theory*. Volume 12, Issue 5, Pages 761–769, ISSN 1435-4446, ISSN DOI: 10.1515/JGT.2009.010, /September/2009

bridge to the fourth dimension where the pentahedron 1-5-10-10-5-1 appears. This means that although the topology of three-space (third dimension) is within the four-space (fourth dimension) that the hypertorus represents, it is actually simpler than the tetrahedron. Its representational shape is more complex than the super-synthesis of the hypersphere, which is the minimal shape within the fourth dimension. The bridge that connects the dimensions does not serve as a super-synthesis because it is topologically unstable. It produces chaotic dynamics and very complex surfaces as the various sides of the compact cubic space are twisted and rotated. This process reveals their identification and creates various three-manifolds³⁰⁹. The surface of the hypertorus is infinite and thus it does not have a bounded form. So, the formula $8\pi^3 r R$, which we would extrapolate from the formula for the surface area of the torus, would be three independent circles interconnected in a toroidal fashion. This formula produces a cube of length two, the diagonals of which are irrational square roots of two. This means that the space within the cube of the hypertorus is extremely unstable (due to its irrationality), which is the opposite of the embodiment of stability in the spacetime of minimal system representations.

³⁰⁹ There are ten of these 3-manifolds in four-space. Five are projections like the 3-manifold and 4 are variations on the Kleinian Bottle. One is unique in that it is a nil manifold which is oriented but is wholly an interface between other manifolds. It is called the Hantzsche-Wendt manifold. Many such manifolds (1171 to be exact 22 of which are orientable) are produced by the gluing of the faces of the 24 cell polytope. Thus this singular nil manifold has a special relation to the unique 24 cell polytope of four-space. See Daverman, Robert J., and R. B. Sher. Handbook of Geometric Topology. (Amsterdam: Elsevier, 2002) p. 907. See also "The sixth manifold, the famous Hantzsche-Wendt manifold, is the most interesting of all. Unlike the preceding five manifolds, which we defined by constructing fundamental domains, the most natural way to define the Hantzsche-Wendt manifold is to start in the universal cover and define its group of covering transformations. Specifically, its group of covering transformations is the group generated by screw motions about a set of orthogonal but nonintersecting axes (indicated by heavy lines in fig. 24). Each screw motion consists of a half turn about an axis composed with a unit translation along that axis. Note that this group of covering transformations does not take a basic cube to all other cubes in the cubical tiling of 3-space. Rather, the images of a basic cube fill only half the cubes in the tiling, checkerboard style. Thus a complete fundamental domain would consist of two cubes, the basic cube and any one of its immediate neighbors; images of the basic cube would fill the black cubes in the 3-dimensional checkerboard, while images of its neighbor would fill the remaining white cubes. But we would really prefer a fundamental domain consisting of a single polyhedron. To get one we employ the balloon construction for a Dirichlet domain introduced in Section N.1.2. Let the Dirichlet domain's basepoint be the center of a basic cube. As the balloon expands it fills that basic cell entirely, and also fills one sixth of each of its six immediate neighbors. The resulting Dirichlet domain is a rhombic dodecahedron (fig. 26). The face gluings are given by the original screw motions along the axes. Note that this construction of the Hantzsche-Wendt manifold corrects an error, appearing elsewhere in the cosmological literature, which takes the three screw axes to be coincident. This erroneous construction leads to a cube with each pair of opposite faces glued with a half turn. The cube's corners are therefore identified in four groups of two corners each instead of a single group of eight corners. The resulting space has four singular points and is thus an orbifold instead of a manifold." Levin, Janna "Topology and the Cosmic Microwave Background" at <http://arxiv.org/abs/gr-qc/0108043> August 20 2001. Section 3.2.2 Flat three-dimensional manifolds p. 28. Notice that the Hantzsche-Wendt nil manifold has a special relation between the projection manifold and its neighbors so that self and other are interrelated which is the nondual position between projection and narcissistic self reflection without taking into account the other.

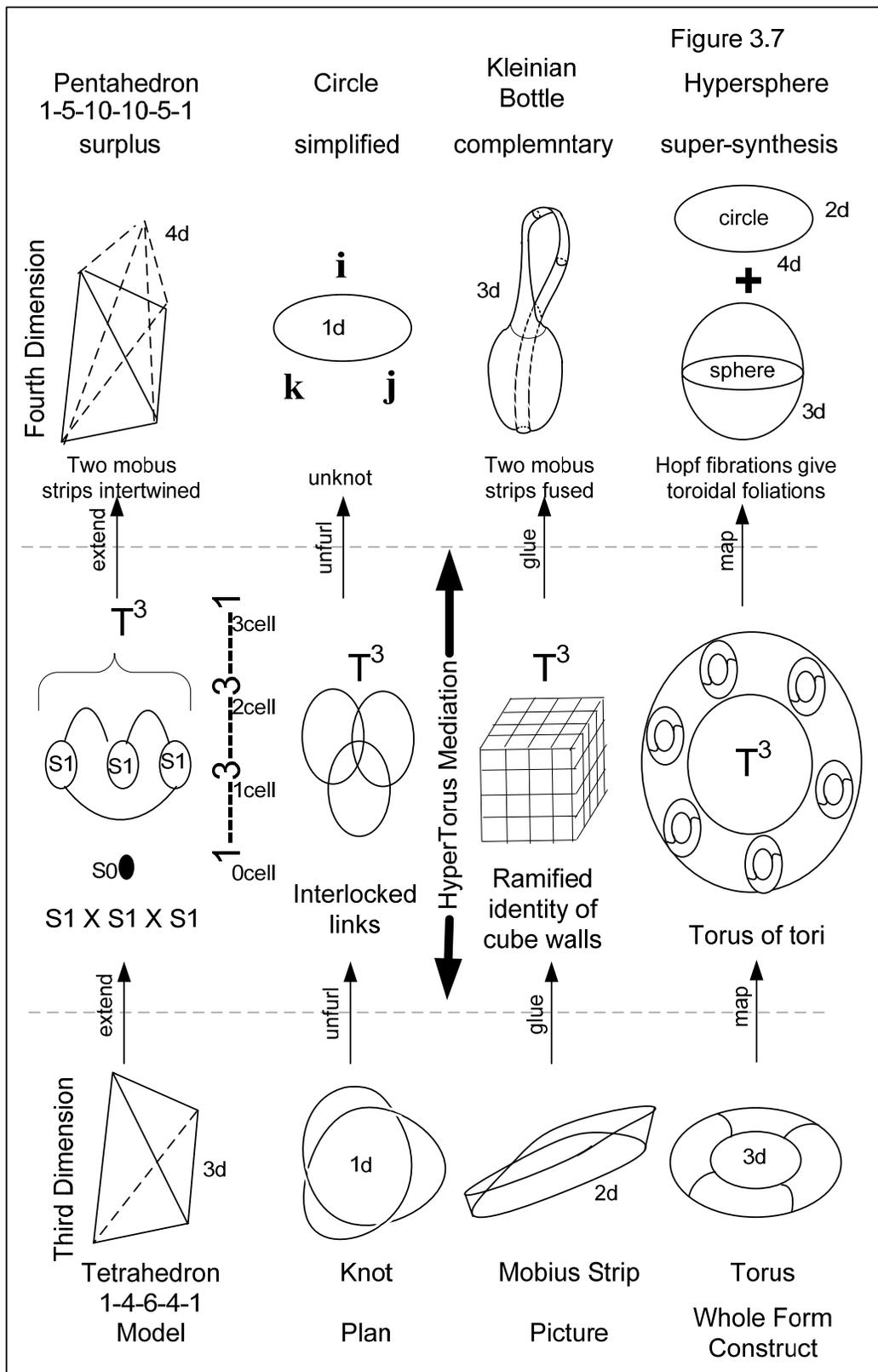


Figure 3.7. Hypertorus Mediation between Third and Fourth Dimension

The Sixth Philosophical category is the holoidal³¹⁰, or interpenetration, which gives the characteristic of Poise. Interpenetration is the concept that the four minimal forms are, in fact, a manifestation of a higher dimensional object in lower space. The Sixth Philosophical Category opens up in the Domain schema and that has two representations, one from the fifth dimension and one from the sixth dimension. In the fifth dimension, the Domain schema appears as perspectives, with each perspective seeing the 720 degrees of angular change. Each of these perspectives is embodied in a different mathematical object from a different mathematical category. But – a full *six dimensional figure* of the domain would see *all* of those perspectives as being added together in a way that allows the various different objects to interpenetrate and exhibit intra-inclusion. Finally, the Seventh Philosophical Principle related to the World schema is uniqueness, and this manifests in experience. It produces a Singularity out of the interpenetration and intra-inclusion of the Sixth. The fact that singularities naturally arise from interpenetration and intra-inclusion can be seen in the dynamics captured in hyper-complex algebras. The lower version of the World Schema, which is six-dimensional, is where all the perspectives cancel. And the higher version, which is seven-dimensional, is where all of the perspectives form a unique perspectival singularity that encompasses a whole world. We call this the *quintessence*, which can be an anamorphic object³¹¹. The fact that singularities are produced within the perspectives of both holoidal interpenetration and intra-inclusion is unexpected. However, we see this expressed in the hyper-complex algebras at the level of Sedenions and beyond. When we move past the Octonion hyper-complex algebra, zero divisors appear because the division property is lost. Those zero divisors become the basis for not only the negation but for the arising sequence of Philosophical Principles³¹² and Foundational Mathematical Categories as well. In this way the Philosophical Principles and the Foundational Mathematical Categories naturally form a cycle as a result of the production of singularities within the matrix of interpenetration and intra-inclusion. The Quintessence³¹³ is the opposite of Existence³¹⁴. Existence is defined as being neither aspect nor anti-aspect,

³¹⁰ This term ‘holoid’ was coined by Leonard, George. [The Silent Pulse: A Search for the Perfect Rhythm that Exists in Each of Us](#) (Layton, Utah: Gibbs Smith, 2006) pp. 81-83.

³¹¹ <http://en.wikipedia.org/wiki/Anamorphosis> accessed 080531.

³¹² Or sometimes called ‘Philosophical Categories’.

³¹³ The ‘quintessence’ means many things in traditional philosophy. The author uses this term to mean the opposite of existence.

³¹⁴ ‘Neither – Nor’ and ‘Both – And’ are opposite terms in the Tetralemma = A, ~A, Both A&~A; Neither A nor ~A. In Tibetan Buddhism there is controversy over the meaning of the double negative of the last term. In effect, if you interpret “nor ~” as positive then ‘Neither’ becomes negative with respect to A and this is seen by logicians as reducing to A and ~A which seems redundant. Certainly this is a misunderstanding of the meaning of the terms. Even in English multiple negations were at one time tolerated and understood to

while Quintessence is defined as being both aspect and anti-aspect. The aspects of Being are: Identity, Presence, Reality, and Truth, and the anti-aspects are their opposites³¹⁵. The Zeroth Philosophical Category refers to Existence as either Emptiness or Void and thus stands for Existence. The Quintessence is the opposite of Existence and appears at the level of the Seventh Philosophical Principle³¹⁶.

The Philosophical Principles, i.e., the Neganary, Zeroth, First, Second, Third, Fourth, Fifth, Sixth, and Seventh correspond to the set of schemas from the *Facet* to the *World*. They provide a context for understanding the System within the series of the other schemas. Instead, we generally think of the relationship of the Philosophical Principles to the pairs of schemas so that they cover the entire span of the ten schemas plus the special systems. But the structure is overdetermined and that makes another interpretation possible. Notice that this gives a very precise model of the system and how it relates to the higher experiential schemas. The system schema is really only understood to the extent that it is viewed in this entire context. This is why we have belabored this point by extending the trans-Peircean categories all the way to the seventh category, which is believed to be the last one because the Singularity of the Quintessence *folds back* into the Neganary by cancelling with the Zeroth category causing the cycle to repeat itself. The Seventh and the Neganary philosophical principles are really two sides of the same coin, they both concern singularities³¹⁷. The Zeroth and the Sixth Philosophical Categories are also opposites. In Hua Yen Buddhism, Emptiness is interpreted as the fullness of interpenetration. This entire set of schemas arises from a singularity and it returns to a singularity. There is a fundamental transformation from Existence, with *its negation* of the aspects and their opposites, to the paradox, or even absurdity, of the Quintessence, which *affirms* the combination and fusion of the aspects and their opposites. This, then, throws us into the Anamorphic cycle³¹⁸, because the Quintessence is likely to be embodied as an anamorphic object³¹⁹. An example of this is the myth of the *philosopher's stone* in alchemy. The Philosopher's Stone is *not* a physical thing that transforms metal into gold.

have different valences in the same sentence. Chaucer famously uses five negations in one of his sentences. Negations do not necessarily cancel each other out.

³¹⁵ i.e., Difference, Absence, Illusion, and Fiction.

³¹⁶ Quintessence and Existence are nihilistic opposites, which means that they are ultimately the same. That sameness is expressed in the Neganary, or the negative Philosophical Category, which is the source of all the other Philosophical Categories. There are interesting relationships between these bounding Philosophical Categories, which are the Neganary, Zeroth, Sixth, and Seventh.

³¹⁷ one as source and the other as origin.

³¹⁸ "The Anamorphic Cycle" at <http://archonic.net> by the author.

³¹⁹ See the work of Donald Kunze at <http://art3idea.psu.edu/boundaries/> accessed 080531. See also Kunze, Donald. "Architecture as Reading; Virtuality, Secrecy, Monstrosity" *Journal of Architectural Education* (1984), Vol. 41, No. 4 (Summer, 1988), pp. 28-37.

That is a separate process that Ripley³²⁰ described as using mercury to bond with trace precious metals in prime matter (prime matter being ordinary rock with trace mixtures of gold and silver). According to Ripley, the amalgamated mercury fuses with the trace gold and is then burnt off revealing the precious metal. Mercury is transported for this purpose as Cinnabar, which is mercury mixed with sulphur. Ripley is quite clear that this is not a magical process, but a chemical one by which gold can be extracted from what appears to be ordinary rock *if* it already has a trace of gold or silver within it. *Rather, the mythic 'philosopher's stone' is one particular example of a virtualized object that embodies the paradoxes and absurdities of the worldview and thus provides an anagoric pivot so that transformations in perspectives can occur within the world schema.* In effect, anamorphism is always the switch from one lower schema to another lower schema through the operation of a higher schema. Also, within the higher schema there is a special type of anamorphic object that can be produced, which is the pivot that indicates this switch from one lower schema to another. These special objects are usually thought of as works of art³²¹, and they serve as catalysts for these anamorphic cycles to manifest within the worldview. We have treated this question in "The Anamorphic Cycle"³²². We can embody this idea in the move from the minimal system representations (knot, mobius strip, torus, and tetrahedron) into the fourth dimension that encompasses the third dimension via the mediation of the hypertorus singularity. At the higher dimensional level there are corresponding representations to the minimal systems within the meta-system of spacetime such as the unknot, the Kleinian bottle, the pentahedron, and the hypersphere. Here, the hypertorus appears to be a conjunction of the minimal system representations in the embodiment of three-space. The higher dimensional extensions are sometimes more complex such as the comparison of the pentahedron to the tetrahedron, or even simpler, such as the comparison of the unknot to either the knot or intertwined link. In some cases they are merely conjunctions, for example, the Kleinian bottle is a conjunction of two mobius strips, as is the pentahedron. But, in the case of the hypersphere, the super-synthesis of the synthetic torus is a differentiated Whole Form Construct that encompasses the torus as foliations, which allows the sphere to turn inside out as the hypersphere

³²⁰ Ripley, Sir George "A Treatise of Mercury and the Philosophers' Stone" <http://www.rexresearch.com/alchemy2/riplmerc.htm> accessed 080531. Ripley gives a candid assessment of the realities underlying Alchemy. See also Houprecht, John Frederick, Bernardus Trevirensis, William Cooper, Nicolas Flamel, Ramon Llull, and George Ripley. Aurifontina Chymica; or, A Collection of Fourteen Small Treatises Concerning the First Matter of Philosophers, For the Discovery of Their (Hitherto so Much Concealed) Mercury. (London: William Cooper, 1680).

³²¹ See Holbein's 'The Ambassadors' with a Memento mori anamorph skull in the foreground. See [http://en.wikipedia.org/wiki/The_Ambassadors_\(Holbein\)](http://en.wikipedia.org/wiki/The_Ambassadors_(Holbein)) accessed 080531.

³²² Op. cit.

rotates. Because the hypersphere is a modulo transformation of the torus, it is possible to move back down to the torus from the hypersphere and so recover the synthesis of the differentiated object from the higher super-synthesis of the undifferentiated object. This is our proposed answer to the problem of how to recover the synthesis as a Whole Form within the cycle of the Quadralectic given that repetition and representation alone are not sufficient. The hypertorus appears to be an embodiment of this insufficiency in its inherent instability. But, it conjuncts and bridges the minimal systems to the fourth dimension where it is possible to achieve super-synthesis. At this point the super-synthesis can be factored back into a 'lower dimensional whole', which is a synthesis that is not merely a hypothetical construct.

Hyperspheres and Higher Dimensional Openness

In this series of nested schemas we have ventured into higher dimensions. It is a peculiarity of the higher dimensions that the area and volume of hyperspheres become larger as we progress higher, and then, beyond a certain point, they unexpectedly become smaller again and trail off to become infinitely small. The *volume* of hyperspheres is greatest in the fifth dimension. In the seventh dimension, the *area* of the hyperspheres are greatest. This means that in the sixth dimension there is a point where the volume is getting smaller and the surface area is becoming greater, which is particularly counterintuitive. But after the seventh dimension they both trail off toward the *infinitesimal* at different rates³²³. When the hyperspheric volume decreases it decreases at a faster rate than the hyperspheric area.

³²³ Notice our previous series of steps associated with the schemas and the philosophical categories went up to the seventh dimension.

Hyperspheres³²⁴:

<u>Dimension</u>	<u>Volume</u>	<u>Area</u>	
<u>1</u>	2.0000	2.0000	
<u>2</u>	3.1416	6.2832	
<u>3</u>	4.1888	12.5664	
<u>4</u>	4.9348	19.7392	
<u>5</u>	5.2638	26.3189	
<u>6</u>	5.1677	31.0063	Area is bigger as volume decreases!
<u>7</u>	4.7248	33.0734	
<u>8</u>	4.0587	32.4697	
<u>9</u>	3.2985	29.6866	
<u>10</u>	2.5502	25.5016	

Table 3.1. Hypersphere Expansion and Contraction in Higher Dimensions

So, from the table we can see that the volume of the hypersphere peaks at dimension five and the area peaks at dimension seven. We equate this size of the hypersphere with the openness of the dimension and we note that dimension five is shared by the Meta-system and Domain schemas, while dimension seven is shared by the World and Kosmos schemas. This means that the greatest openness appears within the Domain and Meta-systems schemas, which Heidegger calls the Clearing in Being³²⁵. But, at the level of the World and Kosmos schemas, the hyperspheres cover the greatest surface area and thus we may speculate that this means that this level is where our highest sensitivity exists, which is between the World and what lies *beyond* our World, i.e., the Kosmos. Through schemas we can actually access, conceptually, and even use, virtually, higher dimensions than we are able to access physically in our worldview. This is not surprising because we understand that the systems we build actually have multidimensional characteristics that we can think about simultaneously. How do we think about multidimensional characteristics when we are physically bound to three-dimensional spaces? It must be that we have access to higher dimensions within the ‘clearing’ that is made accessible by the schemas. Within this ‘clearing’ we can consider multiple dimensions simultaneously. *Our seven plus or minus two*, short term memory must be a space in which to consider *seven plus or minus two orthogonal dimensions*. That means our short term memory might be the clearing or openness that allows us to conceptualize multi-dimensional schematizations as

³²⁴ <http://www.mathreference.com/ca-int.hsp.html> accessed 080531; “Here is the volume and surface area for the first 10 dimensions. As you can see, the greatest volume occurs at dimension 5, but the greatest surface area occurs at dimension. 7. Like volume, surface area approaches 0 as n approaches infinity. See also Op. cit. Havi, Julian. Nonplussed.

³²⁵ Notice that this is an example of the Open/Clearing, which is an unstriated and striated pair.

entities. When we access these higher dimensions conceptually, we can see that those concepts have many representations in objects within our world. If at any time we have to keep in mind five to nine orthogonal things in short term memory, we are actually accessing these higher dimensional spaces³²⁶. We convert these higher dimensions into time, but time cannot be representably distinguished, so we do not notice the fact that we are continually using these higher dimensions when we deal with things in terms of Meta-systems, Domains, Worlds, and the higher non-experiential schemas. We deal with schemas and their organizations, which are rooted in higher dimensions, and we do not notice that in order to affect the nesting of those schemas, we need additional degrees of freedom conferred on us by the higher dimensions. We cannot access *all* higher dimensions because the set of the finitudes of the schemas are limited to ten and only extend up to the ninth dimension. Beyond that is String Theory³²⁷, which is not comprehensible through the schemas, i.e., it is not fitted to our human finitude. So what we notice is that the System interfaces with the Meta-system, which has access, along with the Domain schema, to the highest degree of openness due to their associated hyperspheric volumes. This is another reason that the interface with the Meta-system is important. It also means that the openness within the System schema is fairly high and this translates into the ability of the schema to shed light on things as a result of its relatively large internal openness within the fourth dimension that it shares with the meta-system. The fourth dimension is not the most open, but it has other strange properties, such as not having a determinate topological structure as discovered by Donaldson³²⁸. Also, the fourth dimension has an extra regular solid that no other dimension has³²⁹. The third dimension has five Platonic solids³³⁰, and the fourth dimension has six regular polytopes. Having these extra polytopes and solids mean that there is additional synergy between these dimensions that other dimensions do not share. This synergistic structure not only affects the System and the Meta-system, but the Forms as well, because they share this extra synergy. It means these schemas have special properties conferred on them by their dimensional affiliations. When the special properties of the fourth dimension come into play, then the full openness of the fifth dimension, and eventually its full sensitivity (due to

³²⁶ http://en.wikipedia.org/wiki/Short-term_memory accessed 080531.

³²⁷ String theory has representations in the dimensions ten and eleven and F theory exists for dimension twelve. In the tenth dimension E. Witten discovered that the various ten-dimensional string theories became one theory. See <http://online.itp.ucsb.edu/online/lecture/witten/> accessed 080531 for a lecture.

³²⁸ Donaldson, S. K. and Kronheimer, P. B. The Geometry of Four-manifolds (Oxford: Clarendon Press; New York: Oxford University Press, 1990).

³²⁹ <http://en.wikipedia.org/wiki/24-cell> accessed 080531.

³³⁰ http://en.wikipedia.org/wiki/Convex_regular_4-polytope accessed 080531.

its greatest surface area) appears in the seventh dimension between the World and Kosmos³³¹. The actual series of schemas stops at the point where a contained smaller hypersphere between externally close packed bounding hyperspheres actually becomes larger than its containing area³³². That means that when the difference between the inside and outside of the hyperspheres is breached in hyperspace, the schemas stop. Thus, there is a geometrical reason for the limitation of the number of schemas³³³. All schemas must obey the distinction between inside and outside, and when that is breached by the hyperspheres in hyperspace, then the schemas come to an end.

Logic of the Philosophical Categories and the Foundational Mathematical Categories

We have demonstrated that the System schema is part of an unfolding set of schemas that are connected to the trans-Peircean Philosophical Categories which, in turn, are connected to the dimensions. The schemas are connected to, at least, two dimensions, and each dimension is, at least, connected to two schemas. This is part of the hypothesis in General Schemas theory called S-Prime. In other working papers further hypotheses called S-double-prime (three schemas per dimension) and S-triple-prime (five schemas per dimension) have been explored. These are more sophisticated hypotheses that go beyond this starting point and explore the relationship of dimensionality to the finitudes of the schemas³³⁴. We have emphasized how the fourth dimension interfaces with the minimal system representations of geometry/topology. This is a more robust description of the system than what we discussed in the last chapter where the discussion was in terms of perception and conception and time. Here we have spatial objects that give a complex representation of the system and its relationship to its environment, which is called the Meta-system. This further specifies the ‘System/Meta-system’ and ‘Process/Meta-process’ interface in terms of a ‘diachronic/synchronic’ differentiation. The diachronic aspect is seen in the spinor, while the synchronic aspect is seen in the various geometrical/topological representations. Each representation is a synchronic system configuration, but we can also view each one as a temporal gestalt or diachronic system.

³³¹ Note there are hyperspheres for which the surface area is bigger but the volume is less.

³³² See also Havil, Julian. Nonplussed!: Mathematical Proof of Implausible Ideas (Princeton: Princeton University Press, 2007) p. 137ff for volume in table 12.2 and p. 147ff for surface in table 12.3.

³³³ Ibid Havil, J. pp. 127-130 Reference. See also Lounesto, Pertti. Clifford Algebras and Spinors. London Mathematical Society lecture note series, 286. (Cambridge: Cambridge University Press, 2001) p. 91.

³³⁴ For S-prime theory see “Schemas Theory within the Worldview”, Chapter 3, in On a Foundation for Emergent Design in General Schemas Theory. For S-double prime see “The Meta-schematic Field”, Chapter 9, in Introduction to General Schemas Theory For S-triple prime see “New Schemas Theory”, Chapter 4, in Emergent Architectural Design and Onto-Epistemological Engineering at <http://holonomic.net> by the author.

Diachronic Process refers to the generation of the figure from the interpenetrated quintessential source of the super-figure (which is non-representable). Synchronic Process refers to the idea that time is frozen in a time-lapse sort of way. We can understand this when we simultaneously consider all four forms that make up the conceptual minimal system. The spinor can be transformed into any of these forms, and these forms represent the sub-schemas of form. These geometrical intricacies are not random, but have meanings, just as B. Fuller advocates in his Synergetics. But the meaning for humans only becomes apparent when you connect the mathematics to the schemas. The mathematics has to be translated into comprehensible terms by human finitude and the schemas give us that medium of intelligibility. Yet, this is really part of the broader question of the intelligibility of the world. Each schematic horizon is understandable in terms of the next higher schematic horizon, and these horizons are phenomenologically apparent because we project them as part of our human spacetime embodiment. We do not exist in spacetime as objects. Spacetime is the environment where objects may appear. Those objects are encapsulated in multiple nested horizons that we manufacture naturally as the essential ecstasy of our human finitude. It is just like the spider spinning its web. Our web is the schemas. Through them we interface with the nomos of dimensionality, and within that nomos of dimensionality, we discover the categoricity of the nomos via mathesis. Categoricity has layers of constitution based on the Foundational Mathematical Categories, such as sets, masses, and mereology of wholes, etc. as discussed in the author's Emergent Engineering working papers³³⁵. The Foundational Mathematical Categories are also related to the trans-Peircean philosophical categories and this has been explored in those working papers as well. The Foundational Mathematical Categories provide the basis for defining the representations of order in the schemas. The Foundational Mathematical Categories are like meta-axioms in the sense that they are whole categories that act like axioms that support all of mathematics. The Foundational Mathematical Categories are more closely connected with logic (through Model Theory) than to schemas theory. Schemas Theory connects the spacetime intelligibility of things to different scales that are related to human finitude through dimensionality. Schemas theory and Mathematical Model Theory are duals. Between them there is a Reference Theory that allows language to refer to things that have been embodied and encapsulated by schemas.

³³⁵ "Extending the Foundational Categories", Chapter 6, in Emergent Engineering at <http://holonomic.net> by the author.

This connection to logic is important because Peirce treated logic as a system and he developed his philosophy as an extension of his understanding of logic as a system. The basis of that understanding of logic as a system is rooted in the Philosophical Categories, but unfortunately he did not see all the categories that applied to the system schema. He did not clearly understand synergy and its importance, which really only became clear with the development of higher dimensional geometry, or by following B. Fuller who saw it on comparing the Platonic solids. Yet, we can see how he treats Logic systematically when he demands that all the permutations of the syllogism be meaningful and identifies abduction as a hypothesis, or when he defines the levels of the sign as the substrate of the symbols used by logic. Peirce is also systematic in the way that he reduces logic to the three principles related to the indefinables in Euclidean Geometry. But because he did not consider n-dimensional geometry, he did not see the significance of synergy. He even expanded each of his Philosophical Principles by applying each of them to the others to produce the nine categories through which he created the framework for his signs³³⁶. This work has been re-interpreted by Pieter Wisse³³⁷ in order that it may be applied to engineering semiotics. However, Peirce's systematic treatment of logic was defective in that it does not actually serve as a complete model of the system itself. It only serves as the *formal* part of the system, i.e., the interface of the Form to the System.

These considerations naturally lead to K. Gödel³³⁸ and his *undecidability proof*. Gödel shows that G. Peano's system of arithmetic³³⁹ is not decidable, which leads to the idea that many more complex systems could be undecidable³⁴⁰. It turns out that some more highly complex systems than arithmetic *are* in fact decidable, but that has to be proved on a case by case basis. It just so happens that the *system*, which is the basis for the generation of the number line, and is very basic to our thinking, is *not* decidable. Some complex parts of mathematics are, in fact, decidable, but in general Gödel's ideas hold for more complex systems. From the point of view of emergence and de-emergence, the undecidable Gödel statements are what *determine* emergence or de-emergence. In other words, if you add the Gödel statement to the category, you get emergence, but if you take it away, then you get de-emergence, which means that we assume that the undecidable statement may concern

³³⁶ See Peirce's Relational Logic and his discovery of the Nonions. Op.cit. See Chronological Edition of Peirce's papers Volume 4.

³³⁷ See www.wisse.cc accessed 080531.

³³⁸ Nagel, Ernest and Newman, James R. Gödel's Proof (New York: New York University Press, 1958; Routledge, 1971).

³³⁹ Peano, Giuseppe. Selected Works of Giuseppe Peano (Toronto: University of Toronto Press, 1973).

³⁴⁰ Davis, Martin. The Undecidable: Basic Papers on Undecidable Propositions, Unsolvability Problems and Computable Functions (Hewlett, N.Y.: Raven Press, 1965; Mineola, N.Y.: Dover Publications, 2004).

statements about what the emergent properties are for a given system. Peirce did not realize that geometry had the emergent property of synergy even though he patterned his philosophical categories on Euclid's indefinables. Synergy is a new philosophical principle because it is emergent, although it is undecidable with respect to geometry. Peirce did not include the principle of Synergy so he had an incomplete Model Theory that dealt with Logic, but without a Category attached to that Logic.

In general Peirce's Philosophical Principles are useful in understanding the place of the system within the layers of the series of schemas, and we can use the Platonic mathematics of higher dimensions (that are related to the minimal regular solids in each dimension) to comprehend the relationship between the schemas and the Philosophical Principles. Regardless of the emergent properties that those mathematical objects have, whether normal or abnormal, they have meaning only with respect to the schemas' embodiment. For instance, the volume of the hyperspheres relates to the openness of the schemas at each dimensional level. The area of the hyperspheres relates to sensitivity, which increases up to the interface between the World and Kosmos. Schemas Theory allows us to put to use the capacities of higher dimensional geometry in our lifeworld. Our lifeworld has an openness that is characteristic of the higher dimensions, which are embedded within the schemas. There are intrinsic types of intelligibility associated with each schema that are spontaneously generated and self-organized to give comprehensibility to phenomena. We naturally face the openness of the Meta-system as we look out from the System. *That is why the key interface of the System is with the Meta-system, and not with the Form schema.* That is because Systems and Meta-systems share the fourth dimension, which has many strange, interesting, and important properties. The System shares the third dimension with the Form schema, which is the dimensionality of the apparent space that we live in. Yet, the *real* spacetime of physics is four-dimensional and is not a broken symmetry like the experiential relationship between three-dimensional space and one-dimensional time. *So, we can see that our basic experienced space is that of the formal system, but the real physical space is that which is shared by the System and Meta-system (Open-scape).* Four-dimensional space operates as a mirror in three-dimensional space³⁴¹. It is a model of Existence, which can be interpreted as Emptiness or Void. And ultimately it has the nature of interpenetration and intra-inclusion. *Unlike all other dimensions, four-dimensional space has no intrinsic topology, therefore, it has a certain virtual freedom within that*

³⁴¹ Rucker, Rudy von Bitter. Geometry, Relativity and the Fourth Dimension (New York: Dover Publications, 1977). p13; See also Al-Khalili, Jim. Black Holes, Wormholes & Time Machines (Bristol, UK; Philadelphia, PA: Institute of Physics Pub., c1999) p. 20.

space that does not exist in any other dimension. This intrinsic freedom is the source of the production of the endless variety by human beings³⁴². *This intrinsic freedom from a set topological structure makes the interface between the System and the Meta-system unique among the schemas.* The System's nature is more determined by this unique characteristic of four-dimensional space (that it shares with the Meta-system), than it is by the relationship that it has with its embodied form as a three-dimensional configuration. Forms, and Systems as configurations of Forms, are the real meaning of embodiment in our lifeworld. But, on the other hand, the System can be dynamic and that dynamism models interpenetration and involves the freedom that appears in the fourth dimension, which has the special characteristics of Existence as Emptiness or Void. So, the 'System' is a very significant schema that stands between embodiment in the third dimension on one hand, while interfacing with the fourth dimension and its unique properties on the other³⁴³. The fourth dimension's unique properties are very significant because they represent embodied nonduality and interpenetration as well as freedom from topological constraints. The fourth dimension is the reality behind the mundane world as attested to by Relativity Theory, which sees space and time as a single continua. Yet, as we have said, the interface that the fourth dimension shares with the Meta-system is more important because of the uniqueness of the fourth dimension as the center of the set of schemas that gives rise to the Special Systems. Special Systems depend on the unique characteristics of the fourth dimension for their own special characteristics. All the schemas experience entropy in their organization, but between the System and the Meta-system there are neg-entropic structures that have special properties. These Special Systems, with their anomalous properties, can only be appreciated if we first understand both the structure of the System and its duality with the Meta-system.

In this essay we are taking our cue from B. Fuller's Synergetics³⁴⁴ and using advanced geometrical analogies as our guiding thread for understanding the properties of the System. We are examining how those properties can appear in completely different formations while maintaining the same essential *core* property, such as stability in spacetime. We have shown that there is a relationship between these geometrical analogies and the Peircian

³⁴² See Beer, S. The Heart of Enterprise (London and New York: John Wiley, 1979; Reprinted with corrections 1988).

³⁴³ By unique properties we mean the number of Platonic polytopes greater than any other dimension. According to S. K. Donaldson there is no set topology in the fourth dimension.. Quaternion rotations have no singularities. Etc.

³⁴⁴ Op. cit. Fuller, Richard Buckminster, Synergetics, Volumes 1 & 2 (New York: Macmillan, 1982 & 1983); See also Fuller, R. Buckminster, and E. J. Applewhite. Synergetics Dictionary: The Mind of Buckminster Fuller: with an Introduction and Appendices. (New York: Garland, 1986).

concept of the Philosophical Categories. This will clarify our view of systems and their evolution, which can then serve as a basis for further phenomenological exploration.

Philosophical Category	Meaning	FMC	Dims	Schema
Negenary	Singularity	Singularity	-1, -2	? (unknown)
Zeroth	Nothing, Existence	Site/Event	0, -1	facet
First	Discrete isolate	Multiple	1, 0	monad
Second	Relata	Set	2, 1	pattern
Third	Continuity	Mass	3, 2	form
Fourth	Synergy	Whole	4, 3	system
Fifth	Integrity	Holon/integra	5, 4	meta-system
Sixth	Interpenetrating	Holoid	6, 5	domain
Seventh	Singularity Quintessence	Singularity	7, 6	world
? (unknown)	Beyond experience	? (unknown)	8, 7	kosmos
? (unknown)	Beyond Experience	? (unknown)	9, 8	pluriverse

Table 3.2. Alignment of Categories, FMC, Dimensions, and Schemas

Notes:

In this instance, the alignment of the Philosophical Categories, their meaning, the Foundational Mathematical Categories (FMC), Dimensions, and Schemas are different from other representations that I have studied. Our aim here is to understand the Philosophical Categories by aligning them with Euclidian Geometrical Dimensions, which will lead to a mapping of the Foundational Mathematical Categories, Dimensions, and Schemas. Different mappings work for different purposes and there does not seem to be one canonical mapping, but rather, different mappings that bring out different characteristics of the interactions of the elements. The key alignment is between the Philosophical Categories and the Foundational Mathematical Categories. But the comparison to Geometry gives us a way to examine the dimensions and the schemas which, in this case, ends at the schema of the World as the boundary that borders the greatest area of the hyperspheres. Generally we do not compare the Philosophical Categories and Foundational Mathematical Categories to the Schemas because the Foundational Mathematical Categories are used by the schemas to produce their ordering capabilities and this makes our mapping a degenerate case. Yet, all the same, it is illuminating in the way that this geometrical analogy motivates the expansion of the trans-Peircean categories. However, it does *not* explain why the trans-Peircean categories end as they do at the sevenths. And I have no explanation of this limiting finitude in this case.

Heidegger's Inversion of Phenomenology

How the System and Meta-system Participate in a Nihilistic Structure to Hide the Special Systems

Heidegger seized upon of Husserl's concept of the World Horizon as a background for forms in Phenomenology and then inverted Husserl's Phenomenology in order to subvert the distinction between subject and object. He achieved this by embedding the proto-subject (Dasein) in the World Horizon. We refer to the proto-objects that are embedded in this World Horizon as "ejects". This is a fundamental transformation of Phenomenology that is still playing out in postmodern Phenomenology. We can use this new way of looking at the relationship of things to the horizon as a means for understanding the System because the System is an intermediate horizon between the Form and the World horizon. These Phenomenological horizons are linked to the various schemas in General Schemas Theory. Our cultural blindspot in relation to the Meta-system affects our understanding of the duality between the System and Meta-system, which are made into nihilistic opposites in our culture.

Transforming Phenomenology

Husserl's great innovation was the realization that there was an outer horizon, i.e., the World, which could be used as the background for all subjects, things, and practices. For Husserl, this concept of the 'world as horizon' ameliorated problems that concerned the solipsism and isolation of subjects and objects in his phenomenology. Husserl's most important student was Heidegger³⁴⁵, who worked with him as an assistant and helped publish The Phenomenology of Internal Time Consciousness³⁴⁶. When Heidegger was pushed to publish his own work in order to qualify for professorship, he rushed to publish his masterwork Being and Time³⁴⁷. In Being and Time Heidegger turns the phenomenology of Husserl upside down and inside out while maintaining the essential insights. Heidegger realized that instead of defining the Horizon of the World as a

³⁴⁵ Crowell, Steven Galt. Husserl, Heidegger, and the Space of Meaning: Paths Toward Transcendental Phenomenology (Evanston, IL: Northwestern University Press, 2001).

³⁴⁶ Husserl, Edmund. The Phenomenology of Internal Time-Consciousness. (Bloomington: Indiana University Press, 1964) Ed. Heidegger, Martin Trans. Churchill, James S.

³⁴⁷ Heidegger, Martin. Being and Time. Trans. Joan Stambaugh. (Albany: SUNY, 1996). See also Heidegger, M. Being and Time, Trans. J. Macquarrie & E. Robinson, (New York: Harper, Blackwell, Oxford, UK, 1962).

background on which the subject *saw* the objects or other subjects³⁴⁸, he could instead eliminate the subject and object all together and *we* could inhabit the horizon itself. Thus, Heidegger developed the idea of the pre-subject/pre-object, which he called Dasein, or “Being There”, which can also be described as “being-in-the-world”³⁴⁹. Heidegger maintained that since the horizon of the world mediates between the subject and object, it could be used as the *center* of experience rather than the *mediator* of experience, and ‘who we are’ as projectors of the world horizon, could be absorbed into the horizon. Heidegger theorized that once we had rid ourselves of subjects and objects, then all the isolation of solipsism or isolation from the noumena would disappear. This single brilliant move transformed all of *transcendental philosophy* into an *immanent philosophy*. The move toward dwelling in the horizon of the world transformed the limits of other subjects and noumena into what are merely other things in our world. It made the world horizon the central characteristic of experience. All that was left was the pre-object/pre-subject called Dasein who projected the world, and the world horizon itself. Everything else, i.e., whatever was ontic, was seen against this ontological horizon that H. Dreyfus refers to as the “background practices”³⁵⁰.

³⁴⁸ (which made bracketing no longer necessary as Husserl realized)

³⁴⁹ Op. cit. Heidegger, Martin. Being and Time: A Translation of Sein und Zeit Trans. Joan Stambaugh p. 50ff.

³⁵⁰ See the Berkeley Philosophy Course on Heidegger taught by H. Dreyfus, which is available as a podcast called “from gods to god and back.” Phil 6, Spring, 07.

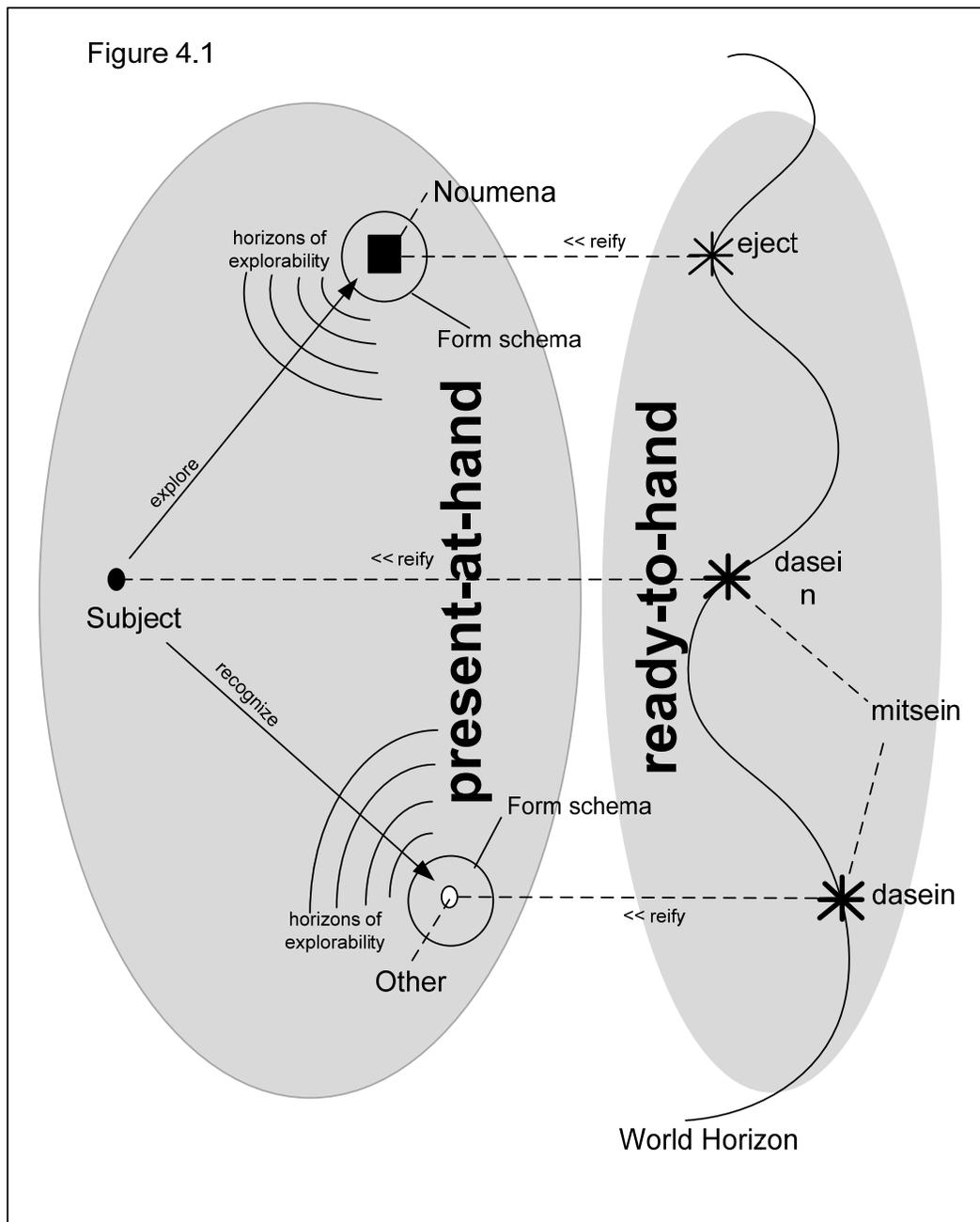


Figure 4.1. Difference between present-at-hand and ready-to-hand

Heidegger preserved the idea that there is a difference between an abstraction that leads to ideas and the eidetic intuition of essences. In Heidegger these become modes of being-in-the-world. And Being, as a monolith, becomes modal so that there are two modes. These are the *present-at-hand*³⁵¹ (Pure Being³⁵² that is static and Parmenidian³⁵³) and *ready-to-*

³⁵¹ Op. cit. Heidegger, M. p. 79ff; See also Heidegger, M. *Being and Time*, Stambaugh translation uses "objectively present" instead of present-at-hand, sometimes the word "extant" is used in other translations.

³⁵² Pure Being for present-at-hand is the author's own terminology.

*hand*³⁵⁴ (Process Being³⁵⁵ that is dynamic and Heraclitian³⁵⁶). These two modes are modes of the impingement of Being onto Dasein. Dasein projects Being as a monolith, but Being impinges back upon Dasein through the modes of its Being. Heidegger's departure from Husserl was considered radical because it was realized for the first time that Being was not unified but had different modes, and that all of Western Philosophy throughout its history had been in the *present-at-hand mode*, ignoring and forgetting the *ready-to-hand mode* except in a few instances when it was indicated as such, and these instances were usually degraded images taken from the present-at-hand mode. The equi-primordiality of the two modes was not recognized before, and this created a new horizon for the exploration of philosophy without the transcendental superstructure that had been necessary since Kant and Husserl. *When Heidegger placed Dasein, the proto-subject, within the horizon of the World, he demonstrated what being-in-the-world means.* Heidegger presented the horizon as a *clearing* within Being, which created an opening for intelligibility within experience. But that opening was not inhabited by subjects and objects *except* in the present-at-hand mode. In the ready-to-hand mode, we instead saw the dynamics of the projection process by which that reification is constituted. And Heidegger discovered that this constitution process had to do with technology³⁵⁷ and its strange kind of wholeness that served as an infrastructure to the present-at-hand world making its goals, distances, isolations, and solipsisms possible. Suddenly, the depth of the world-as-horizon for 'opening and clearing' was available for exploration by the ones who were projecting this ecstatically. The ecstatic projection was called *exi-stance* (existence³⁵⁸) because when Dasein projects the world, it stands outside of it – *although the projection of the world has come from inside of Dasein involuntarily.* Dasein finds itself thrown into and enmeshed in the world as a 'discovered way' of being, prior to any thought of differences between subjects and objects. In that 'primordial engagement' Dasein is already speaking, already understanding the world, and is already part of the others that it is with. Dasein then has to separate itself

³⁵³ Parmenides. Parmenides of Elea Trans. Gallop, David (Toronto; London: University of Toronto Press, 1984).

³⁵⁴ Heidegger, Martin. Being and Time Trans. John Macquarrie, Edward Robinson, p. 99ff; Stambaugh renders this "handy"

³⁵⁵ Process Being, or Becoming, is the author's own terminology.

³⁵⁶ Heraclitus. Heraclitus: The Cosmic Fragments Trans. Kirk, Geoffrey Stephen (Cambridge, UK: Cambridge University Press, 1954).

³⁵⁷ Heidegger, Martin. The Question Concerning Technology, and Other Essays Trans. William Lovitt (New York: Harper & Row, 1977).

³⁵⁸ Heidegger uses the term Existentialism in a very different way from Sartre, which he pointed out in his "Letter on Humanism." MacDonald, Paul S. The Existentialist Reader: An Anthology of Key Texts. (New York: Routledge, 2001) pp. 227-270; See www.wagner.edu/departments/psychology/filestore2/download/101/MartinHeideggerLetter_on_humanism.pdf accessed on 080430

from that milieu in order to authentically realize its *own-most*³⁵⁹ possibilities in that situation. Reification of the subjects and objects in the world gets in the way of that authentic being, which is oriented toward the embeddedness within the situation that is constantly aware of Dasein's own finitude.

Heidegger did not produce this inversion of Husserl in a vacuum. His ideas were influenced by his theological and physical studies. From theology he took the idea of God as being the creator of the world but also as 'becoming incarnate'. This paradox is seen clearly in John's Gospel³⁶⁰ and this paradox, or even absurdity, becomes the heart of the relationship of Dasein to the World. Dasein gives rise to the world horizon by projection, but then Dasein is one subject/object among many that are seen in relation to that horizon. Another way to say this is that Dasein is both ontological (projecting Being) and ontic (a being within Being) at the same time³⁶¹. This paradoxical nature of Dasein is seen as an existential ecstasy by which Dasein stands outside of its own projection within the world it has projected³⁶². The other source of Heidegger's philosophy comes from his study of the contemporary physics of his time, which were Relativity Theory³⁶³ and Quantum Mechanics³⁶⁴. Although these two views have never been reconciled, Heidegger saw that they both had an underlying structure in common. Heidegger posited that there was the 'normal world,' as well as a 'real world' beyond that normal world that was very different from the normal world. In Quantum Mechanics that difference was between the Newtonian World³⁶⁵ at the macro level and the Quantum World at the micro level (as established by the Copenhagen Convention³⁶⁶), which concluded that the world had two levels: macro and micro. It was proposed that Quantum Mechanics applied only to the micro world, leaving the Newtonian macro-world intact but irreconcilably different. The same is true of Relativity Theory, where the normal space and time relationships understood by Newton were different from the macro spacetime relationships that occurred in relativity theory, for example, the curving of spacetime under gravity. We experience space and time as

³⁵⁹ This is a term used in the translation of Heidegger, for the possibilities that are most the own of Dasein, i.e., closest to the core of Dasein, and those are the possibilities of its life in relation to its death.

³⁶⁰ Morris, Leon. [The Gospel According to John](#) (Grand Rapids: Wm. B. Eerdmans Publishing, 1995) pp. 63-95.

³⁶¹ See http://en.wikipedia.org/wiki/Heideggerian_terminology accessed on 080430.

³⁶² Similar in some ways to the dialectic in [The Social Construction of Reality](#): Externalisation, Objectivation, and Internalisation See Berger, Peter L. and Thomas Luckmann. [The Social Construction of Reality: A Treatise in the Sociology of Knowledge](#) (Anchor Books, 1966). See <http://www.arasite.org/band1.htm> accessed on 080430.

³⁶³ http://en.wikipedia.org/wiki/Theory_of_relativity accessed on 080430.

³⁶⁴ http://en.wikipedia.org/wiki/Introduction_to_quantum_mechanics accessed on 080430.

³⁶⁵ http://en.wikipedia.org/wiki/Newtonian_mechanics accessed on 080430.

³⁶⁶ http://en.wikipedia.org/wiki/Interpretation_of_quantum_mechanics accessed on 080430.

different (just as Kant, who followed Newton, proposed), but actually, space and time are a continuum with different phases that can be represented in different ratios depending on what inertial frame you are in. Both of these scientific theories posited a two tier world, one normal and the other strange, but the two theories differed on whether that strangeness was macro or micro in relation to the meso³⁶⁷ of the normal Newtonian realm.

Heidegger was interested in establishing the realm of finitude at the meso level as the arbiter of experience rather than the strange realms at the macro and micro levels. But he realized that all science posited the present-at-hand as the fundamental basis for establishing the ‘fantasy of objectivity’ of science. Therefore, Heidegger also posited a two tier system like that of science, but instead of the second tier being a strange macro or micro view of scientific phenomena, the second tier was the vehicle or means through which science and engineering were carried out. In other words, the second tier is the realm of technology itself, which he called the “ready-to-hand”. Heidegger posited that the realm of technology (ready-to-hand) had a different and very strange nature, compared to the present-at-hand that we are accustomed to as our subject/object reification of the world, which was established by Descartes, articulated by Kant, and accepted by Husserl. All science and engineering is based on the existence of the ready-to-hand modality, which is just as strange as the macro and micro realities discovered by science, although the ready-to-hand is, in fact, prior to the constitution of the present-at-hand and thus prior to the possibility of science and engineering. Thus, we get an interesting picture of the ready-to-hand as a strange constitutional infrastructure that supports the present-at-hand, which is the reification of subjects and objects. This view allows us to accept Newtonian Science with a Descartes/Kantian understanding of the reified world as Objective or Subjective dualities. But then, when we are pushed to the micro and macro limits beyond this meso plane, this view is superseded by either Relativity Theory or Quantum Mechanics, which are still formulated in the present-at-hand mode of science, but reach limits of comprehension that defy understanding through subject/object reification. This is because each of them, in their own way, approximates the limits of the divided line³⁶⁸ of Plato, which is the ultimate basis of our metaphysical worldview. The limits of the divided line are supra-rationality³⁶⁹, which is beyond the ratio, and the paradox³⁷⁰, which is beyond the

³⁶⁷ ‘Meso’ here means generally what is in the middle between Macro and Micro.

³⁶⁸ <http://www.clas.ufl.edu/users/rhatch/his-sci-study-guide/> Go to page on Plato’s Divided Line for diagram of the line. accessed on 091106.

³⁶⁹ Supra-rational is what is beyond the rational. In this case it is a form of intuition, which is the dual of contradiction, paradoxicality, and absurdity. Instead of mixing opposites, one holds opposites at the same time without mixture and without contradiction, paradox, or absurdity. Zen Buddhism’s Enlightenment is a

doxa. In Quantum Mechanics these limits appear as superposition³⁷¹ and entanglement³⁷². In Special Relativity Theory these limits appear as the paradox of the twins traveling at different speeds and the disassociation of the frames of reference for each twin in relation to their relativistic intervals. As a result, the twins age differentially. The paradox is due to the difference between *movements* in relation to the speed of light and phenomena that is *at rest* within these different reference frames. That is to say, it is a paradox of movement and stillness in relation to different unsynchronizable clocks given the speed limit of light in the universe. This is a way of stating that the limits we see at the macro and micro levels may simply be the limits of our own capacity to represent physical phenomena and not something intrinsic to the physical phenomena itself. *Yet, be that as it may, Science still posits images of these limits in the present-at-hand mode, without realizing that they may be images of the present-at-hand that originate from the ready-to-hand modality.* Thus, we see that Heidegger is simultaneously responding to paradoxes and supra-rational limits that are presented in theology and physics. In Christian Theology the paradoxicality revolves around incarnation where supra-rational nondual views are suppressed. But since Descartes, man as subject has taken on the fundamental characteristics of God as the projector of meaning on objects in the modern world. And that internalization of the paradox of ‘God as incarnate,’ within the world that He created, brought to the forefront the problem of mortality and the question of how man could understand a Godless world in scientific terms. This created a split between religion and humanism/scientific endeavors. And this has been a source of disenchantment that has led to modern nihilism³⁷³. The triumph of rationality in science and engineering contrasts the problems brought about by the circumstances that have been created by imposing these rationalities. The response to this was romanticism³⁷⁴, which ultimately led (via Hegel) to Nietzsche’s philosophy³⁷⁵. Nietzsche posited that we must *value* our values, and understand them genealogically as something that changes over time³⁷⁶, and that we must understand that we are creating the

supra-rational state. See Aśvaghōṣa [The Awakening of Faith](#) Trans. Hakeda, Yoshito S. (New York: Columbia University Press, 1967).

³⁷⁰ Hofstadter, Douglas R. [Gödel, Escher, Bach: An Eternal Golden Braid](#) (New York: Basic Books, 1979, 1999).

³⁷¹ Schlegel, Richard. [Superposition & Interaction: Coherence in Physics](#) (Chicago: University of Chicago Press, 1980).

³⁷² Aczel, Amir D. [Entanglement: The Greatest Mystery in Physics](#) (New York: Four Walls Eight Windows, 2002; Raincoast Books, 2003).

³⁷³ Rosen, Stanley. [Nihilism: A Philosophical Essay](#) (New Haven: Yale University Press, 1969).

³⁷⁴ Stevens, David. [Romanticism](#) (Cambridge; New York: Cambridge University Press, 2004).

³⁷⁵ Vattimo, Gianni [Nietzsche: An Introduction](#) (Stanford, Calif.: Stanford University Press; London: Athlone, 2002) Trans. Martin, Nicholas.

³⁷⁶ Nietzsche, Friedrich W. [The Genealogy of Morals](#) (Oxford; New York: Oxford University Press, 1998; Courier Dover Publications, 2003)

nihilism that is endemic to the modern world. Nietzsche takes responsibility for his own nihilism³⁷⁷ and begins searching for an alternative model of values, which he calls the values of the free spirit. Ultimately this romanticism became the source of the search for a way out of the dualism of subject/object ways of looking at things that has become foundational to the modern era. This problem has been the prime impetus for Heidegger's work, which demonstrates how to accomplish the miracle of solving the subject/object dualism in the context of the transformation of phenomenology.

³⁷⁷ Kaufmann, Walter A. Nietzsche (New York, Meridian Books, 1956; Princeton: Princeton University Press, 1974) p. 255, cf. "Blond Beast" used in a self disparaging way.

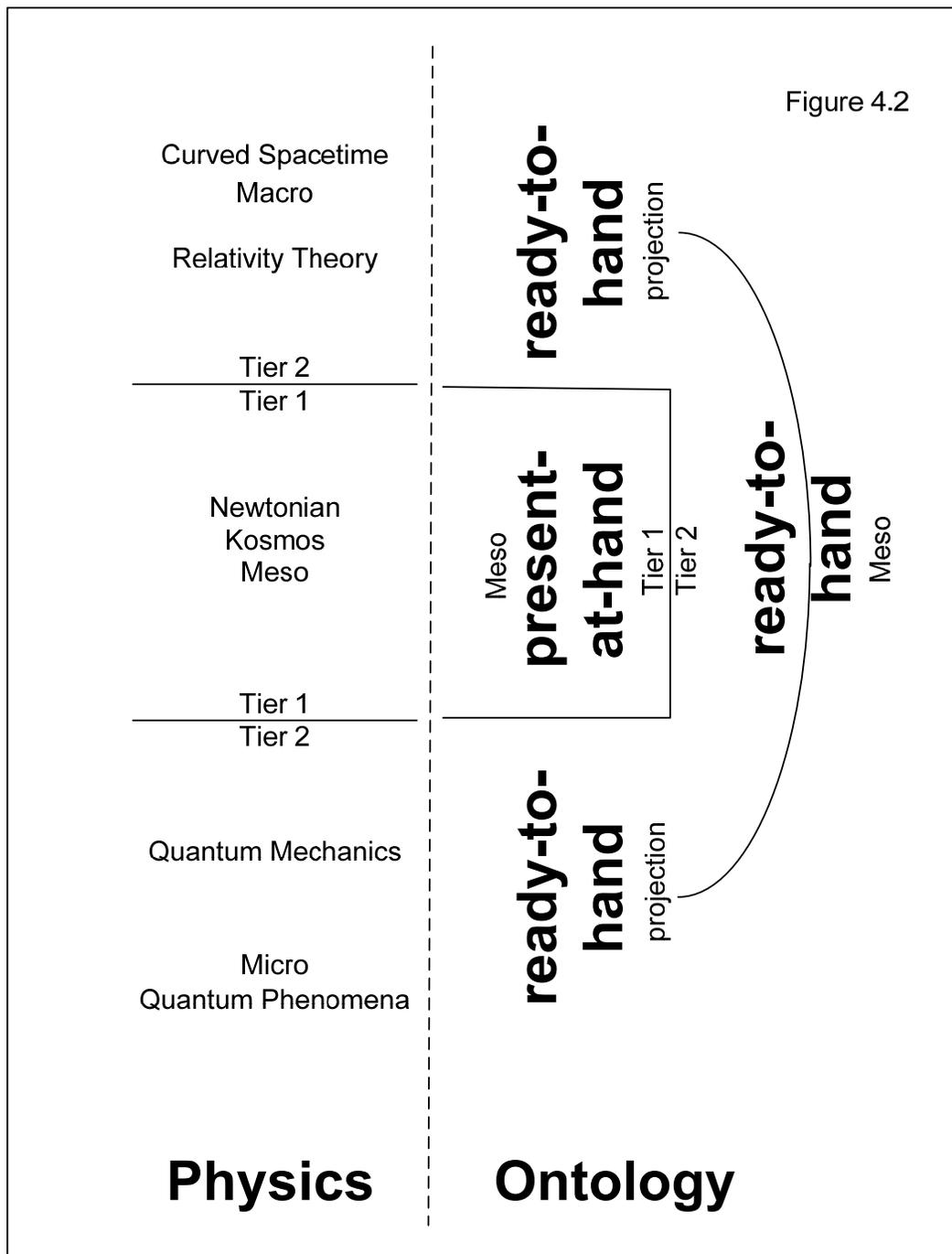


Figure 4.2. Duality of Relativity and Quantum Mechanics in relation to Heidegger's distinction of ready-to-hand from present-at-hand

In Heidegger's phenomenology *essence perception* becomes the way of understanding the ready-to-hand while the present-at-hand is constituted by *abstract ideation*. The *world* becomes the one fundamental *horizon* against which all phenomena can be seen and apprehended by our human finitude. The relationship of the Form and the World horizons becomes like the intrinsic nondual relationship between Dasein and World. But that horizon, which projects the meaning of Being onto things, has two modalities, which are

equi-primordial. These are the ready-to-hand of the technological infrastructure when it is working and supporting the present-at-hand, and the present-at-hand itself, which is the normal reified way we view things as dualistic subjects and objects. In the ready-to-hand modality, the duality is ameliorated because we are wedded to the horizon of the world, and we become *being-in-the-world*, which is a *clearing in Being*, and that is the realm of intelligibility that we project and then inhabit.

Phenomenology of the System: Dasein and Ejects

We can take this insight that Heidegger's bold transformation of Phenomenology gives us and we can apply it to our Phenomenology of the System. We have recognized that there are multiple horizons of exploration, not just the largest in scope, which is the World. The System, Meta-system, and Domain are sub-thresholds between the World and the Form. Philosophy, prior to Husserl, generally talked only about Forms. Husserl, in order to eliminate bracketing, realized that he could project the horizon of the world as a background to the form, and solve the problems of intersubjectivity and the noumena. Heidegger then realized that we can inhabit that ultimate horizon and become *entangled and fused* into it as projector/projected entities that *hang off* of that horizon rather than being an entity that is *split between subjects and objects* on the background of that horizon. What we can add to this in our Systems Phenomenology, is that there is not just this one horizon, but many – from the Form schema to the World schema, and that we are, in fact, more generally *being-in-the-schema*, where the schema is a specific horizon like the World, or the Domain, or the Open-scape, or the System, or the Form or Pattern that we are aware of 'being entangled in' at a given time. Our projection of the schemas is our entanglement in as well as our embodiment of the things that we experience. In each case we can become being-in-the-schema, and that schema will establish a 'clearing' of a certain type within the horizon of that schema, and that brings with it a certain type of intelligibility in each case, where intelligibility means some sort of pre-understanding of the organization within that horizon. Each horizon has a different type of intrinsic organization, and that is how we tell them apart from one another. We recognize that they are nested, and that they are all ecstasies of our Dasein, although Dasein does not have just *one* ecstasy, but several ecstasies of different kinds with different scales, and that they nest with each other to create a series of openings with no gaps between them that act as clearings for phenomena to manifest within. As Dasein we are no different from the opening up of these clearings within which we find ourselves as if we were *always already* there.

What Heidegger does not dwell upon, is that the ecstasy of the Dasein in these horizons is like a natural phenomena, in other words, we do not have the power to shape these projections of schemas as we see fit, they jump out of us unbeckoned. Our ‘thrown-ness’ into the world is the throwing of the schemas into the world. The horizon is the background context of the phenomena that we are experiencing, and we are part of that background context. A strange part of this is the constitution of the horizon together with others. Also participating in that context with others are the non-projecting entities, which we will call *ejects*³⁷⁸, rather than objects. We call them ‘ejects’ because Heidegger, following Nietzsche, sees Dasein as falling into *groundlessness*, as ‘thrown in the world.’ As such, Dasein has two modes, one in which Dasein is grasping for straws to attempt to stop his fall toward nothingness, i.e., death, and the other, in which Dasein accepts his intrinsic falling nature. These are the inauthentic and authentic modes of the *being* of Dasein. The ejects, i.e., ontic non-projecting entities, which are not yet objects (just as Dasein is not yet a subject), are what is thrown out with Dasein as part of the grasping of Dasein in its falling. Heidegger does not really name these pre-objects the way he names the pre-subject, except by referring to them as ontic phenomena. But for our analysis, it is important to name them so that we can discuss their relationship to the schemas. In other words, in some sense the Ontology of Heidegger is *Dasein centric*, and does not consider the things that Dasein cares about, except to the extent that they can be other ‘pre-subjects’ in *Mitsein* (Being With), or other ‘pre-objects’, which we will call *ejects*. They are what were *ejected* along with Dasein *when it was thrown into the world*, like the placenta that is ejected with the baby in the birthing process. It is the ejects that are schematized by Dasein in its ecstasy of existence. These *ejects* are important to our analysis³⁷⁹ because they are the sources of *anamorphic objects* that instigate the *anagogic swerve* through which the subjects realize perspectival transformations within the context of the nihilism of their world which we call Emergent Events.

³⁷⁸ My terminology for non-Dasein ontic entities, recognizing that these things are encountered in the midst of our “thrown-ness.” Not related to J. Kristiva's 'abject' which means *exhausted*. R. Kaehr contrasts abject with reject as being opposites, which are orthogonal to normal dualities. In this sense the eject is prior to all four possibilities of the diamond logic or the tetralemma. These orthogonal opposites of abject and reject are like N. Hellerstein's imaginary logical limits in his [Diamond Logic](#). See J. Kristeva, Julia. [Powers of Horror: An Essay on Abjection](#). European Perspectives. (New York: Columbia University Press, 1992). R. Kaehr's works at <http://www.thinkartlab.com> accessed 091007

³⁷⁹ Ejects are pre-objects that are prior to being in any perspective of a subject, so that means they can assume the variability necessary when objectified so that they can become pivotal objects that allows the transformation from one perspective to another when the nihilistic sameness of conflicting dialectical moments are realized by the subject. Anamorphic objects embody contradiction, paradox and absurdity which gives them the ability to indicate different perspectives that resolve these quandaries for the subject who is attentive to the possibilities of changing their perspective on the wicked problems that they confront.

When we think about being-in-the-schema as *both a projecting of the horizon* as well as *being-in the horizon*³⁸⁰, we must distinguish between the 'horizon' and the 'ejects' that are seen on the horizon. We must also distinguish the paradoxical entities (dasein) that are *projecting what they encompass*, while at the same time they are being *encompassed* by their own projections. Dasein is like the point on a Kleinian bottle³⁸¹ where it self-intersects. In that sense Dasein is always paradoxical, taking all the absurdity of Being into itself. But if we think of the projection as being like the Kleinian bottle that self-intersects and produces ambiguous points that are on two surfaces simultaneously, then the rest of the bottle is like the projection. Dasein, as Mitsein, cannot distinguish itself from all the other projectors of that horizon, largely because *the horizon is a mutual projection*. But since Dasein cannot distinguish itself as something that projects from 'a thing projected upon,' then it is equally 'a thing within the world.' Husserl's phenomenology was characterized by too much distance as well as unreachable limits, but as Heidegger worked to overcome and transform these problems, he created a view of the world in which things were entangled and *too* closely aligned to be distinguished from each other essentially. And this is why differentiating the schematic levels is important, because it gives us a tool to tease out these differences that Heidegger could not easily make on his own. The noematic nucleus is, at the same time, the *thing projected*, the *projector*, and the *other projectors*. Other Subjects and Noumena no longer exist as separate from Dasein. Heidegger was fascinated with the 'point of paradox,' which is: *the being-in-the-schema that appears in its own clearing and opens its own openness to itself*. But, if we continue our examination and look at the rest of the Kleinian bottle as an entire field, we would see that, in this situation, there are ontic ejects within that field that are facets of Dasein, but distinguishable from Dasein at a non-representable or a-conceptual level. In this regard, we accept the interpretation of Heidegger offered by Pauli Pylkko in *Aconceptual Mind*³⁸². In other words, the transformation *out* of the distancing of the subject/object duality into a nondual state prior to the arising of that duality, takes us into an unrepresentable and a-conceptual mode of Being for Dasein. This means that, at a *distance*, the ejects are not representable (and thus are opaque and obscure) for Dasein. And this has implications for our understanding of the System and other schemas. The 'ejects' are non-representable and non-conceptual to the extent that they are part of the field of the horizon that is

³⁸⁰ whether it is a horizon encompassing things or people.

³⁸¹ http://en.wikipedia.org/wiki/Klein_bottle accessed on 080430.

³⁸² Pylkko, P. *The Aconceptual Mind: Heideggerian Themes in Holistic Naturalism*. Advances In Consciousness Research, v. 11, (Amsterdam: John Benjamins Pub, 1998).

projected (but beyond) the crossover point of Dasein. For something to be represented and repeated it must be at a distance from the subject. When that distance collapses, then it is impossible to have enough distance from the entity to represent it or repeat it. When we talk about ‘repeating’ we are considering the dual of representation presented by Deleuze in Difference and Repetition, as *repetition*³⁸³. We also understand that between representation and repetition is a form of Mimesis³⁸⁴ that is described by Taussig. We only mention this now in order to get our bearings because our focus will be on “re-presentation”. It should also be noted that *ejects* are at once the unconscious “thing” and the phantoms of Abraham and Torok³⁸⁵.

Schopenhauer realized that “*Wille*”³⁸⁶ and Representation constitute the World. Schopenhauer was looking for the Kantian Noumena in us, and realized that it was the *Wille*, which means passions, instincts, will, desire, intention, and all that motivates us from within, which is beyond our control and comprehension (See also *trieb* according to Freud, which is more than “instinct”³⁸⁷). We create the world of representations beyond us, but we are plagued by the noumenal within. And exploring in this direction leads to the ideas of the Unconscious developed by Freud and Jung. But, we are still thinking at the level of the subject, and the *Wille* is seen as something noumenal within the subject. When you get rid of the subject/object split, then *Wille* spreads out everywhere, and merges with the noumenal within the field of the projection. It also merges with the *Wille* of others to be a fundamentally non-representable side of existence³⁸⁸. From the Heideggerian point of view, as expressed by the interpretation of Pylkko, everything is infected to some extent by the non-representability and a-conceptuality that Schopenhauer³⁸⁹ saw in the *Wille*. And as

³⁸³ For use of term “repetition” see Deleuze, G. Difference and Repetition, (New York: Columbia University Press, c1994; Continuum International Publishing Group, 2005) A key point not made until the end of the book is that Repetition is “that which cannot be repeated”, i.e., repetition is in fact impossible and that is what drives it on to attempt to realize itself again, which is ultimately denied. A good example of this is the sacrifice of a whole living animal as a means of regaining lost wholeness. Wholeness is destroyed in order to realize lost wholeness again. This is why there is no simple bridge between the model and the whole schema in the Quadralectic, and why the design moment as enacting metis (trickery) exists.

³⁸⁴ Taussig, Michael T., Mimesis and Alterity: A Particular History of the Senses (New York: Routledge, 1993).

³⁸⁵ Op. cit.

³⁸⁶ ‘*Wille*’ means more than the English ‘will.’ Terence Kuch "Schopenhauer: "The World as Will" as Theology" Cf. “wille”, An interesting student essay, which is an introduction to the idea and contrasts it to God. <http://www.philosophypathways.com/essays/kuch4.html> accessed 080430. There are few examples of treatments of this concept by itself.

³⁸⁷ A better translation of ‘trieb’ might be “Drive.” See Frank, George. “Triebe And their Vicissitudes: Freud’s Theory of Motivation Reconsidered” Psychoanalytic Psychology 2003, Vol. 20, No. 4, pp. 691–697.

³⁸⁸ The *ejects*, as the non-representable side of existence, are something we cannot project as objects through the Kantian Categories in experience, or as statements through the Aristotelian Categories in language.

³⁸⁹ Schopenhauer, Arthur The World as Will and Representation Trans. Payne, E.F.J. (New York, Courier Dover Publications, 1966).

we explore how these concepts have evolved, we can see that this is the romantic strain that originated with Schopenhauer and Hegel, then brought to fruition in Nietzsche and later systematized by Heidegger. It is Heidegger's exploration of this non-representability and a-conceptuality that makes his philosophy so difficult to understand³⁹⁰, particularly by philosophers who strictly adhere to the Analytical school of thought, so we need to understand how this affects the way we see systems/processes and other schemas as horizons of intelligibility. It means that there is a certain degree of non-intelligibility mixed into the intelligibility of each schematic level (we previously called this the *introjected hyle* when we thought it came from outside of us). This is what we understand as the split between the schema and the noumena that the schema is projected upon. In all cases, in spite of eliminating the noumena as a limit, the price we pay is that the noumena has become *part* of the field where we see the ejects (as intrusive introjected hyle within that field). What is ejected is something that is *not* part of the projection, but appears *within* the projection as *through a glass darkly*. Each eject is a nexus of an external organization of the projection (Immediate Object) and also its own internal organization as the 'thing-in-itself' (Dynamic Object). And we must attempt to clearly distinguish between the two, which, in fact, is the job of Science, because when Science listens to the phenomena rather than to its own projections, it actually learns something. Historically, the problem of the true names is precisely the problem that Plato deals with so humorously in the *Cratylus*³⁹¹. It is a serious problem.

How does one see through to the organization and nature of the noumenal when all we have are our projections, and distortions? Within the field of the Kleinian bottle, beyond its folding through itself, there will be distortions in the field of the bottle, and those that are centered around the ejects are non-representable and a-conceptual in nature. The only way to deal with this problem is to understand the *medium that is distorted* because then we can understand the *normal formation of that medium* at each horizon. By doing this, the distortions and anomalies will stand out as they occur. This means that in order to understand the noumenal aspect behind the phenomena of the eject, it is necessary to study the Schemas in general, and in toto, so that we may understand their own inherent organizations and their relationships to each other, so that when a distortion occurs it is

³⁹⁰ Soames, Scott. *Philosophical Analysis in the Twentieth Century* (Princeton, N.J.: Princeton University Press, 2003).

³⁹¹ Plato, partial commentary by author at <http://holonomic.net>

listened³⁹² to and apprehended (or understood) as significant information departing from the norm of projection. Heidegger calls this “gelassenheit”³⁹³. Letting things be in themselves what they are in their essences and allowing them to manifest that while we reign in and control our projections voluntarily. Where Husserl wants to go “to the things themselves”, Heidegger wants to allow the things to come to him by controlling himself, in terms of his projections onto things.

Being-in-the-System

It is surprising that nothing like General Schemas Theory now exists. We must invent it³⁹⁴ within the tradition so that we may have it as a guidepost. We study our representations and their repetitions and their mimesis for two reasons, first so that we can understand their non-representable a-conceptual distortions, which tell us something about the ejects that appear as phenomena in the world, but also because whatever we design will follow the projections and conform to the horizons that are “always already” with us before we begin any task. *In one instance, we want to take the schematic input out of our design proposals when considering nature, but we still want to understand how we base our designs upon nature when we build artificial things.* These schemas are the web we weave, like the spider that unfolds his web in a particular space in a certain sequence in time. If we design anything, we will follow that natural schematic organizational patterning that is intrinsic within us as it is modified by our culture. But when we compare our understanding of projections with nature, we need to be keenly attuned and we must listen to the distortions in our projections that can give us some idea of what lies beyond our projections³⁹⁵. One is like the spider listening to the vibrations of his web in the wind as it waits for its prey to alight. What we do not understand about our projections, is how their nature manifests within us. What we do not understand about the ejects, is what their nature is like beyond how our nature unfolds them, which is different from to the way we naturally would unfold them if there were no resistance from ‘things-in-themselves.’ One mistake is to think that things-in-themselves are absolutes, rather, they are what we do not yet have schemas for at any level. The first level of schematization is finding an appropriate spacetime envelope

³⁹² Fiumara, Gemma C., *The Other Side of Language: A Philosophy of Listening* (London; New York: Routledge, 1995).

³⁹³ Sometimes translated as “releasement” or letting things be as they are in themselves. See Pezze, Barbara Dalle. “Heidegger on Gelassenheit” *Minerva - An Internet Journal of Philosophy* 10 (2006): 94-122 ISSN 1393-614X

³⁹⁴ See author’s paper “General Schemas Theory”, CSER 2004.

³⁹⁵ Fiumara, Gemma C., *The Metaphoric Process: Connections Between Language and Life* (London; New York: Routledge, 1995) Metaphors can be very helpful in this process. Amazingly Fiumara defines metaphor in a very similar way to my definition of Schema.

for things we have not encountered before, and then from that, other higher level schemas will follow. We are only concerned with this lowest level of schematization, which relates to the spacetime envelopes of things prior to knowing what they are, what their individual characteristics are, and what their meaning is. We are part of nature, and we have been endowed with our notions of the mathematical and geometrical schemas as a web that we can weave in spacetime through which we can catch the ejects that are beyond our schemas.

So, let us apply what we have learned to the System Schema as part of our development of a Systems Phenomenology within the context of General Schemas Theory, which is a broader theoretical horizon. We are not merely 'being-in-the-world,' we are also 'being-in-the-system.' There is a view of the system prior to the arising of the subject/object dichotomy. This former viewpoint prompted us to propose certain questions: Do we freely project, do we project socially as a group, or are systems merely objective things in the external world? Yet, suddenly we realize that these questions are meaningless because all of these things have become entangled for us. *We* are the noumena. We are the *other* subjects and we do not identify with our own subjectivity, because we are actually 'being-in-the-system' when we are focused on the organization of things, and we cannot be separated from the 'system' as such. Ask any engineer who has created systems in his career. You will see that something of himself has gone into the system that he has created, and as he creates it, he has to be completely part of the system he is working on. He is engaged *doubly* in the ready-to-hand. He is immersed in the technological infrastructure *as he is creating it*. He is *using* the technological infrastructure as he creates it. It is simultaneously changing while he is in the process of producing new changes that will affect others and their creation of new things. In his *non-routine* work, the engineer engages fully in the 'change *of* change' in the system that he is building. What saves us and makes this possible is that there are time lags in the adoption of new technologies so that the effects are not immediate. It takes time for the technological diffusion of new innovations in the technological infrastructure to take hold. So, suddenly it is possible to understand the paradoxicality of Dasein on a practical level. Dasein is using the time-lags in the technological infrastructure to build on existing technology while it changes out from under him. At the same time, what he builds changes the future of the infrastructure that he is embedded in, and these changes affect both him and others. We can only create

new technology based on the pragmata³⁹⁶ of the technology that we are immersed in that exists in the moment. We are constantly bootstrapping new technologies out of old technologies. We are doubly caught in our own web³⁹⁷. We create the web of technology, while taking from the web that we have created. And, from that baseline, the creation assumes a hierarchical scale of organization, or horizons, that we call the schemas. This puts the ready-to-hand into practice at each level, but also allows representations that can be repeated mimetically to exist as representations through those pragmatic background practices as present-at-hand. *Schemas are horizons that we use in our technological practice to produce present-at-hand products and representations that become the technological infrastructure. In a sense, the Dasein of Heidegger is the perfect description of the nature of Engineering as a self-bootstrapping pragmatic practice (based on metis³⁹⁸) within the technological sphere.* And Heidegger was aware of this! That is why he takes the theme of the ‘nihilism of technology’ from Nietzsche and explores it even deeper. We can examine an interesting rendition of this argument given by Fandozi in his Technology and Nihilism³⁹⁹ but it would be a distraction to deal with the problem of nihilism in relation to technology at this point. Rather, what we want to show is that Engineering has a ‘Dasein like’ orientation toward the technology that it builds and uses. And there must be a *difference* between the ‘use phase’ and the ‘builds phase.’ In the ‘use phase’ the technology is ready-to-hand, and in the ‘build phase’ one is trying to create a present-at-hand product that can be used. We will refer to the ready-to-hand as Process Being, and the present-at-hand, or final product, as Pure Being. This difference brings up the transitional nature between the two phases, which we will call the in-hand⁴⁰⁰, or Hyper Being⁴⁰¹. This also alludes to the argument of Wittgenstein⁴⁰² who was onto the same thing when he stated that *meaning is use*. He was contrasting the idea of ‘meaning as use’ to the idea that

³⁹⁶ This term means pragmatic considerations of practical reason necessary to bring about emergent effects in new systemic artifacts.

³⁹⁷ In software, bootstrapping a language out of another language is a good example of this.

³⁹⁸ Metis means cunning, it is the primary characteristic of Odysseus who designed the Trojan Horse. See Gordon, R. L., and Marcel Detienne. Myth, Religion, and Society: Structuralist Essays (Cambridge, UK: Cambridge University Press, 1981). See also Doueïhi, Milad. The Mētis of the Greeks (Baltimore, MD: John Hopkins University Press, 1986). See also Barnouw, Jeffrey. Odysseus, Hero of Practical Intelligence: Deliberation and Signs in Homer's Odyssey. (Lanham, Md: University Press of America, 2004). See also Parsons, Anne. Metis in the Iliad: Gender and Verbal Deceit (Thesis, Honors, --Smith College, Northampton, Mass., 2000).

³⁹⁹ Fandozi, Phillip R., Nihilism and technology: A Heideggerian Investigation (Lanham, MD: University Press of America, 1982).

⁴⁰⁰ ‘In-hand’ is my own terminology, for tools that transform in our hands, which is the next meta-level up from the ready-to-hand, which is the nature of tools from the point of view of Dasein.

⁴⁰¹ Hyper Being is the Differance of Derrida, ~~Being~~ (crossed out) of Heidegger, or the “Hyper-dialectic of Being and Nothingness” described by Merleau-Ponty in the Visible and the Invisible. Op. cit.

⁴⁰² See Wittgenstein, L. Philosophical Grammar (Berkeley: University of California Press, 2005). See also Philosophical Investigations (New York: Macmillan, 1953, Prentice Hall, 1999).

things have inherent and intrinsic meaning. The former idea might be seen as the ready-to-hand of meaning and the intrinsic and inherent meaning might be thought of as the present-at-hand of meaning. Thus, Wittgenstein was essentially drawing a similar distinction to the one that Heidegger was drawing. He was contrasting how things appear in use. We have a difficult time creating the distance that we need in order to understand their representation with how things appear when they seem to have inherent meaning as something that is present-at-hand. In fact, Wittgenstein has a book called Philosophical Grammar in which he discusses the Schemas at length, mostly using them as metaphors and analogies. This book of Wittgenstein's is replete with the way schemas can be used to understand our relationships to things. The view in Philosophical Grammar, which is the precursor to Philosophical Investigations, is more conducive to our view than his later reworked book. At any rate, the same idea is essentially expressed by both Wittgenstein and Heidegger who are generally regarded as the greatest philosophers of the twentieth century in terms of their influence.

Schematic Horizons and the Meta-systemic Blindspot

The point that we would like to make, which we think may be new, is that at a given particular schematic horizon, it is the next *higher* schematic horizon that is the basis of its representation and repetition. In other words, if we are building a form, then the system schema is its horizon, if we are building a system, then it is the *meta-system* (open-scape) that is the basis of its representation. The higher horizontal schema is the medium through which we approach the representation of the lower level schematic representations. Thus, we approach the lower level schematic present-at-hand representations through our ready-to-hand relationship in terms of the higher level schema as the horizon. Ready-to-hand and Present-at-hand then become relationships that are between horizons, rather than being a reification on the background of a single horizon of the World. We think this may be an important insight for us in terms of the System. The Form is a representation on the background of the System, and we approach the Form as a present-at-hand reification on that background, but if we approach the Form through the System, then it is ready-to-hand within the horizon of the System. Similarly we can create a representation of a System that is present-at-hand on the background of the Meta-system, but if we want to create a System, *and* if we want to approach it in terms of its non-representable and aconceptual nature, then we have to approach it through the ready-to-hand relationship that it has to the horizon of the Meta-system. If this is true, if these modes of 'Being of Dasein' and the 'Engineer' emanate from the relationship between schemas, then this could have important

consequences for how we understand what we are doing when we build systems. Another important implication is the fact that we do not understand meta-systems in the same way that we understand the other schemas, we have a blind spot⁴⁰³ at the Meta-system level in our culture, and this has a tremendous effect on our ability to produce Systems when we ‘bootstrap’ technology. Bootstrapping depends on its ready-to-hand relationship to the higher horizontal level schema, and if we don’t understand that schema cognitively, then we are handicapped. And this problem may compound at the higher level schema of the Domain, since the Meta-system should be a representation on the horizon of the Domain. Something is interfering with the Meta-system representations that take shape in the Domain horizon. As we have said, the representation of the schema takes shape or ‘gels’ from out of the conjunction of the System and Domain schemas. A Meta-system is a System on the background of a Domain. We can understand that very well. We have Product Line Engineering⁴⁰⁴, which was once called Domain Analysis⁴⁰⁵, and thus we understand the relationship of the Systems to the Product Lines through Domain Analysis. So what we see from *that example*, is that the juxtaposed System and the Domain are not producing a conjunctive organization of the Meta-system schema as they should.

Now we could argue that the schemas are merely a background against which we see things, or a background that serves to make things visible. We could also argue that every System that is created to make things visible *must* have a blind spot, and that the Meta-system *is* that blind-spot in the schematic spectrum of scales that constitutes phenomena. There is also the possibility that some particular schema had to be this blind spot, and that in our culture, during the Metaphysical Era, that blind spot was the meta-system. In other words this argument proposes that *visibility* is dependent on the ‘counter constitution’ of something that is *invisible* and that it is a *particular* horizon in the hierarchy of horizons at various scales. But the failure of the Meta-system to ‘gel’ and to form a conjunction from the juxtaposition of System and Domain, has crucial consequences for systems design and its development within Engineering. It means that our mode of ready-to-hand access to the System through the Meta-system horizon is impaired. But then we see, on the other hand, that building systems is where our greatest activity is focused for creating artifacts that

⁴⁰³ By a blind spot I mean that although meta-systems are there and we project them, we are not self-conscious of that projection in the same way we are self-conscious of the other projections of other schemas. Somehow there is a barrier or opacity obscuring the meta-system in ways that do not affect other schemas.

⁴⁰⁴ Käkölä, Timo, Software Product Lines: Research Issues in Engineering and Management (Berlin; New York: Springer, 2006). Also see work done at the Software Engineering Institute which is part of Carnegie Mellon University.

⁴⁰⁵ Prieto-Diaz, Ruben, Domain Analysis and Software Systems Modeling (Los Alamitos, Calif.: IEEE Computer Society, 1991).

serve as the infrastructure for our world. So much so, that the entire discipline of “Systems Engineering” is named after that one schema, i.e., the System Schema. This is the schema that we must develop as a general trans-disciplinary academic discipline called Schemas Science⁴⁰⁶. We need to balance the extraordinary activity that it takes to produce systems, with the fact that the meta-system, as a horizon for the ready-to-hand gasping of systems, is defective in our Western culture and worldview. This is not an accident. What has been cited as a purely negative *cultural* defect, is perhaps a *structural problem* within the panoply of the schematic spectrum of our culture. It is a nihilistic structure with too much repetitive activity on one hand, and too little representability on the other. And this not only affects the development of systems, but the placement of the systems in environments where they have unintended consequences that are unforeseen. In other words, it affects the entire lifecycle of the system and its interaction with its environment.

This means that the part of Systems Phenomenology that is necessary for recognizing the representation of the Meta-system as a ‘horizon for systems’ is absent. This is in keeping with the Heideggerian idea of Hermeneutics, which sees a *sign*⁴⁰⁷ as something that stands in as *present* (conspicuous) for something that is *absent* (inconspicuous). Our frenetic activity in building Systems is balanced by the absence of the representation of the Meta-system/Open-scape, as well as by the absence of an appropriate concept of accessing the ready-to-hand aspect of the System through the background horizon of the Meta-system. This *excess* and *lack* that appears in relation to Systems and Meta-systems manifests as nihilism on the spectrum of the horizons of the schemas. That must affect our way of creating Systems, it makes them more difficult to bootstrap from our existing technology. It is as if we are groping in the dark. And this is amazing since technological innovation is such a central part of our economy and our industry. It is important, as part of our Systems Phenomenology, to understand that the *absence* of our recognition of the Meta-system stymies our ability to build products with Systems that resonate. It is also important to note that we do not acknowledge or understand the Meta-system, and as a result, our attempts to create new Systems bootstrapped from the existing technological infrastructure are often blind and miscalculated endeavors with disastrous consequences. As part of our Systems Phenomenology it is important to understand the Meta-system as what is absent, and that

⁴⁰⁶ Warfield, John N., [An Introduction to Systems Science](#) (Hackensack, NJ: World Scientific, 2006).

⁴⁰⁷ Heidegger had a peculiar sign theory of his own in [Being and Time](#), which does not seem to have been picked up and developed by anyone else. Heidegger thought that the sign was part of the ready-to-hand but was a conspicuous part that was different from the normal inconspicuousness of the ready-to-hand, and thus offered a special avenue to understanding the World.

through its absence it conditions our intensive attempts to create new Systems bootstrapped from the existing technological infrastructure that is the background horizon for every innovation in technology that becomes a new product. This bootstrapping is concerned with producing emergent effects, and so it is important to understand the relationship between emergence and de-emergence. The production of new innovations through emergence, or the destruction of old infrastructure through de-emergence, is caught up in the relationship between the System and Meta-system, because systems are emergent and meta-systems are de-emergent. And it is probably no accident that the system and the meta-system are the central schemas in the series of ten schemas that exist as finitudes for human beings in our culture during this Metaphysical Era. In other words, the presence and absence are in play circling around the central fold⁴⁰⁸ in the schemas through which they express their duality with each other. The nihilistic *excess and lack*, as well as *presence and absence*, plays around the center of the set of ten schemas that appear as Pluriverse/Facet, Kosmos/Monad, World/Pattern, Domain/Form, and ~~Meta-system~~⁴⁰⁹/System. Notice that the defect in the ~~Meta-system~~ occurs within the duality between the Domain and the System. It is the juxtaposition of the Domain schema and the System schema that should yield the Meta-system schema. So, this means that an asymmetry is created around the core of the spectrum of the schemas, and at that core the Special Systems are represented by the Reflexive Social, Autopoietic Symbiotic, and Dissipative Ordering Special Systems⁴¹⁰. That core is hidden by the nihilistic structure of presence/absence and excess/lack, which is nihilistic and semiotic at the same time. Thus, we can consider that the *hiding* of the Special Systems might be the root cause of this nihilistic structure. In other words, it is our *access* to the Special Systems that is *absent*, and this absence is invisible and cannot be properly dealt with as long as the System and Meta-system cannot be definitively distinguished. This means that, through asymmetry, our Systems Phenomenology discovered that within the symmetrical structure of the set of schemas there is something more deeply absent than just the Meta-system. This focus on absence can transform our Systems Phenomenology into a Meta-systems Phenomenology.

⁴⁰⁸ For the importance of *folds* see Deleuze, G. The Fold - Leibniz and the Baroque (Minneapolis: University of Minnesota Press, 1993; London, Athlone Press, 1993).

⁴⁰⁹ ~~Meta-system~~-(crossed out) indicates its hidden nature as a blindspot within the ontotheological structure of intrinsic absenting.

⁴¹⁰ See “Reflexive Autopoietic Dissipative Special Systems Theory” at <http://archonic.net> by the author.

This will allow us to define a new kind of Science⁴¹¹ and Engineering that is intrinsically *nondual* rather than dualistic⁴¹².

⁴¹¹ See Nondual Science by the author at <http://nondual.net>

⁴¹² See Foundations of Emergent Science and Engineering at <http://holonomic.net> by the author.

The System and its Relationship to the Meta-system Open-scape Schemas

Why the Meta-system Schema is Necessary

This chapter explains the relationship between the 'inverse duals' of the System and Meta-system schemas. The structure of showing and hiding between them is nihilistic, which means that their opposition is so extreme that they are ultimately reduced to the same thing in that extremity. What is the *same* between them is called the Enframing by Heidegger, which is explained in terms of Ontotheology, the Philosophy of Presence, and Logocentrism. These pivotal critiques of postmodern metaphysics will help us to understand the metaphysical conundrums that are endemic to our tradition as we indulge in a phenomenological speculation concerning the Quadralectic and its relationship to the structure of consciousness. In addition we will also examine the four viewpoints of the Novel, the four Zoas of Blake, and the four types of Time as discovered by Brumbaugh. We are attempting to cast a wide net in order to understand the foundations of the phenomenological structure of the Quadralectic.

The Nihilistic Structure of Systems and Meta-systems

In the last chapter we examined how an over-emphasis on Systems is dialectically related to an under-emphasis on Meta-systems. This indicates that there is a nihilistic structure of *showing and hiding*, and *absence and presence*, built into the way that the schemas appear to us within our worldview in this Metaphysical Era. The *Form* schema has been dominant up until the beginning of the last century⁴¹³. At this time there was an evolution in the worldview that emphasized the *Pattern* or System schema as a structure. The *Form* schema is opposite the *Domain* schema and the Domain schema has to do with *perspectives*. Since the Renaissance the Form schema has been perspectivized in painting. And since then the perspectivized forms have been the dominant motif in our culture until the end of the

⁴¹³ At the beginning of the twentieth century, the Western Tradition began to seriously consider the dynamics of form and this led to an emphasis on the system and pattern schemas which had not been emphasized up to that time. An excellent example of the consideration of the dynamics of form is Thompson, D'Arcy Wentworth and Bonner, John Tyler On Growth and Form (Cambridge, UK: Cambridge University Press, 1992).

nineteenth century⁴¹⁴. Then there was a move toward a Structuralism⁴¹⁵ of Pattern⁴¹⁶ and System⁴¹⁷, which are the two adjacent schemas to Form⁴¹⁸. And in this competition between Pattern and System, the System won out as the dominant mode of understanding things beyond Forms. This is partially due to the *Gestalt School* that defined gestalts as combinations of figures and backgrounds in a state of interactive tension⁴¹⁹. Thus, there was a natural understanding of the form in relation to a background. A System is merely *forms seen in sequence on a mutual background that reveals their relationship as a temporal gestalt*⁴²⁰. Systems are somewhat abstruse because we seldom see them all at once as a static configuration. Generally, we project their totalized unity after serially inspecting each form that exists within the scope of the background of the system. Once we understand that the system can be a static meta-figure on the background of the meta-system, or that it can be seen as a temporal gestalt, which is more dynamic, it is then possible to see how the analogy of a figure on the background of the gestalt is repeated in the system on the *deeper background of the meta-system as open-scape, or land-scape, or sea-scape, or mind-scape or X-scape*⁴²¹. So there is a powerful analogy working here between the two sets of adjacent schemas. Patterns reduce our scope, and although they are powerful explanatory devices, as with Mendeleev's Table of the Elements⁴²², patterns do not increase the scope of our vision or apply the relationship of the system to the meta-system in the context of the gestalt analogy. Thus, it is understandable how the *System*

⁴¹⁴ Kant was the first philosopher to orient his whole philosophy toward the System in terms of its architectonic, but the explicit focus of his work was still on Form as the objects of Physical Science, which were described 'a priori' in terms of the Categories.

⁴¹⁵ A good example of structuralism as it applies to evolution is Monod, Jacques. Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology (London: Knopf, 1971).

⁴¹⁶ Grenander, Ulf. General Pattern Theory: A Mathematical Study of Regular Structures (Oxford: Oxford University Press, 1993).

⁴¹⁷ Laszlo, Ervin The Systems View of the World (New York: G. Braziller: 1972; Penguin Group, Canada, 2000).

⁴¹⁸ Alexander, Christopher. Notes on the Synthesis of Form (Cambridge MA: Harvard University Press, 1964). Lynch, Kevin. A Theory of Good City Form (Cambridge, Mass.: MIT Press, 1981).

⁴¹⁹ Vecera, Shaun P. , Vogel, Edward K. , and Woodman, Geoffrey F. "Lower Region: A New Cue for Figure-Ground Assignment" Journal of Experimental Psychology: General 2002, Vol. 131, No. 2, pp. 194–205.

⁴²⁰ This is my own definition. The link between systems and gestalts is not generally recognized. This is because we think of the gestalt as having only one figure on a background. But where there is an illusory interference between gestalts a figure-gestalt exclusion is at work, and this suggests that systems can be sets of these exclusions. The idea that we see only one gestalt is an over simplification. Generally, multiple gestalts are possible. Thus, we must take into account the proto-gestalt, i.e., the implicit and implicate relationship between gestalts that relate to the meta-system, and we must take into account that within the same background there may be exclusions operating in such a way that a system is seen as a set of figures on the same shared background. Gestalts overlap to give us a picture of the system as multiple figures upon the same background.

⁴²¹ This can also be described as a panoramic view of the horizon from a static point in the landscape.

⁴²² Scerri, Eric R. The Periodic Table: Its Story and Its Significance (Oxford: Oxford University Press, 2006).

schema became prominent in the last century. But it is also interesting that the System schema's prominence coincided with a de-emphasis on the *Meta-system schema* such that the system was envisaged as if on a *plenum* or *blank background*⁴²³ rather than upon an *organized background* that it could have an interactive relationship with. This, in effect, causes the Meta-system, as an Open-scape schema, to become *invisible* because it appears between two emphasized schemas: the System schema and the Domain schema. The *World schema* only really came into prominence through the work of Husserl and Heidegger and others who subscribed to the ideas of Schopenhauer and recognized it to be the ultimate schema in the horizon of our experience. *Pattern* serves as an explanatory schema and is central to science, but is de-emphasized in Phenomenology, which instead, emphasizes the World schema. The Form schema is taken for granted and thus it is de-emphasized by structuralists and systemicists alike. Now, this 'emphasis' and 'de-emphasis' forms a nihilistic panoply across the schemas which, in effect, means we must take into account the meta-system as the *hidden aspect* of the system schema. This is the basic idea of A. Plotnitsky in his book, *In the Shadow of Hegel*⁴²⁴. He illustrates how Hegel's philosophical concept of the System implies that the "General Economy" of Bataille⁴²⁵ is a *background*, which is hidden and ignored. We equate the "General Economy" of Bataille with our idea of the meta-system as being a systemic dual. That means that the "Restricted Economy" of Bataille is an image of the system. Thus, Plotnitsky was the first to clearly see this nihilistic ontological structure of 'emphasis and de-emphasis,' as well as 'excess and lack' between the System and Meta-system schemas. This is part of what Heidegger calls the Ontotheological⁴²⁶ Metaphysics of Presence and what Derrida calls Logocentrism⁴²⁷. *It is an emphasis on the presence of the whole and complete System that de-emphasizes the background, or absence, of the un-whole-some and incomplete Meta-system.*

Once we have realized that this dialectical structure exists between System and Meta-system, then we must treat the Meta-system as part and parcel of the System schema as well as part of our systems phenomenology. Phenomenology, according to Heidegger,

⁴²³ A plenum is a space that is full. It is the opposite of a vacuum. It also means a space in a building where the wiring and plumbing and other infrastructure are located. The term is used here as homogeneous background that blots out the possibility of the Meta-system as an organization different from the System. In a sense, the fullness of the plenum hides the Meta-system away in the cavities of the building. It gives the illusion that the space is full of Systems with no room for the Meta-system, and whatever is left over is a *blank fullness* that blots out and hides the possibility of the Meta-system.

⁴²⁴ Plotnitsky, Arkady, *In The Shadow of Hegel: Complementarity, History, And The Unconscious* (Gainesville: University Press of Florida, 1993).

⁴²⁵ Bataille, Georges, *The Accursed Share: An Essay on General Economy* (New York: Zone Books, 1988).

⁴²⁶ <http://en.wikipedia.org/wiki/Ontotheology> accessed 080627.

⁴²⁷ <http://en.wikipedia.org/wiki/Logocentrism> accessed 080627.

studies the relationship of *showing and hiding*. This nihilistic structure can also be understood as a *presenting and absenting* ontological structure that is significant and relevant because it plays a role in the articulation of the schemas. This nihilistic structure also *obscures* the Special Systems whose visibility is dependent upon a *clear* delineation of the distinction between the System and Meta-system. The Special Systems are a model of interpenetration⁴²⁸, and are related to Existence rather than Being, which implies that this obscuring of the Special Systems is a result of emphasis and de-emphasis and that it is ontological rather than an existential in nature. Emphasis and de-emphasis coincides with the relationship of Systems to emergence and Meta-systems to de-emergence. Thus, we can see that this nihilistic structure is built in and is not adventitious.

So, let us look more carefully at the Meta-system schema as a context for the System Schema. The first thing we can say is that these schemas are duals. Systems are three and four-dimensional while Meta-systems are four and five-dimensional, so they are posed around that crucial transition to the uniquely structured fourth dimension, which is a model of Existence and interpenetration. It is possible that our access to Existence from the realm of projection (which is based on Being) is obscured as a result of a suppression of the Meta-system. It is in that interface of the fourth dimension that the Special Systems are formed, especially the Autopoietic Special System, which is modeled by the quaternion and is the rotational group for the fourth dimension⁴²⁹. The Meta-system can also be described as a de-emergent dual of the emergent System. This means that Meta-systems are fragmented, and can be seen as *wholes less than the sum of their parts* in relation to the System, which is a *whole greater than the sum of its parts*, as modeled on the gestalt perception. Meta-systems can be likened to the wild seas that may surround a small craft (the system) as it tries to remain viable. Meta-systems are full of positive feedbacks, in either negative (blackhole) or positive (miracle) directions. We can model both the system and meta-system using Systems Dynamics equations, although the difference is that the system has a negative feedback at its core, while the meta-system contains uncontrolled positive feedbacks that may produce an environment hostile to the viability of the system that inhabits it. They are also full of discontinuities and singularities. They are structured

¹⁶ The special systems are a model of interpenetration, which can be seen by looking at the relations of the imaginaries in the Quaternion which has the structure of Aczel's non-well founded sets except mediation between any two is through the third in all cases. And thus there is mediation through the Other for any given pair of imaginaries. If you think of this as a cascade then you can see that any one imaginary contains the two other imaginaries giving a precise model of intra-inclusion and interpenetration.

⁴²⁹ Hanson, Andrew. Visualizing Quaternions. Morgan Kaufmann series in interactive 3D technology. (San Francisco, CA: Morgan Kaufmann, 2006). See also Robbin, Tony. Shadows of Reality: The Fourth Dimension in Relativity, Cubism, and Modern Thought (New Haven: Yale University Press, 2006).

on the pattern of source, arena, origin (sink), and horizontal boundary. The meta-system is an open-scape, which is like a panorama. The panorama is seen from a particular point in the landscape by an unmoving system configuration. A figure appears on the background of the system as the system appears on the *deeper* background of the meta-system open-scape. But this deeper background of the meta-system is fragmented; it does not have the continuity of the system background. Systems are unified and totalized as wholes. Meta-systems are dis-unified and de-totalized, but still *act* as *wholes* even when they have *holes* in them. The holes act as niches for the system wholes. The meta-system acts as a filter for the system, but whether or not the system fits into the meta-system niches, is the question. The system sees those niches as voids to be filled.

Think of the meta-system as the shadow of the system, as Plotnitsky discusses In the Shadow of Hegel⁴³⁰. There may be multiple points of view, which can be seen as multiple points of light sources in the Domain, and these will cast multiple shadows when they fall upon a system within the meta-system. The multiple overlapping shadows with their umbra and penumbras serve as an adequate model for the meta-system. Many times the meta-system, because it is suppressed in our worldview, haunts the system. The meta-system is all the negative and disruptive aspects that have been suppressed in order for the system to be brought into presence. Jung referred to this as the Shadow⁴³¹ that encompasses the suppressed, negative aspects of the Ego, which is localized in relation to the general unconscious, which, in turn, is the meta-system to the system of consciousness that is totalized and unified around the Ego. For Hegel, the historical dialectically evolving consciousness was unified and totalized by the Spirit. And when we apply this model to the schemas we begin to see that there are multiple concentric horizons, each giving a deeper background to the phenomena that is being brought into presence. We see the background of the figure on the system as a whole, but we forget that the system has a background in the meta-system. And this forgetfulness is a preserved structure within the overall panoply of presentation on the background of obscuration. The entire panoply of presentation and obscuration has to be taken together.

Heidegger calls this the enframing⁴³². It is only when we are reminded of the forgotten parts and bring those into conjunction with the presented parts that we see the entire

⁴³⁰ Op. cit.

⁴³¹ Casement, Ann "The Shadow" in Papadopoulos, Renos K. The Handbook of Jungian Psychology (Psychology Press, 2006) Chapter 4 pp. 94-111.

⁴³² das Ge-stell "The essence of technology, Ge-stell, is a way of revealing (disclosing, uncovering, bringing out of concealment) of what is (Seiendes or das Seiende) as Bestand (standing-reserve)." "Heidegger,

structure of the enframing. *Heidegger sees enframing as the essence of Technology*. It is the production of a standing reserve. Meta-systems are about providing resources for Systems, they manage the standing reserve that Systems need in order to operate. Thus, we can see that the relationship between Systems and Meta-systems are emblematic of the wider question concerning the essence of technology as Heidegger describes it. As Systems and Meta-systems participate in the enframing it is the deeper background that serves to highlight the System. This is why we must make the ‘enframing of the system’ part of our phenomenology. Heidegger posits that a complete phenomenology does not simply look at what is presented, but also sees what is made *absent* in the *showing and hiding* structure that enframes the phenomena we notice. So much happens off-stage or back-stage, which serves as a support to what is presented *on-stage*. We need to engage phenomenology with more than what the audience sees on stage. We must engage phenomenology in terms of the complete theatrical operation. The relationship of Systems and Meta-systems gives us a glimpse of this enframing in operation. We see how they depend on each other and produce a metaphysical Ontotheology as a mixture of too light *and* too dark. When we continue to study the entire ‘enframing’ characteristics of the Meta-system, then we see that all the aspects of the theater make the presentation of what appears on stage possible. The same is true of consciousness. The relationship of the conscious mind with the unconscious must also be considered. An example of this is eating at a table while seated in a chair. Beneath its flat surface, the table creates a dark, hidden recess where it is possible to use your legs or feet to nudge or communicate indirectly with another diner. If one were eating while seated on the floor as is the custom in many parts of the world, then that would not be the case because all the action and interaction can be seen. It is the structure of the *table as a platform* that is *raised* that makes it possible for things to go on *under the table*. This structural relationship between showing and hiding, visible and invisible, present and absent, emergence and de-emergence, figure and background (in the gestalt), system and ‘deeper background of the meta-system’ is called *the enframing*.

Ontotheology, Philosophy of Presence and Logocentrism

We must consider the relationship between Ontotheology, the Philosophy of Presence, and Logocentrism. In our tradition the Philosophy of Presence states that what is present is given priority over what is invisible or absent. The present-at-hand is what has Pure Being.

This is regarded as superior to what is absent, and many times a state of absence is created in order for the present to come to the fore. Ontotheology is a deeper background to the Philosophy of Presence that sets up the relationship between what is made present and what is made absent in our tradition. Ontotheology is a monolithic approach that influences what is allowed to appear as well as what is relegated to the shadows. This has been perpetuated by a collusion between Theology and Ontology. Ontology specifies that Being should triumph over existence, and Theology specifies that there should be One Supreme Being (God) that has ascendancy over all others. This is often specified by saying that there is only one God and that this God of Christianity has a triadic structure in line with the structure of the syllogism, and that “He is Good” besides being omnipotent, omniscient, and eternal as well as having other non-finite characteristics. Ontotheology is a monolithic transcendental system that suppresses difference. On the other hand, Logocentrism, which is a term coined by Derrida, has to do with the fact that “spoken culture” is more highly valued than “written culture”, even though writing is the basis of all our tradition, and is the vehicle for events to become preserved and passed on through time. This overvaluing of the Spoken over the Written as seen in Plato’s Phaedrus is a persistent structure in our culture that hides Hyper Being whose nature is similar to the nature of Writing. Software, as a mode of dynamic writing, is perhaps the only human artifact that embodies Hyper Being directly. Ontotheology, on the other hand, suppresses the nature of Process Being by projecting an unchanging transcendental superstructure beyond experience, which does not allow difference to play its necessary role in making change possible. The Philosophy of Presence is undergirded by these two other approaches (Ontotheology and Logocentrism) that establish an enframing in culture such that it puts the entire emphasis on Pure Being as what is Present, and suppresses absence by denying the dynamic of showing and hiding.

Our view of these three approaches, i.e., Ontotheology, the Philosophy of Presence, and Logocentrism have defined the essence of our tradition by promoting Pure Being and suppressing both Process and Hyper Being so much that Wild Being and Ultra Being, which exist at levels beyond Hyper Being, are never recognized as having any standing at all. This promotion of Pure Being at the expense of Process and Hyper Being is particularly evident in mainstream Science and has a hold upon Engineering, which sees itself as the handmaiden of Science. Beyond the sciences, though, these modes of philosophical thought have profoundly affected our cultural and academic tradition. They have defined our approaches to religion and philosophy alike, and have filtered down to dominate almost all aspects of our lives within the Western culture. Our emphasis on

finished products in Engineering is the case in point. When a product is completed and ready for delivery to the customer, the product must be in pristine condition in order to fulfill the customer's expectations or requirements so that the company (or purveyor) can be paid for the work that has been done to produce the product. That *moment* is the interval of *Pure Presence* around which everything else revolves. All is sacrificed in order that this moment can be achieved with as much perfection as possible. Although we are loath to admit it, Process Being, Hyper Being, Wild Being, and Ultra Being play huge roles in our product development processes even though we suppress them in every way we can, while, at the same time we are saddled with the task of having to pragmatically deal with their consequences.

The Philosophy of Presence, Ontotheology, and Logocentrism are descriptions of our attempts to ignore the meta-systems that envelop our systems. If we trace our history it is possible to see how these meta-systems and their structures are reflected in the various religious and philosophical ideas that were put forth at various times. Ontotheology and the other philosophical approaches that shift our attention away from what is actually happening toward ideals that are illusory continuities is a persistent global tendency across the history of our tradition that produces centers of attention on the one hand, and peripheral areas of avoidance on the other, so that our experience is conditioned and reflected in our theories, philosophies, and religions through a hidden infrastructure. It is possible to map the major philosophical trends of our Western Tradition into the schematic organization of the Meta-system. This unseen (or unrecognized) meta-systemic structure produces breaks and discontinuities as well as other features of our cultural landscape that the interpretations of religion and various philosophies attempt to map⁴³³. Science and engineering are not different in this regard. All the various maps of the landscape are different and have structural relationships to each other, but the underlying landscape that they are mapping does not change because that landscape is producing the basic drive to emphasize some things and deemphasize others in order to maintain the Philosophy of Presence, the regime of Ontotheology, and the reign of Logocentrism, which are designed to suppress the higher meta-levels of Being from being recognized.

⁴³³ See draft presentation by the author concerning the mapping of major philosophical systems from the Western Tradition onto the meta-systemic structure of the Western worldview. The upshot of this presentation is that the structure of ontotheology is that of the meta-system which is expressed in different philosophies or religious views in different ways and many times these different philosophies that map the same territory of the meta-system are diametrically opposed like the opposition between Dante and Milton. Another example is the diametrical opposition between Spinoza and Leibniz, who although taking radically different views of God and with philosophies of different structures end up mapping the same meta-systemic territory from opposite viewpoints.

In response to Heidegger's theological studies, let us briefly consider the relationships of the System to the Meta-system in light of Western Christianity and two literary works borne from that tradition that exemplify Ontotheology. Dante's Inferno presents a Supreme Being that is Good and fully satisfying in tandem with an autonomous devil who appears at the lowest place in hell fanning his wings at his frozen compatriots. Dante gives an archetypal map of the topology of the Ontotheology of his time, which splits existence into the Inferno, Purgatory, and Paradise. This map of the transcendental realms beyond the immanent lifeworld bears an uncanny resemblance to the structure of the Meta-system and this provides an insight into the organization of the Meta-system in allegorical terms. The Inferno becomes the refuge for those who seek autonomy from God as Supreme Being. Purgatory is the refuge for those who are freeing themselves from the sin of autonomy from God, and Paradise is the abode of those who have given themselves up to the utterly satisfying vision of God. Descartes takes those frozen beings in Purgatory (little gods) and designates them as subjects (cogito) who determine meaning independently. For Dante, the devil is frozen and freezes his fellow rebels in a static rebellion against God. But in Milton's Protestant vision presented in Paradise Lost⁴³⁴, the Devil is very active and is the center of interest in the story. This theological difference between the activity of Milton's vision of the devil and the passivity of Dante's vision is also expressed metaphysically in the difference between the philosophies of Kant and Descartes, or as another example between Leibniz and Spinoza⁴³⁵. Descartes dualistically separates the mind from the extension of space. In Kant, there is the active projection of space and time and the categories, which make the universe safe for Newtonian Science. Thus, when we consider the impact of Descartes and Kant's philosophical views, it clarifies how the rebellion of Science against Religion merely preserves the same relationship between the elements but *inverts* them, so that rationality becomes exalted and the irrationality of religious belief becomes suppressed. As Harold Bloom says in his Map of Misreading⁴³⁶, it is Milton's devil that becomes the archetype for the creative poet as genius! In Dante's view, the devil is frozen along with his rebel angels and cannot move because all movement comes from the Prime Mover, God. Yet, it is Milton who goes a step further and gives an extraordinary

⁴³⁴ Milton, John, and Maurice Kelley. Paradise Lost, and Other Poems. (New York: Published for the Classics Club by W.J. Black, 1943). See also Bloom, Harold. John Milton's Paradise Lost. Modern critical interpretations. (New York: Chelsea House Publishers, 1987).

⁴³⁵ Stewart, Matthew. The Courtier and the Heretic: Leibniz, Spinoza, and the Fate of God in the Modern World. (New York: Norton, 2006).

⁴³⁶ Bloom, Harold, A Map of Misreading (Oxford; New York: Oxford University Press, 1980, c1975). See also Bloom, Harold. The Anxiety of Influence; A Theory of Poetry. (New York: Oxford University Press, 1973).

amount of movement and activity to the devil so that he becomes the most interesting figure in the drama. Thus, the devil becomes the archetype for the poet *and* the scientist⁴³⁷. And so, on the one hand, the *ontotheological enframing* is defined by the less intense and inactive archetype created by Dante, while paradoxically, it is also defined by the more intense and active archetype created within Protestantism. This contrast is actually an inversion that preserves the same enframing structure that Heidegger presents. The poet and the scientist are archetypes that represent the ones who bring in the *new* in order to displace *tradition*. And when the scientist or poet/artist presents an idea or work that changes our point of view and our lifestyle, this initiates an *emergent event* that *transforms history*. This archetype is represented in Goethe's Faust⁴³⁸ and in Mary Shelly's Frankenstein⁴³⁹.

Ontotheology harbors two mistaken concepts: First, the unification of everything under a single metaphysical principle with a Supreme Being, and Second, the miscarriage of autonomy where rebellion is initiated against the totalitarianism of the complete unification of all beings under a Single Principle and all powerful Being⁴⁴⁰. These ideas are present in Dante's vision of the topology of the moral universe that exists beyond life, but they are also present in Science, which rebels against Religion by elevating reason over unquestioning faith. When reason is raised to the highest position, God is seen as the Designer of Nature and the autonomous scientist/poet is seen as the one who brings about emergent change through the exploration and exploitation of the *design* of nature produced by God. The scientist/poet exploits nature and uses it as a basis for creating new things that are founded on the principles and techniques that Science discovers. In regard to the poet, he is the one to discover new visions that rebel against the traditional sensibilities, such as we see in Turgenev's Fathers and Sons⁴⁴¹, which was the first book where Nihilism, as a concept, was mentioned. In that novel the son used science and reason to challenge traditional mores, including religious values, but this destroyed the meanings embedded in the tradition that helped people to make sense of their lives. According to

⁴³⁷ E.g. Faust by Goethe, J. W. von.

⁴³⁸ Goethe, Johann Wolfgang von Faust (New York: Continuum International Publishing Group, 1993) Trans. Lange, Victor.

⁴³⁹ Shelley, Mary Wollstonecraft, and J. Paul Hunter. Frankenstein: The 1818 Text, Contexts, Nineteenth-Century Responses, Modern Criticism. A Norton critical edition. (New York: W.W. Norton, 1996). See also Palmer, Robyn J. "Women as Monsters: The Horror of Abjection and the Negation of the Feminine as Expressed in Mary Wollstonecraft's Maria and Mary Shelley's Frankenstein" Master's Thesis Draft, University of California, Irvine, 2009.

⁴⁴⁰ According to Herbert Dreyfus in his lectures on the Genealogy of the Western Worldview. Op. cit.

⁴⁴¹ Turgenev, Ivan Sergeevich, Fathers and Sons; a novel (New York: Leypoldt & Holt, 1867). See also http://en.wikipedia.org/wiki/Fathers_and_Sons accessed 090222.

Harold Bloom, each generation of poets misread the last generation, and then try to hide their readings as if their work had no relationship to what was created in the past by others. We see a similar proclivity for the precedence of ideas in Science. Emergent ideas, hypotheses, and theories are carefully recorded so they can be adjudicated as to who was the first to discover something and claim priority for their discovery. Here, we propose that *misreading* be interpreted in the context of a *creative* reading in which new ideas are formed from the tradition, which, in turn, changes the tradition when an *emergent event* occurs. Yet, the poet and the scientist make the fundamental assumption that they have the autonomy to act creatively as an independent individual. The creativity of God, who becomes incarnate as an emergent event in history, is transformed into the creativity of individuals within the tradition⁴⁴². Once we see that Science and the Christian religion *are actually one structure*, we can better understand how enframing works. The fact that they have been adversaries throughout Western history tells us that they are dependent on assumptions that are similar to the assumptions that Heidegger refers to as Ontotheology. This is exemplified in Baudrillard's The Mirror of Production⁴⁴³, where he shows how *both* Communism and Capitalism share the idea that the purpose of life is to produce. Science and Art raise 'production' to the status of creativity, i.e., the *production of the genuinely new*. But this production of the new is exactly what Dante sees as a rebellion by the enemy of God in his cosmology of the romanticized Catholic moral sphere. There is a structural transformation between Dante's romantic vision, which is rooted in Catholicism, and the Protestant vision of Milton. Milton turned the Inferno hot. He made the character of the devil active rather than passive. He turned the forces of evil into an army actively warring against God, rather than a frozen static force who are attempting to hold on to their autonomy under siege in the city of Hell. Milton made the character of the devil more interesting than it ever had been before. The devil, rather than God, becomes the center of the drama in Paradise Lost. This contrast between Catholicism and Protestantism, as seen in epic poetry, exemplifies structural reversals that reverberated throughout the culture of Europe. These structural reversals created a place for rationalism and empiricism to be fostered in Northern Europe. This rebellion of Protestantism created a haven for Science and Art to become independent and creative activities that could take place outside the Church. It made a place where Galileo would not have had to recant his scientific discoveries. The entire ontotheological enframing includes not just the universal Catholic

⁴⁴² Cf. Tolkien's idea of 'Sub-creation' in Tolkien, J. R. R. "On Fairy Stories" in The Tolkien Reader (New York: Ballantine Books, 1989).

⁴⁴³ Baudrillard, Jean, The Mirror of Production (St. Louis: Telos Press, c1975).

Church but all the hinterlands of the barbarians where Protestantism eventually took hold and set Science and Art free from the chains of dogma⁴⁴⁴. The wars fought between the Catholics and the Protestants eventually exhausted Europe and almost destroyed Germany. But it set the stage for Modern Europe where religious tolerance would become the status quo and this development first took hold in the Netherlands. We often fail to notice the fundamental insight that when two powers fight they become more and more like each other, and that the structural distinctions between them actually sharpens in their conflict. It is necessary to consider the entire structural panoply of distinctions because that is what defines the ontotheological enframing. This occurs because each side completely embraces a totality and unity of their beliefs that they are willing to die for. In each case this totality and unity is defined against the Other although the rejected Other is always a fundamental part of the entire field of distinctions that any one player (on either side) uses to define himself. Ontotheology recognizes that there is an inner fragmentation of the unifying and totalizing vision of the marriage of Being and God, which produces conflicts such as those between Protestantism and Catholicism. This conflict in the religious realm sets the stage for an inevitable conflict between Religion and Rationality. The irony lies in the fact that as *both* sides of the conflict seek to suppress difference, their actions actually have the effect of generating greater difference and conflict. The entire panoply of structural differences that produce the enframing must be considered together as a structural field. This is because the over emphasis on the totality and unity of the given viewpoints produces fragmentation, conflict, and difference that leads to war. Our generally accepted view is that during the Middle Ages religion was preserved in the monasteries where the vestiges of civilization were kept alive against a barbarian world. Then, with the advent of the Enlightenment and the decline of the Middle Ages, rationality was substituted for religion as the stance against the darkness and the perceived irrationality of the religious dogma that had reigned during the Middle Ages. But, this accepted view does not take into account the different viewpoints on rationality during the Middle Ages and the Modern Era. These two eras defined darkness (irrationality) and light (rationality) differently. The light of one era is the darkness of another. In other words, the organization that dominates and controls the accepted mainstream thought in a given era considers itself to be in the light, *so what is considered to be darkness is relative and therefore changes*, but the *light*

⁴⁴⁴ We might well ask why the Universal Church embraced Dogma in the first place? Aristotelian Science was the dogma that was contested because it could be tested against the physical world unlike theological principles. Because the theology was so closely related to the scientific ideas, which came from the same source in antiquity, when Aristotelian Science was challenged, it caused the theological principles to be discredited as well.

and darkness continue to be part of the *same* enframing. An example of this is the mythical Mithra⁴⁴⁵, who is the leader of the forces of light against darkness. In Mithraic doctrine, whoever is defined as the Other and the Enemy become the forces of darkness⁴⁴⁶.

Presenting this history of Ontotheological enframing helps us to understand the part it plays in our modern scientific and engineering culture. The claims of ontotheological unity and totality produce the structural field of fundamental differences that we call the enframing, and it is across the divides of that enframing that conflicts arise and wars are fought in an attempt to enforce the totalitarianism of one Ontotheological viewpoint (dogma) over all others. Tolerance springs from the exhaustion of these religious wars such as those between Protestantism and Catholicism. Tolerance is an acceptance of difference. But that acceptance of difference can produce even deeper divisions within culture such as those between church and state, which leads to individual rights, freedom of thought, and the organization of the secular state. So, we live with the traces and remains of Ontotheological conflict in the organization of modern societies. These traces and remnants of Ontotheology permeate our entire society and even affect the internal structure of Science and Engineering. Here we focus on one such remnant of Ontotheological Metaphysics that persists today, which is the fact that the Meta-system is suppressed and the System is raised to a level of emphasis that is not in keeping with the duality between the two schemas.

A similar sort of enframing logic applies to the relationship between the System and Meta-system. We see everything as a system, and we think of the system either as a configuration of different ‘gestalt forms’ that are part of the same background or as ‘temporal gestalts’. Yet, either way we are forgetting the deeper background of the meta-system. We need to envision the enframing of the System and Meta-system together.

⁴⁴⁵ As an aside, Gandalf in Tolkien’s Lord of the Rings is specifically identified with Mitra. That makes Saron Varuna. Each power in the Lord of the Rings is one of the Adityas of the Vedas of which Mitra, god of contract, and Varuna, god of binding magic, are the most prominent. This book is a good example of a Zoroastrian dualistic conflict between Good and Evil of the type that occurs in the Ontotheological enframing. There is no known myth in which Mitra and Varuna, i.e., the Titans fight among themselves. But certainly there is the Persian myth where Ahura Mazda (Varuna) is pitted against Angra Mainyu (Ahriman).
⁴⁴⁶ Similarly, the way both the Greeks and Romans characterized their enemies (barbarians or Celts) as having the opposite characteristics as themselves, rather than having merely different properties, that would have been a more naturalistic or ethnographically correct picture of what these peoples who are lost in history were actually like. The definition of the Enemy is mostly about the definition of the Self, and has little to do with who the Enemy actually is. This is projection and it happens on a psychological level as well, as Freud, Jung, and others have pointed out. The schemas are the most basic and fundamental form of this projection, which shapes the Other of extension and time through which we look as if we are looking through a distorted glass to attempt to see groups, people, and even things. Ontotheology and its enframing is the most global form of this projection process that plays itself out in the way our tradition looks at its world at large.

Eventually this enframing structurally transforms so that the Meta-system is in the foreground and the System is in the background, which is what is now happening in the Postmodern Era. Post-modernism is producing many ‘meta-system like’ images. What was once the fringe, is now being promoted as something central, and what is central is becoming peripheral⁴⁴⁷. What we see as we gaze at the meta-system phenomena (which was previously suppressed), is what is interesting to us, because, for so long, it had been lost from sight in the enframing⁴⁴⁸. But, *because of the Meta-system’s duality with the System*, the Meta-system *was always there* as part of this enframed mutual structure from the beginning. When we understand the two together, then we can reach deeply into System Phenomenology and realize that this phenomenology is pervaded by a Meta-system that is an *absent, but implicitly implicated*, element.

Enframing the System and Meta-system Schemas

Now that we have examined the notion of Enframing with regard to the Ontotheology of the Western Tradition, we need to consider it in relation to the System and Meta-system schemas in the context of the entire set of schemas. S-Prime theory⁴⁴⁹ suggests that there may be ten schemas organized in a hierarchy that are nested in relation to *scope* and that they constitute various horizons from Pattern to World. System and Meta-system schemas are at the center of this hierarchy and together they form a very significant dimensional transition. One of these schemas is emphasized and the other is de-emphasized, and our belief is that their nihilistic relationships serve to hide the Special Systems. The central Special System is the Autopoietic Symbiotic Special System, which represents closure and thus autonomy. It is also described as representing unity by Maturana and Varella⁴⁵⁰. As mentioned previously, according to Dreyfus⁴⁵¹, unity and autonomy are the central “mistakes” of Ontotheology from a pagan point of view⁴⁵². Schemas are very strange, because, although they have an existential structure, they are also part of the projection mechanism of Being at the lowest level of our intentionality where we are projecting spacetime. If we think of the schemas in terms of projection, then they are Set-like and project upon the Mass-like nature of spacetime. They signify the dominance of Set

⁴⁴⁷ This is a concept of Herbert Dreyfus as discussed in his lectures at Berkeley which are available on his website occasionally See <http://socrates.berkeley.edu/~hdreyfus/> accessed 080627.

⁴⁴⁸ Tester, Keith. The Life and Times of Post-modernity (London; New York: Routledge, 1993) p. 95 Discusses definition of Enframing.

⁴⁴⁹ Developed by the author as a first hypothesis for a General Schemas Theory.

⁴⁵⁰ Maturana, Humberto R. and Varela, Francisco J. and Paolucci, Robert. The Tree of Knowledge: The Biological Roots of Human Understanding (Boston; New York: Shambhala, 1992).

⁴⁵¹ Op. cit. Dreyfus, H. “From gods to god and back again” Lecture as Podcast on his Berkeley home page.

⁴⁵² Here pagan merely means someone who rejects ontotheology.

approaches over Mass approaches, which are the rule in our tradition. They cover all experience at each of the different scopes. They form a hierarchy and a nesting relationship with each other, which is normally described by the Western Tradition as ‘a place for everything and everything in its place,’ while being dominated by a Supreme Being such as we see in Dante’s realms⁴⁵³. Both the inferno and purgatory are constructed as if there were nested spirals with landings of different sizes at each stage of the journey. In a sense, the schemas refine this type of hierarchical image, which is assumed to be unified and totalized, i.e., consistent and complete. The schemas project their own order onto things, each different from the other, but, in general, they are similar to each other in as much as their various orders can be created based on the Foundational Mathematical Categories. So, we can see that the schemas are part of a totalizing scheme of domination that project the same set of organizations onto all experience at various scopes, with each one related to the next in an emergent series. The various schemas take on various levels of importance in relation to each other within the worldview. Thus, there are variations of emphasis within the overall structure of the schemas. But all the schemas work together to make sure that all the possible scopes of experiential phenomena are covered by one or another. Depending on its dimension, a phenomenon can be schematized in a number of ways (usually it is two but it can be as many as three, four or five ways⁴⁵⁴). The selection is always from the limited set of the schemas that are given in S-prime theory. The schemas are unified, first, by the fact that they are folded at the System/Meta-system boundary, and second, by the fact that they form a series of duals. At their core, they have the Special Systems, which confer autonomy and closure as well as existential unity. From this perspective, i.e., the perspective of Being, schemas are the very embodiment of Ontotheology. Therefore, it is not surprising that we will find nihilistic structures within the panoply of the schemas as a whole.

But the schemas also have another side, which is based on the model of Existence provided by the Special Systems. The relationship of the schemas to each other is one of juxtaposition and conjunction. *We notice that from the bottom up they form a series of emergent layers, but if we consider them from the top down, then they are supervenient*

⁴⁵³ Reynolds, Barbara. Dante: The Poet, the Political Thinker, the Man (Emeryville, CA: Shoemaker & Hoard Publishers, 2006).

⁴⁵⁴ S-double prime theory explores the whether it is possible to have three dimensions per schemas, and S-triple-prime theory extends this to the exploration of the possibility of five dimensions per schemas.

*rather than emergent*⁴⁵⁵. They form a series of duals such as pattern/world, form/domain, and system/meta-system, but when these dualities come together in a series, they tend to produce an autopoietic ring⁴⁵⁶. The schemas are related to dimensionality, which is generated by Pascal's Triangle⁴⁵⁷ with its minimal dimensional solids. It is the Pascal Triangle that has the characteristics of the Special Systems fused together into one mathematical structure.

Thus, we have a complex situation where, on the one hand, schemas are projections of Being, and on the other hand, they are models of Existence based on the Special Systems. This makes sense because they are the interface between awareness and intentionality. They establish the spacetime envelopes that are the reference points for intentionality. To the extent that we are aware of the schemas, they have a structure related to the Special Systems that model existence, but to the extent that they are a distorting but semi-transparent medium of the projection of Being, they support the rest of the super-structure of intentionality in Being. So, it is important to keep these two ways of looking at the schemas in mind, one is from the point of view of Being and the other from the point of view of Existence. They are an interface between Being and Existence, and this makes sense because Being and Existence are interleaved. This is to say that the *kinds* of Being are interleaved with the Special Systems as a model of Existence. This interesting structure that intertwines Being and Existence has been pointed out and explored in several of the author's working papers⁴⁵⁸. The structure looks like this:

⁴⁵⁵ This is a just one of the strange characteristics of the Schemas. They are emergent if you move up the schemas in nested scope. But if you reverse the schemas and consider patterns of forms, or forms of systems, or systems of meta-systems, then they become supervenient rather than emergent.

⁴⁵⁶ One way to look at the structure of the schemas is as an autopoietic ring. An autopoietic ring acts as a closed autopoietic symbiotic special system as a whole and the individual schemas in it are seen as locked in pairs of dissipative ordering special systems. This hypothesis would explain the stability of the set of schemas as a whole.

⁴⁵⁷ Edwards, A. W. F. [Pascal's Arithmetical Triangle: The Story of a Mathematical Idea](#) (Baltimore: Johns Hopkins University Press, 2002).

⁴⁵⁸ See for example "Proto-Schemas for Meta-systems Engineering" by the author at <http://holonomic.net>

Ultra Being
• Meta-system ⁴⁵⁹
Wild Being ⁴⁶⁰
• Reflexive Social Special System ⁴⁶¹
Hyper Being ⁴⁶²
• Autopoietic Symbiotic Special System ⁴⁶³
Process Being ⁴⁶⁴
• Dissipative Ordering (Neg-entropic) Special System ⁴⁶⁵
Pure Being ⁴⁶⁶
• System ⁴⁶⁷
Ultra Being ⁴⁶⁸

Table 5.1. Special Systems interleaved with the Kinds of Being.

The kinds of Being are interleaved with the Special Systems. The two mutually define each other. And, in the Pascal Triangle we find a structure in the Nomos that has the characteristics of all the Special Systems. So, it makes sense that from different viewpoints, the schemas may have the characteristics of both Being and Existence at the same time. In other words, if there is a transitional part of the nomos that links together all the Special Systems, then why should there not be something that links together Being and Existence that serves as an interspace between them? The fact that this interspace is right on the boundary between awareness and intentionality seems only natural. Existence is what is found and what we are aware of – *without any projections upon it*. Being is what has meaning for us within our world. ‘Being’ is the intelligibility of everything that *is*. And what *is* presents itself over and above our awareness of that which *exists*. That is why Heidegger’s major question concerns the *Meaning* of Being. The *meaning* of Being gives *intelligibility* to what we *intend* and to what is meaningful for us beyond mere existence. The basis of that intention is to project the spacetime envelopes that form our reference to the thing. This spacetime envelope is right on the border between awareness and intention, between Existence and Being. It *is* the projection *itself* that allows us to see what is there prior to that projection, *if* we have the ability to see beyond our own projections. It is what

⁴⁵⁹ Sedenion Algebra, Mirror House with distorted mirrors. “Mirror House” Term and mirror analogies from Onar Aam [onar at netpower period no.](#) personal communication.

⁴⁶⁰ Out-of-hand, encompassing, propensity.

⁴⁶¹ Octonion algebra, four facing mirrors inside tetrahedron.

⁴⁶² In-hand, bearing, possibility.

⁴⁶³ Quaternion algebra, three facing mirrors.

⁴⁶⁴ Ready-to-hand, gasping, probability.

⁴⁶⁵ Complexnion algebra, two facing mirrors.

⁴⁶⁶ Present-at-hand, pointing, determinate.

⁴⁶⁷ Real algebra, one mirror.

⁴⁶⁸ No Hand, crushing, singularity.

allows us to hear what the phenomena have to ‘say’ to us if we have the ears to hear it beyond the language we generate. From the *viewpoint of Being*, we call this voice (of the phenomena) that comes from beyond the projections, the *introjected hyle*, or, opacity and obscurity. It is something very subtle that connects us to external things but also hides them from us as well. In Indian Philosophy it is called Maya, in Islam it is called Dunya, and in Buddhism it is called Dukkha (dis-satisfaction). It is what seems to put things within our grasp, but at the same time places things just outside our grasp.

We are in the situation of Tantalus, where what satisfies us is just beyond our grasp, or, beyond the schemas that we present. Remember that Tantalus was in a flowing stream with fruits hanging overhead. When he reached for the fruit, the wind would raise the branches and the stream would push him away, just out of reach, but still within eyesight of the fruit. *This is an image of having the Present-at-hand without the Ready-to hand*. Yet, although we can see this as an image of the distortion and interference that we project, this state of introjected hyle also *connects* us to things in our world, or to what is in all the other schemas. If we do not consciously understand the schemas, it is like being a fish in water or a bird in the air, but not knowing that the water or the air is there! The schemas do not impose distortions through movement in the same way that water or air impedes Tantalus from reaching his goal, but rather, the schemas cause us to mediate our relationship to things through ‘projected’ organizations that are based on the Nomos. We organize ourselves with language and logic, but we organize other things with the schemas. *Logic connects to the mathematical categories in the Nomos to produce Model Theory. Schemas connect to dimensionality in the Nomos to give us Schemas Theory*. Between the embodied schemas and the spoken language there is Reference Theory, which is part of pragmatics. For example, Ethnomethodology⁴⁶⁹ is largely concerned with Reference Theory⁴⁷⁰. Ethnomethodology explores the disconnects between our social projections through the radical methodology of provocation i.e., setting up odd situations to see how people react, like “candid camera” scenes⁴⁷¹. By exploring these disconnects, we learn how the projections are different from the actuality of the situations that we find ourselves in. So, much of what we see is simply what we assume, rather than what is observed, and this state of affairs can profoundly impact our designs. The schemas exist in this gap between what is *found* to be actually there, and what we *believe* is there, or what we *rationaly*

⁴⁶⁹ Garfinkel, Harold *Studies in Ethnomethodology* (Cambridge UK: Polity Press, 1984).

⁴⁷⁰ Evans, Gareth. *The Varieties of Reference* (Oxford: Oxford University Press, 1991).

⁴⁷¹ Calvert, Clay. *Voyeur Nation: Media, Privacy, and Peering in Modern Culture* (Boulder, Colo.: Westview Press, 2004). Alan Funt, “Candid Camera” TV Show in 1940s and 1950s on CBS, see p. 41.

thought was there. This gap where the schemas thrive is between awareness and the intentionality of consciousness and they are based on the obscure and opaque machinations of the unconscious.

Phenomenological Speculation on the Schemas

We notice that the external mundane world is schematized, but what we do not notice (quite so specifically unless we think about it), is that our dream world is also schematized⁴⁷². And if we think about the hypnogogic dreams we have had, which are very real dreams right on the edge of sleep, we notice that they are schematized too. By schematized, we mean that we see envelopes of spacetime in those altered states of consciousness in the same way that we see them in the mundane world of everyday consciousness. According to recent research⁴⁷³, everyday consciousness can be considered a type of dreaming, such as day dreaming, a reverie, a trance, or ‘zoning out’. Mundane consciousness is not all rational thought. It can be composed of fantasy, idle thoughts, desires, instincts, and *trieb* or *wille*. All of these states find us referring to the embodied envelopes of spacetime objects whether we are conceptualizing them, imagining them, lusting after them, or perceiving them phenomenologically in our experience, and because schematization crosses all these realms, it is very deeply embedded in our awareness as a trans-conscious bridge across various states of consciousness. It is even found in the structuring of language. Therefore, we speculate that schematization impels us to find intelligible spacetime envelopes in all our experience. Schematization is a very deep and fundamental capacity of our human consciousness. It is deeper than the part of our consciousness that knows what exists in those spacetime envelopes, because ‘whatness’ cannot be determined without the spacetime envelopes existing *first*. The fact that we have reflexes that will involuntarily react against snake-like shapes or any unexpected movement from other primal phenomena (which cause us to react before we know what we are doing), means that there is some part of our mind that schematizes the spacetime shape of the snake, and causes unconscious and “trieb” reactions to take place. This reaction to danger occurs prior to our isolation of the ‘whatness’ of the snake, or any other primal danger that we will react to instinctually. When we react to danger instinctually we only

⁴⁷² Robert Bosnak makes this point in his lecture on Neuroscience and embodied dreamwork. Bosnak, R. (2003). Neuroscience and embodied dreamwork. At Seven on dreams: Remembering dreams, recovering myth, restoring vision [Cassette]. Santa Barbara, CA: Pacifica Graduate Institute Conference. April 11-13.

⁴⁷³ Pace-Schott, Edward F. Sleep and Dreaming: Scientific Advances and Reconsiderations (Cambridge UK: Cambridge University Press, 2003).

know something is there. In other words, we only have its spacetime envelope that has been categorized as dangerous even though we do not know what it is.

Consciousness can be understood as a kind of dream initiated by data from outside our senses, while our sleeping dreams are more freeform in their manifestations. Thus, we can hypothesize that our schematization during the wakefulness of the outside perceptual world is merely a sub-case of a more general schematizing capacity that expresses itself in all realms of our experience. And it is of interest that the hypnogogic dream⁴⁷⁴, which is between sleep and waking states, is the most *real* sort of vision we experience. In the hypnogogic dream the schematization is all the more intense because it exists in the interspace between sleep and wakefulness. Vivid and lucid dreams seem to be a species of hypnogogic dreaming. So, there seems to be a state that is an intermediary between the pure projection of dreams, and the modified projection of perception, i.e., imagining, fantasizing, and conceptualizing. In dreams we know that the schematization is merely a projection because we see landscapes, people whom we don't know in those landscapes, and occasionally people whom we do know. In waking mundane consciousness, in which our natural dreaming state⁴⁷⁵ is somewhat modified by perception or other experiential factors, we forget that we are projecting the spacetime fabric that underlies the experience, and we think that what we see is real. But in the vivid, lucid, hypnogogic dreaming state, we see the vision and we are aware that we are experiencing it. It is very real to us, sometimes more real than external things from our mundane perception. Let us call these hypnogogic visions "Imaginal", following Corbin⁴⁷⁶ who interpreted the works of Ibn al-Arabi⁴⁷⁷. The imaginal is not just an imagination during waking, but a lucid, vivid, hypnogogic dreamstate that is a manifestation of the dreamtime⁴⁷⁸, which seems *more real* than either waking or dreaming states because it is on the boundary, or in the interspace,

⁴⁷⁴ Mavromatis, Andreas. Hypnagogia: The Unique State of Consciousness between Wakefulness and Sleep (London; New York: Routledge, 1987).

⁴⁷⁵ Hobson, J. Allan. The Dreaming Brain (New York: Basic Books, 1988). See also Flanagan, Owen. Dreaming Souls: Sleep, Dreams, and the Evolution of the Conscious Mind (Oxford; New York: Oxford University Press, 2000).

⁴⁷⁶ Corbin, Henry. Alone with the Alone: Creative Imagination in the Sufism of Ibn 'Arabi (Princeton, N.J.: Princeton University, 1998).

⁴⁷⁷ Chittick, William C. The Sufi Path of Knowledge: Ibn Al-Arabi's Metaphysics of Imagination (Albany NY: SUNY Press, 1989).

⁴⁷⁸ Duerr, Hans Peter. Dreamtime: Concerning the Boundary Between Wilderness and Civilization (Oxford, UK; New York, NY: B. Blackwell, 1985); See also for original concept Voigt, Anna and Drury, Nevill. Wisdom from the Earth: The Living Legacy of the Aboriginal Dreamtime (Boston, Mass.: Shambhala, 1998).

between the two⁴⁷⁹. Schematization is not modified by either the dream state or the waking state in the Hypnogogic imaginal vision. The surrealist⁴⁸⁰ paintings of Salvador Dali express something of the character of these imaginal visions. They are striking images, juxtaposed in ways that do not necessarily make sense, rationally or logically, but express the “trieb” of the unconscious, either personal or collective. They are vivid and we are lucid while we are having the visions during this time that we are waking up or falling asleep, so we believe we are seeing something that is *really there before us for that moment*, which seems like eternity. We take this schematization of the imaginal vision of the Hypnogogic Dream to be the *essence* of schematization because it is largely untroubled by a great deal of perceptual input, although, at times, there is some perceptual input (such as loud noises that are interpolated as part of the dream itself). But, we must also note that because of our lucidity and the dream’s vividness, the imaginal is not scattered and fragmented like the normal dreams of REM⁴⁸¹ sleep dreams. The hypnogogic images of the imaginal are often very strange, like the paintings of Salvador Dali⁴⁸² and other surrealists. These dreams stand apart from other dreams because, even though our ‘dream state’ vision is extraordinarily vivid, we are still lucid. What we wish to call attention to, is how those imaginal dream images seem to be embodied in relation to our actual body, rather than in relation to our dream body, which we usually view from outside of ourselves in our normal sleep dreams. In the Hypnogogic dream we experience the vision from the inside of our embodied state.

In normal waking states, as pointed out by Todes⁴⁸³, Merleau-Ponty⁴⁸⁴, and Dreyfus⁴⁸⁵, we are, in effect, living *out* in the openness of the world *beyond* our bodies, seeing the world and not ourselves. In a dreaming state we are normally outside of our bodies watching what is happening from some ‘out of body’ perspective, such as the perspective of the narrator in the novel. That is why our entertainment has us looking at the main characters from the outside. Film and TV series emulate dreams, and, as a result, they are able to put

⁴⁷⁹ Lewis-Williams, J. David The Mind in the Cave: Consciousness and the Origins of Art (New York, N.Y.: Thames & Hudson, 2002). See also A Cosmos in Stone: Interpreting Religion and Society Through Rock Art (Walnut Creek, CA: Rowman Altamira, 2002).

⁴⁸⁰ Durozoi, Gerard. History of the Surrealist Movement (University of Chicago Press, 2002).

⁴⁸¹ Rapid Eye Movement, a sleep phase in which dreams more often occur.

⁴⁸² Etherington-Smith, Meredith. The Persistence of Memory: A Biography of Dali (New York: Random House, 1992).

⁴⁸³ Todes, Samuel Body and World (MIT Press, 2001) Eds. Dreyfus, Hubert L. and Hoffman, Piotr.

⁴⁸⁴ Kelly, Sean Dorrance. "Merleau-Ponty on the Body" in Proudfoot, Michael A. The Philosophy of Body (Oxford: Blackwell Publishing, 2003) Chapter 4, p. 62-76.

⁴⁸⁵ Dreyfus, H. "Samuel Todes's Account of Non-Conceptual Perceptual Knowledge and its relation to Thought" in Proudfoot, Michael A. The Philosophy of Body (Oxford: Blackwell Publishing, 2003) Chapter 5, p. 77-93.

us into a trance that suspend our belief and immerse us in the action of the story. But in the hypnogogic dream, it seems that we are neither outside ourselves (as in normal dreams from the perspective of the onlooker or narrator), nor completely involved in the world as in waking life. Rather, we experience the vision of the hypnogogic dream from within our bodies, although the spacetime envelopment of our phenomenal body is experienced as being separated from that of the imaginal vision. The hypnogogic dream image emphasizes our own embodiment as dwelling at some spacetime distance from the vision. For example, when we perceive a painting or sculpture, we experience our own embodiment in relation to the art work, and this is similar to the hypnogogic vision. In normal REM⁴⁸⁶ type dreaming we are outside of our bodies watching ourselves, but when we are in *waking consciousness* (participating and interacting with the world) we are, as Dreyfus likes to say, “empty heads facing and involved in the world and its affordances⁴⁸⁷” i.e., totally immersed in the activities of the world. In other words, we are fully embodied in the waking state to the extent that we are involved in the world and in action. Yet, we drift from this fully embodied wakeful ‘normal’ state into various trances, reveries, daydreams, thoughts, and imaginings when we become dis-embodied, although *not* as a narrator seeing ourselves from outside of our body, nor as an actor in a dream, but rather as if we are disassociated from ourselves in that ‘distracted’ state. *Bringing these points back to the question of ‘how we design’, we emphasize that we cannot ignore how these conscious and unconscious states affect our perceptions on design.*

Heidegger’s idea of the present-at-hand and ready-to-hand help bring this point into perspective. These two modalities are usually simultaneously experienced by Dasein. We are generally involved in activities that we have *intended* to do. We perform actions based on the ready-to-hand technological infrastructure that is available to us. Only when there is a breakdown in this infrastructure, do we notice the ready-to-hand that lies under our present-at-hand experience of *grasping for things* in the world. *We are focused on the product and the manipulation of the world, rather than ourselves in this present-at-hand orientation that forgets the ready-to-hand substrate of our experience!* Often we are going into trances rather than maintaining some sort of pure present-at-hand consciousness. It is *as if* these trances that denote and relate to our finitude, were the ready-to-hand of consciousness itself. In other words, the time frame in which we are able to stay in a productive and rational controlled conscious state is not as long as we would like to think.

⁴⁸⁶ Rapid Eye Movement.

⁴⁸⁷ This is not a direct quote. See for affordance <http://en.wikipedia.org/wiki/Affordance>

These trance-like states are the infra-structure of consciousness related to our finitude that makes it possible for “pure” consciousness to sometimes exist. These impure (trance-like) states of consciousness surround eating, sex, clothes, entertainment, reading, conversation, almost everything related to our finitude as human animals. Heidegger calls them moods that suffuse consciousness. Mood, in Old English, meant the unity of mind and body, but with the Latinization of English, this term was diluted and pushed to the periphery of our language and now stands for the inalienable affectivity of consciousness, i.e., its feeling and emotional states. For Heidegger, the most important mood is Anxiety, because it has no specific object. Anxiety is a mood attached to the Meta-system and not the System. Heidegger sees Anxiety as a mood that relates us to the nature of our mortal finitude in the world. But Dreyfus speaks of the moods as being various augmentations, or variations on the world, which are related to the gods of ancient polytheism, such as those of the Greeks. Moods are more persistent than the brief interludes of trances during daily life that make up the impure states of consciousness. From the point of view of the dominant ethos of productivity that Baudrillard speaks of in The Mirror of Production, and according to Dreyfus, this ethos can be traced back to the Roman worldview. We note that from Heidegger’s point of view, it is when we are in the dominant, socially imposed, productive state of intentional rational consciousness called *work*, which is defined over and against *leisure and play*⁴⁸⁸, there is an emphasis on the equi-primordially of present-at-hand and ready-to-hand.

But, what of the *impure* states of consciousness? When we consider the wide range of these impure states we see that there are variations on dreaming, and the most interesting among these is the surreal hypnogogic imaginal vision. That type of impure consciousness shows us something interesting about schematization because, in the same space, it relates the body of the vision to our own body that dwells as a virtual extension of the real space. When we are in that state of mind it is as if we catch a glimpse of the extension of three-dimensional (3d) space into four-dimensional (4d) spacetime. We are in a dynamic tension between ourselves and the vision while dwelling in a relationship that we do not experience from outside our bodies, nor in a disassociated mode of reverie, or fantasy, nor in a fully involved mode where we are “empty heads involved in the world” (and thus are forgetting ourselves as we are projected into the ‘open’ of the world we inhabit). In the descriptions of the visions of various Christian mystics, we see this sort of hypnogogic

⁴⁸⁸ Huizinga, Johan. Homo Ludens: A Study of the Play-element in Culture (Boston: Beacon Press, 1955).

vision in action and it was precisely this sort of vision that Meister Eckhart⁴⁸⁹ criticized. Because of its fullness of concept, affect, and phenomena, this sort of hypnogogic vision could not possibly be the deep mystical experience of the Godhead whose hallmark was emptiness. An example of this type of hypnogogic vision would be the visions of Mary, as reported by various Christian mystics, who claim that they see her as if she is life-like and real. It is the external reality of the hypnogogic image that is clear, and that emphasizes the spacetime interval between the embodied, finite, living human being, and the lucid vision, which is vivid. Other dreams, for example the waking dreams of normal consciousness, are reveries or trances, which overcome an individual when he is engaged in work or play or projecting *out into the world* what he has already projected outside his body. We are in the milieu of our experience of the world without thinking of ourselves. Our bodies have become ready-to-hand to normal experience. And the dissociation of trance and reverie take us further out of our bodies and cause us to forget our active engagement in the world for a moment. In dreams, on the other hand, we are a spectator who sees our dreambody and its interactions with others in the dreamscape from some distance. Sometimes we experience things in these hypnogogic dreams from inside our body, but this is rarer than the 'out of body experience' common to normal dreams. Normal dreams are almost the reverse of the hypnogogic state. We are in a dreamspace relationship with our dreambody in which we see things from the point of view of the narrator who is relating the scene of the novel. Modifications of waking consciousness, i.e. fantasy, trance, imagination, is like the character in the novel who is engaged in an imaginary world as a surrogate. In the hypnogogic vision of the imaginal, we are like the reader who feels themselves embodied in a relationship with the scenes that they are reading. The reader can feel the relief we all feel when we wake up from a nightmare which, at first, seems real until we realize that it was only a dream. The writer, on the other hand, is in a state of production consciousness where the present-at-hand and ready-to-hand are equi-primordial. The writer is producing a text, which is spilling out onto the page as he contemplates and wonders what is going to happen next. This is a normal, rational, and mundane productive consciousness, whether we are writing as work or play. As we fall into the trances of our imaginings, reveries, or fantasies that make our consciousnesses impure, then we become like characters who are engaged in the world, as 'empty heads,' totally immersed in the stories they are engaged in. When we become like *dreamers*, we take on the perspective of *narrators*, but when we enter the *hypnogogic state*, then we appear *as readers*.

⁴⁸⁹ Clark, James Midgely. Meister Eckhart: An Introduction to the Study of His Works with an Anthology of His Sermons (Edinburgh: Thomas Nelson, 1957).

Blake's Four Zoas and the Articulation of Time

All four of these positions are illustrated as the Four Zoas⁴⁹⁰ within Blake's meta-novel⁴⁹¹ (prequel) to the Bible and its various versions of the one God:

- Writer Productive Consciousness: **Urthona** (inspiration)/**Los** (poetic prophecy, Blake himself)
- Reader Hypnagogic Dream: **Tharmus** (laborer, instinct, nature) /**Death**
- Character Day-dreaming, imagining, reverie, engaged in the world. The character is engaged in the world, and when we are caught up in the character, we are engaged in a fantasy: **Luvah** (passion) / **Orc** (rebellion)
- Narrator, Night-dreaming outside one's body: **Urizen** (reason) /**Satan** (god of Deism for Blake)

These are the structural positions of the meta-novel. The meta-novel is a *story in a story*. In the meta-novel, the novelist tries to give a feel for what it is like to create a novel. The writer, the character, the narrator, and the reader may all disagree as to what is happening, *but what is happening before all else is schematization, which is modified by each of these viewpoints. These viewpoints are the moments of the Quadralectic.* The Quadralectic is made up of concept, essence, perspective, and design at the level of Hyper Being, which are synchronized to moments of the Emergent Meta-system System in Existence. **Perspective** appears in relation to the *reader/hypnagogic visionary*, **Essence** appears in relation to the *character/daydreamer*, **Design** appears in relation to the *narrator/dreamer*, and **Concept** appears in relation to the *writer/productive creator*. Once we see that the different states of impure and pure consciousness are related to the positions of the meta-novel, in which the writer appears as himself, different from the reader, characters, and narrator, then we see that it is possible to have a work of art, or design, that relates to the entire Quadralectic. As in the case of Salvador Dali, we expect the work of art to be anamorphic, which is something (often a form or object) that is created to embody and resolve the contradictions, paradoxes, and absurdities that appear *in contrast* to the anamorphic object. The anamorphic object is a reification of the 'eject', which is prior to the subject/object dichotomy and this allows the pivotal paradoxical object to participate in different perspectives of the Subject at the same time. Anamorphic objects embody paradoxes by appearing in various forms in relation to our anagogic vision. The anagogic

⁴⁹⁰ Blake, William. The Four Zoas: The Torments of Love and Jealousy in the Death and Judgment of Albion the Ancient Man (Chicago, Ill.: Swallow Press, 1983).

⁴⁹¹ Lowenkron, David Henry. "The Metanovel" College English, Vol. 38, No. 4 (Dec., 1976), pp. 343-355.

vision is one that turns from one perspective to another at the axis of the anamorphic object. The two perspectives are mutually exclusive if not contradictory, but the anamorphic object will generate a change in perspective, which is an attempt to resolve the paradox or absurdity embodied in a “Catch-22”⁴⁹² or double-bind⁴⁹³ situation⁴⁹⁴.

To anchor this scheme further we can appeal to Unreality and Time⁴⁹⁵, the work of R. S. Brumbaugh who previously drew similar conclusions to those drawn here. He says that Time has four different models in history that have led to four different philosophical approaches to Time. It is possible to line up our model (which connects the viewpoints on the novel), the Four Zoas of Blake, and the Quadralectical moments with the four different kinds of time that Brumbaugh identifies.

<u>Novel</u>	<u>Zoas/ Specter</u>	<u>Moments</u>	<u>Brumbaugh’s Philosophical Approaches</u>	<u>Brumbaugh’s Types of Time</u>
Writer view	Urthona/ Los	Concept	Process Philosophy [Heraclitus, Bergson, Whitehead] (material, synthetic) (whole, dynamic)	Subjective time (Psychology, Fine arts, Creativity) memory and anticipation
Reader view	Tharmus/ Death	Per- spective	Atomists [Democritus] (material, analytic) (dynamic, parts)	Public time (Natural Science, Technology) vibration
Character view	Luvah/ Orc	essence	Aristotle (formal, analytic) (static, parts)	Cyclical time (biological), (Medicine, Politics) growth
Narrator view	Urizen/ Satan	design	Plato (formal, synthetic) (static, whole)	Atemporal (mathematical, logical) pure extension

Table 5.2. Brumbaugh's Kinds of Philosophies and Times.

⁴⁹² Heller, Joseph. Catch-22, A Novel. (New York: Simon and Schuster, 1961).

⁴⁹³ Harries-Jones, Peter. A Recursive Vision: Ecological Understanding and Gregory Bateson. (Toronto: University of Toronto Press, 1995). See also Laing, R. D. Knots. (New York: Pantheon Books, 1970).

⁴⁹⁴ “The Anamorphic Cycle” by the author.

⁷⁸ See Brumbaugh, Robert Sherrick. Unreality and Time. SUNY series in philosophy. (Albany, N.Y.: State University of New York Press, 1984).

<u>Philosophical Approaches</u>	<u>Types of time</u>	<u>tenses</u>	<u>Example Novels</u>	<u>Divided Line</u>	<u>Emphasis</u>	<u>Platonic Models</u>
Process Philosophy [Heraclitus, Bergson, Whitehead] (material, synthetic) (whole, dynamic)	Subjective time (Psychology, Fine arts, Creativity) memory and anticipation	Future	Mann <u>The Magic Mountain</u> ⁴⁹⁶	eikasia	Mythological projection (arbitrary temporality of language with each sentence having its own now point, psychological states and events)	Myth of Er Spindle Model (Republic 10)
Atomists [Democritus] (material, analytic) (dynamic, parts)	Public time (Natural Science, Technology) vibration	Past	M. Proust, <u>Swann's Way</u> ⁴⁹⁷	pistus	Phenomenal Object (passing time, tri-modal and one-directional)	Model of Cosmic Reversal (rewinding) (Statesman) Weight and Water driven Town Clocks
Aristotle (formal, analytic) (static, parts)	Cyclical time (biological), (Medicine, Politics) growth	Present progressive	Sophocles <u>Oedipus</u> ⁴⁹⁸	dianoia	Dynamic structure (recurring cycle that is bi-modal)	Timaeus 40d (complex sundial) Antikithera machine
Plato (formal, synthetic) (static, whole)	Atemporal (mathematical, logical) pure extension	Present Eternal	F. Kafka <u>The Castle</u> ⁴⁹⁹	nous	Value (number series)	Model of the WorldSoul [Armillary Sphere] (Timaeus 32ff) Model in motion

Table 5.3. Brumbaugh's Extensions of the approaches to the Kinds of Time.

In other words, we are not claiming that these four different nexuses or moments have not been identified before, rather, we are merely deriving them phenomenologically from the novel in ways that are different, but complementary, to the work that Brumbaugh has accomplished. But, Brumbaugh also makes the anti-ontotheological point that these four different kinds of time and four different philosophical approaches are valid in their own contextual and independent ways of looking at the world. He points out that these

⁴⁹⁶ Mann, Thomas, and John E. Woods. The Magic Mountain: A Novel. (New York: A. Knopf, 1995).

⁴⁹⁷ Proust, Marcel, Lydia, 1947- Davis, and Christopher Prendergast. Swann's Way. (New York: Viking, 2003).

⁴⁹⁸ Sophocles, Ian McAuslan, Judith Affleck, and P. E. Easterling. Oedipus Tyrannus. Cambridge translations from Greek drama. (Cambridge: Cambridge University Press, 2003).

⁴⁹⁹ Fishelson, David, Aaron Leichter, Max Brod, and Franz Kafka. Franz Kafka's The Castle. (New York: Dramatists Play Service, 2001).

approaches have long histories within the Western tradition, and that none of them can claim absolute supremacy. Each must be considered in their *own realm* as legitimate. And he also makes the point that many problems come from assuming one and suppressing the others, or by applying a root metaphor to a realm that it does not appropriately fit into. Brumbaugh gives examples of novels whose authors exemplify each of the types of time. He also gives examples of mechanical models from Plato that exemplify these kinds of time. He relates them to the Divided Line of Plato as well as to the temporal tenses. In essence, he multiplies the examples of the various kinds of time, so that we can relate them to the moments of the Quadralectic, which were revealed as self-conscious in their relationship to each other by Blake.

Relating schematization to all the states of consciousness allows us to see that it is a very deep projective structure. Furthermore, by relating it to the viewpoints in the novel, we see that there is a wide array of literature available for studying and understanding the Quadralectic in action. The Quadralectic relates at the trace level of Being, i.e., Hyper Being, to the Emergent Meta-system cycle in Existence. But it is also important to note that the moments of the Quadralectic can also be seen as the transformations between the sub-schemas (whole Form sub-schema, partial Picture sub-schema, partial Plan sub-schema, and partial Model sub-schema) and it is through these moments that the schemas are differentiated in terms of the downward (representational) and the upward (repetitional) movement between dimensions.

We wish to point out that the states of consciousness are distinguishable and have different orientations to the schemas. Thus, the different distinguishable states of consciousness can provide a basis for a phenomenological understanding of the Quadralectic. We have used the example of Blake's Four Zoas to show that this Quadralectical structure has been previously represented in Blake's time. At that time Biblical criticism distinguished the different versions of the One God as YHWH, El, Shaddai, Adonai, etc., which were, in turn supported by the plural noun Elohim⁵⁰⁰. The Biblical God can be represented by the Quadralectical structure from the point of view of Blake who created his own pre-biblical narrative in the Four Zoas to explain the relationship between the various images of God in the Bible. These images of God tell us more about ourselves than they tell us about God Himself. They inform us of an internal schematization process that comes out of us. This process can be seen in the entire field as a structural array that consists of ways of

⁵⁰⁰ <http://ldolphin.org/Names.html> accessed 080627.

approaching a concept like God, which has no internal structure Itself. The concept of God is a mirror to Humanity. And when Blake and Hegel looked into that mirror they saw “through a glass darkly”⁵⁰¹ the premonitions of the Quadralectic. In the Bible, God says that He created man in His Image⁵⁰². Yet, we derive some ideas of what we conceive our image to be from all the myriad ways that we think about, or imagine, the ultimate concept of God as Supreme Being. Ontotheology says that utter unity and complete totality is unsustainable, and that it actually only leads to fragmentation and difference between the competing visions of the Absolute. But, as a structural field, this plethora of differences and fragments of the absolute vision are *not* without structure. Blake (privately) and Hegel (publically) give us an intimation of that structure in their meta-novels, and through their example we can see this structure working itself out in the myriad forms of the novel, as well as in the forms of consciousness with all its variety. When we compare the phenomenology of everyday consciousness with the structure of the viewpoints within the novel, we can see that when these viewpoints have been brought together, we are compelled to be self-conscious of them. We must be aware of the dualistic struggle between Good and Evil as it entered the Western tradition from Zoroastrianism⁵⁰³ through the Greeks. As a generator of difference this dualistic struggle has helped us to understand ourselves at a fundamental level when we see that the field of this struggle and the differences that it produces are self-organizing in the face of a lack of any internal structure in the ultimate and absolute Transcendental Object, i.e., God, and that this structure mirrors the Quadralectic. In fact, it has been shown in this chapter that we can see the outlines of this structural pattern when we compare the phenomenology of everyday consciousness with the structure of the viewpoints concerning the novel, and that this structural pattern has been brought to consciousness, in such a way to make us self-conscious of them by the work of Blake and Hegel. The same pattern has been found by others as we have shown through our reference to Brumbaugh who connects similar patterns found by other scholars. At this point we are in the position to mathematically reify this structure and realize that it is actually the structure of our creativity in all realms of endeavor, although our focus here will be on the creative process of Emergent Design.

⁵⁰¹ CORINTHIANS. 13:12.

⁵⁰² GENESIS, 1: 27.

⁵⁰³ Berman, Morris. Coming to Our Senses: Body and Spirit in the Hidden History of the West. (New York: Simon and Schuster, 1989).

The Wholeness of the Axiomatic Platform and the Entry into Hyper Being

The Importance of Self-mediation in the Structure of Sign Systems.

Once we understand the general phenomenological context of the Quadralectic we can then focus on Hyper Being as the meta-level of Being where the design process occurs. However, it is necessary to show that Hyper Being exists, so a geometrical analogy is used to clarify the existence of Hyper Being within a world of objectivist Science and Engineering. We will focus on establishing the Axiomatic Platform as the basis of Axiomatic Geometry and relate it to the Ennead of Pieter Wisse, which serves as the foundation for his Metapattern method. At this point we will generalize from the Ennead to the Icosaheptead, which is the next level up in complexity and then show how it is part of a structure that Plato termed the WorldSoul. The Foundational Mathematical Categories will be used to analyze the structure of the Enneadic Axiomatic Platform and its relationship to the Icosaheptead. Next, we will demonstrate how the Meta-system is produced as non-Euclidian Geometry when we add the Fifth Axiom to Absolute Geometry. Finally, we will look at the possibility of *mutual grounding instead of self-grounding* as a solution to the problem of foundations in the Western tradition. We will show how this mutual grounding is related to the Special Systems that are embodied as structures of mirroring. This reveals the difference between the differentiated and undifferentiated structures such as Being and Beyng, or Clearing and Openness. In addition, we will look at various tasks in Engineering development where Hyper Being shows up in disciplines other than Design.

Entry into Hyper Being

So far we have explored Pure Being and Process Being and their impact on Systems Phenomenology. Now it behooves us to enter the upper reaches of the meta-levels of Being, which has been our goal from the beginning. The next higher kind of Being is Hyper Being. But, with our entry into Hyper Being things become much more difficult and suddenly we are in an esoteric, metaphysical realm. Yet, it is necessary to enter into this realm, and the others beyond it because this is where the core capacity for Design originates. Hyper Being is the realm of possibility, and without possibility there would be no design. However, in the Western Tradition, this higher type of Being, which plays a central role in Ontotheological Metaphysics, has been forgotten or suppressed and this leads to the challenge of showing that it exists so that it can be taken seriously. Once we show that Hyper Being must exist, then the other more esoteric realms of ontological standing, such as Wild Being and Ultra Being, become more plausible. We will be treating

these higher meta-levels of Being in Chapter Eight, but to begin with we will only introduce Hyper Being as we strive to show that this standing toward the world exists and provides a foundation and a spring-board for the possibility of design. We will use geometry to demonstrate the existence and nature of Hyper Being. This example will have multiple applications. First, our application of geometry will demonstrate that Hyper Being exists. Second, it will give us a basis for understanding the Ennead as an Axiomatic Platform⁵⁰⁴. Third, it will help us to further refine our understanding of the nature of the transition between the System and Meta-system, and fourth, it will prepare the ground for the development of Sign Engineering.

Hyper Being can be identified through the relationship of the first four axioms of geometry to the fifth axiom⁵⁰⁵ of geometry. The first four axioms of Geometry give the definition of the Axiomatic Platform⁵⁰⁶ of Geometry, but the fifth axiom⁵⁰⁷ has always been problematic, and eventually led to the development of non-Euclidian geometry⁵⁰⁸. We will analyze the relationship of non-Euclidian geometry to traditional Euclidean geometry as a metaphor for the relationship of the System to the Meta-system. We will stress the point that Hyper Being characterizes the transition between the System and Meta-system, which designates that design must find its niche between these two core schemas. So, by establishing the relationship between the four basic axioms of geometry and the fifth axiom, which gives rise to the alternatives of the three geometries, we will have a fundamental example of the arising of the possibility of Hyper Being. That relationship

⁵⁰⁴ Hartshorne, Robin. Geometry: Euclid and Beyond. Undergraduate texts in mathematics (New York: Springer, 2000). p. 118. Hartshorne uses the term Axiomatic Platform in the sense that the 'axiom set' is a platform for thinking about proofs. Without that platform there is no starting place. There is no First as a starting place, rather there is the set of axioms that forms a foundational platform for further exploration and this is the basis for establishing a system boundary for a discipline such as geometry.

⁵⁰⁵ Stillwell, John. Mathematics and Its History. Undergraduate texts in mathematics (New York: Springer-Verlag, 1989) p. 338, Section 18.1 on The Parallel Axiom.

⁵⁰⁶ Also called Absolute Geometry. The Axiomatic Platform can also be likened to the Nonion, which Peirce claims to discovered before Sylvester in a priority dispute. Peirce says that he discovered it in the course of developing his Relative Logic. The Nonion is the three Quaternion Imaginaries i, j, k taken times themselves to give nine combinations. These develop into Dyadic Tensors. They form a stable basis for the manipulation of three dimensional reference frames and represent the dynamics of torsion. This is another image of the Axiomatic Platform. See Peirce, C. S., "A Communication from Mr. Peirce" Chronological Edition Volume 4 p. 467. See also Sylvester, James Joseph "On Quaternions, Nonions, Sedenions, John Hopkins University Circulars III (1884) pp. 7-9 in The Collected Mathematical Papers of James Joseph Sylvester pp. 122-132. (New York: American Mathematical Society 1973).

⁵⁰⁷ Ravindran, R. "Euclid's Fifth Postulate." Resonance -Bangalore-. 12. 4 (2007): pp. 26-36. See also Saunders, Margaret Ann Hockensmith. A Report on the Significance of the Controversy Surrounding Euclid's Fifth Postulate (Thesis, M.S. --Virginia Polytechnic Institute, 1963). Withers, John William. Euclid's Parallel Postulate: Its Nature, Validity, and Place in Geometrical Systems (Chicago: Open Court Pub. Co, 1908). Augros, Michael Anthony. Euclid's Fifth Postulate and the Nature of Geometrical Truth (Boston, MA: Boston College Thesis, 1995).

⁵⁰⁸ Bonola, Roberto, János Bolyai, and N. I. Lobachevskii. Non-Euclidean Geometry; A Critical and Historical Study of Its Development (New York: Dover Publications, 1955).

embodies the nature of Hyper Being, which is normally thought of as a type of indecision⁵⁰⁹ between possible alternatives. The existence of Hyper Being is intrinsic to the nature of the manifestation of the fifth axiom of geometry in relation to the four basic axioms of absolute geometry⁵¹⁰, i.e., the core of geometry that does not change in relation to the alternative possible geometries generated by the fifth axiom.

The four axioms of absolute geometry, this unchanging core of all geometries, is an archetypal example of an axiomatic platform. All other axiomatic systems in mathematics, logic, and other determinate disciplines, which were based on proof and developed later in the history of the Western tradition, were modeled on this first axiomatic platform. We call it a platform because it is a stable basis for reasoning and defines essential differences minimally. Wisse based his Ennead on this axiomatic platform structure when he developed his Metapattern meta-method. The Axiomatic Platform of the Ennead is posited as the foundation for Sign Engineering. But we can go further and examine a geometrical example that will provide a fundamental basis for Semiotics⁵¹¹. Thus, in this chapter we will develop a broader basis for Sign Engineering⁵¹² by using geometry to create a Theory of Signs⁵¹³, which will further develop the theory of Peirce by moving from the structure of Logic to the structure of Geometry. This movement from the structure of Logic⁵¹⁴ to the structure of Geometry will further develop and complement the theories of Peirce⁵¹⁵.

A geometrical example gives us a very precise analogy for the relationship of the System to the Meta-system. We have been attempting to define this difference as precisely as we can all along, but here we will show how *distinction* figures into the relationship of the fifth axiom to the first four axioms of Absolute Geometry. The axiomatic platform defines a System and differentiates that System from all that lies beyond, i.e., its Meta-system. But

⁵⁰⁹ De Nooy, Juliana. Derrida, Kristeva, and the Dividing Line: An Articulation of Two Theories of Difference (New York: Garland Pub, 1998) p. 66.

⁵¹⁰ Behnke, Heinrich. Fundamentals of Mathematics (Cambridge, Mass: MIT Press, 1974) Three volumes, Vol.#1, p. 129, chapter 5 on Absolute Geometry.

⁵¹¹ Merrell, Floyd. Semiotic Foundations: Steps Toward an Epistemology of Written Texts (Advances in semiotics. Bloomington: Indiana University Press, 1982).

⁵¹² Zellweger, Shea. Sign-Creation and Man-Sign Engineering (Semiotic Society of America, Third Annual Meeting, October 6-8, 1978, Mariott Inn, Providence, Rhode Island. 1978) Semiótica, vol. 38, no. ½, (1982): pp. 17-54. See also Liu, Kecheng. Semiotics in Information Systems Engineering (Cambridge: Cambridge University Press, 2000).

⁵¹³ Eco, Umberto. A Theory of Semiotics. Advances in semiotics (Bloomington: Indiana University Press, 1976). See also Danesi, Marcel. The Quest for Meaning: A Guide to Semiotic Theory and Practice Toronto Studies in Semiotics and Communication. (Toronto: University of Toronto Press, 2007).

⁵¹⁴ Ross, Stephen David. The Limits of Language (New York: Fordham University Press, 1994). Discusses Peirce in relation to Semiotics and Logic.

⁵¹⁵ Colapietro, Vincent Michael, and Thomas M. Olshewsky. Peirce's Doctrine of Signs: Theory, Applications, and Connections Approaches to Semiotics, 123. (Berlin: Mouton de Gruyter, 1996).

in defining the boundary of the System, the fifth axiom also opens up the possibility that the Meta-system exists as a parallel intrinsic structure to the System by utilizing the fifth geometric axiom to provide closure⁵¹⁶ for a particular geometry. Giving closure to a particular geometry excludes other possible geometries that the fifth axiom may generate through variations of itself. The fifth axiom is a prime example of a Gödelian Statement⁵¹⁷, which is a statement that defines a System's emergent properties but cannot be confined to existing either inside or outside of the System. It is the Gödelian characteristics of the fifth axiom that will generate the repercussions that we will explore⁵¹⁸. It simultaneously defines Hyper Being as a possibility that can manifest between Static Being⁵¹⁹ and Becoming⁵²⁰. It also defines the difference between the System and Meta-system, and gives criteria for the problematic sublation⁵²¹ of the axiomatic platform into an entity that is whole. The problematic nature of this sublation produces an alternative model for Semiotics⁵²² that can be added to Peirce's development of the same discipline, which shows that Pieter Wisse⁵²³ has had an essential insight into the nature of the Axiomatic Platform in his definition of the Ennead⁵²⁴.

When we define the difference between the System and Meta-system, we discover that there is an even more subtle structure of differentiation, which we will call the *Special Systems*⁵²⁵. It is only through making a clear distinction between the System and the Meta-system that it is possible to see this more subtle organization of structures⁵²⁶ that exists within the discontinuity between them. Although Hyper Being is more obscure than Static

⁵¹⁶ We are assuming autopoietic closure is produced for a particular geometry by a variant of the fifth axiom. See Stewart, J. "From Autopoiesis to Semantic Closure." *Annals - New York Academy Of Sciences*. 901 (2000): pp. 155-162. See also Chandler, Jerry L. R., and Gertrudis van de Vijver. Closure: Emergent Organizations and Their Dynamics (Annals of the New York Academy of Sciences, v. 901. New York, NY: New York Academy of Sciences, 2000).

⁵¹⁷ Lucas, J.R. on "The Implications of Gödel's Theorem" at <http://users.ox.ac.uk/~jrlucas/Godel/implic.html> accessed 080904. See also Mostowski, Andrzej Sentences Undecidable in Formalized Arithmetic: An Exposition of the Theory of Kurt Gödel (Amsterdam: North-Holland Pub. Co., 1952). See also Wang, Hao. Reflections on Kurt Gödel (Cambridge: MIT, 1987).

⁵¹⁸ Graves, Daniel, MSL "Gödel's Theorems And Truth" at <http://www.evanwigg.com/articles/GODEL.html> accessed 080905 discusses fifth axiom in the context of Gödel's undecidability.

⁵¹⁹ Pure Being of Parmenides.

⁵²⁰ Process Being of Heraclitus.

⁵²¹ Aufhebung or the production of synthesis from Hegel.

⁵²² To my knowledge no one has used geometry directly as the basis of semiotics.

⁵²³ <http://www.informationdynamics.nl/pwisse/> accessed 080905.

⁵²⁴ Wisse, Pieter, "Information Meta-theory" PrimaVera Working Paper 2003-12, November 2003, Universiteit van Amsterdam Department of Business Studies at <http://primavera.feb.uva.nl/PDFdocs/2003-12.pdf> accessed 080906.

⁵²⁵ See Reflexive Autopoietic Dissipative Special Systems Theory at http://works.bepress.com/kent_palmer by the author

⁵²⁶ Reflexive Social, Autopoietic Symbiotic, and Dissipative Ordering Special Systems

Being and Becoming, once its implications are understood, it becomes an avenue for increasing the subtlety of our account of the relationship between the System and the Meta-system because it opens up our access to the finer structures that exist as fractal organizations that transition within that discontinuity. We are expanding Systems Phenomenology on two fronts. On one front we are moving up the meta-levels of Being to higher and higher meta-levels, the next of which is the Hyper Being, on another front we are expanding the scope of our vision from merely analyzing the system on its own, to considering its *inverse dual*, the *meta-system*, and the *special systems* that exist as *partialities* between them. Special Systems are partial thresholds of organization, that are actually incomplete Systems and Meta-Systems. These partialities are part System and part Meta-system. We have shown that there is a *showing and hiding* relationship between the System and the Meta-system that obscures the Special Systems because the Meta-system schema exists as a blind spot in our culture. We have advanced the phenomenological argument that schemas show up in several different states of consciousness and that these differences give a framework for understanding different views of the schemas. This argument moves us closer to a definition of the dynamics of design as expressed in terms of the Quadralectic. However, it behooves us to fully explain the transition between the meta-level of Process Being and the next emergent meta-level of Being, which we will refer to as Hyper Being. This transition is crucial to our argument because it is at this level that we pose the Quadralectic as a fundamental way to understand the design of both Systems and Meta-systems.

Hyper Being is short for what Merleau-Ponty calls the “Hyper-dialectic between (Process) Being and Nothingness” in his work, The Visible and the Invisible⁵²⁷. For Merleau-Ponty, this definition of Hyper Being is the prelude to the definition of Wild Being. The concept of Hyper Being was developed by Heidegger, who named it ~~Being~~ (crossed out⁵²⁸). Derrida took this concept and defined it as the *differance*⁵²⁹, i.e., the *meta-difference*, which contrasts spatial differing and temporal deferring. Derrida's concept of *differance*

⁵²⁷ Op. cit.

⁵²⁸ Being crossed out was a method Heidegger invented to talk about the odd nature of Hyper Being. At that point there was no name for Hyper Being as such, but later Derrida called it Differance. Note: "In Zutr Seinsfrage "Being" is literally crossed out and, as crossed out, becomes a new symbol, which represents for Heidegger the horizon in which man and things confront each other, a horizon that exists only in and through this confrontation." in Dreyfus, Hubert L. "Wild on Heidegger: Comments" The Journal of Philosophy, Vol. 60, No. 22, American Philosophical Association, Eastern Division, Sixtieth Annual Meeting, (Oct. 24, 1963), pp. 677-680.

⁵²⁹ Wood, David and Bernasconi, Robert. Derrida and Différance (Evanston, IL: Northwestern University Press, 1988).

initiated a school of thought called Deconstructionism⁵³⁰. Deconstruction is actually a term Heidegger uses to designate his method in Being and Time⁵³¹. Derrida's early work in Of Grammatology⁵³² and Writing and Difference⁵³³ is closely tied to this approach of Heidegger. Derrida took Heidegger's concept of Hyper Being and applied it to the work of Husserl⁵³⁴. The development of Deconstructionism has led to the further development of Post-modernism⁵³⁵ and Post-Structuralism⁵³⁶. Yet, the most interesting development to emerge in light of these works is that of John Sallis, who traced the concept of Hyper Being back to the Timaeus⁵³⁷ of Plato, who refers to it as the *third type*⁵³⁸ (kind) of Being. Thus, it appears that this perspective was first inaugurated by Plato, but was forgotten in the Western tradition until it was rediscovered by Heidegger and then developed by Derrida⁵³⁹ before being taken up by others⁵⁴⁰. In the Timaeus, as Plato is describing the creation of the world by the Demiurge, he defines Hyper Being as a new beginning, and in the midst of this new beginning, Plato takes an abstract description of the world and seeks to embody it. Here, he sees that the third kind (type) of Being, embodied by the *chora* or *receptacle*⁵⁴¹, is necessary for this process of embodied creation. In other words, the process of *Being and Becoming* are considered theoretical by Plato, because, when an actual, embodied creation occurs, an appeal to this third kind of Being is deemed

⁵³⁰ Derrida, Jacques, and John D. Caputo. Deconstruction in a Nutshell: A Conversation with Jacques Derrida. Perspectives in Continental Philosophy (New York: Fordham University Press, 1997). See also Culler, Jonathan D. On Deconstruction: Theory and Criticism After Structuralism (Ithaca, N.Y.: Cornell University Press, 1982). See also <http://beyng.com/hb/hbdecon.html> accessed 08/09/06. Books about Deconstruction and Heidegger.

⁵³¹ Op. Cit. See also Caputo, John D. Radical Hermeneutics: Repetition, Deconstruction, and the Hermeneutic Project. Studies in Phenomenology and Existential Philosophy (Bloomington: Indiana University Press, 1987). p. 64.

⁵³² Op. cit.

⁵³³ Derrida, Jacques. Writing and Difference (Chicago: University of Chicago Press, 1978).

⁵³⁴ Derrida, Jacques, and Edmund Husserl. Edmund Husserl's Origin of Geometry, an Introduction (Stony Brook, N.Y.: N. Hays, 1978).

⁵³⁵ Grenz, Stanley J. A Primer on Postmodernism (Grand Rapids, Mich: William B. Eerdmans Pub. Co, 1996). See also Bertens, Johannes Willem. The Idea of the Postmodern: A History (London: Routledge, 1995).

⁵³⁶ Belsey, Catherine. Post-Structuralism: A Very Short Introduction. Very Short Introductions, 73. (Oxford: Oxford University Press, 2002). See also Harland, Richard. Superstructuralism: The Philosophy of Structuralism and Post-Structuralism (London: Routledge, 2006).

⁵³⁷ Sallis, John. Chorology on beginning in Plato's Timaeus (Bloomington: Indiana University Press, 1999).

⁵³⁸ 'Type' or 'Kind' of Being will be used interchangeably here, because the translations generally use 'type,' where we usually use the term 'kinds' with reference to the meta-levels of Being. Type is generally something we project as a categorization, while a kind implies something in the nature of the thing itself.

⁵³⁹ Derrida, Jacques. Speech and Phenomena, and Other Essays on Husserl's Theory of Signs Northwestern University Studies in Phenomenology & Existential Philosophy. (Evanston: Northwestern University Press, 1979).

⁵⁴⁰ Wood, David, and Robert Bernasconi. Derrida and Différance. Op. cit.

⁵⁴¹ Vallega, Alejandro A. Heidegger and the Issue of Space: Thinking on Exilic Grounds. American and European Philosophy (University Park, Pa: Pennsylvania State University Press, 2003). p. 29; See also Brockelman, Thomas P. The Frame and the Mirror: On Collage and the Postmodern. Philosophy, Literature, and Culture (Evanston, Ill: Northwestern University Press, 2001). p. 86.

necessary. We call it the *third type* of Being because it appears when one considers the difference between Pure Being and Process Being. It is clear that the differance is a third kind of Being different from what is being distinguished. It cannot be anything that is of a lower ontological status, and it cannot be anything of a higher ontological status either. So, with this third kind of Being, which is beyond Pure Being and Process Being, i.e., *Becoming*, we are opening Pandora's Box and admitting that there might be infinite kinds of Being, each of which we understand as a *meta-level* of Being. Later, in the Timaeus, Plato discusses yet another beginning and comes close to defining Wild Being⁵⁴², but at this point he does *not* call it a *fourth kind* of Being although there is a good chance that Plato knew about all the four kinds of Being and their role in the creation of emergent eventities. Yet, Plato did stress the role of Hyper Being, which was precisely what the tradition had forgotten, so it came as a surprise when Heidegger first rediscovered the concept. Heidegger found this possibility of unleashing an endless succession of various kinds of Being so very disturbing that he sought a radical solution to this problem⁵⁴³. But others eagerly explored this new landscape of the possible kinds of Being, and Merleau-Ponty went on to define the *inverse* of Hyper Being, which he called Wild Being⁵⁴⁴. For a long time it was unclear as to whether there was a *fifth kind* of Being, but it now appears that there *is* a higher level than Wild Being, which we have dubbed Ultra Being⁵⁴⁵. These discoveries of the existence of each higher kind of Being transform the world by specifying higher levels of transcendence⁵⁴⁶ and higher levels of schemas as well. This is because the differences between the schemas are inscribed at their meta-levels of Being and it is these differences that specify their essence. Yet, introducing a new kind of Being restricts the essence of the schema even further⁵⁴⁷. It appears that there is no kind of Being beyond Ultra Being, and Heidegger's concern about an infinite regress was unnecessary⁵⁴⁸. Yet, if we consider Heidegger's innovation with regard to *stopping* that regress, that would be of great interest to us since it orients Metaphysics in a whole new direction⁵⁴⁹.

⁵⁴² Dillon, M. C. Merleau-Ponty's Ontology. (Evanston, Ill: Northwestern University Press, 1997) p. 153, Chapter 9, "The Reversibility Thesis". Also called *Brute* or *Savage* Being by Merleau-Ponty.

⁵⁴³ As seen in his Contributions to Philosophy, Cf. Beyng. Op. cit.

⁵⁴⁴ Hyper Being is an expansion of being-in-the-world, Wild Being is a contraction of being-in-the-world.

⁵⁴⁵ I have coined this term for the fifth meta-level of Being to be the Singularity of Being which is an externalization in existence rather than a projection, it is the difference between the Emptiness and Void interpretations of existence.

⁵⁴⁶ i.e., the standings of the kinds of Being and the other standings like Existence, Manifestation and the Amanifest.

⁵⁴⁷ Each new meta-level of Being further defines the essence of a schema more narrowly.

⁵⁴⁸ The author has not discovered any further kinds of Being beyond Ultra Being, but that does not mean that they do not exist. If they do exist, their emergence will transform our understanding of the meta-levels of Being already known.

⁵⁴⁹ This further development that takes us beyond Being to Beyng will be explored later.

Hyper Being is crucial to our argument because it defines the realm in which design occurs. *That is the realm of possibility.* Hyper Being opens up the realm of possibility, which does not exist in Pure or Process Being. If Design is going to occur we need to open up that realm first. The realm of Hyper Being provides a springboard for the possibility of Design. Our contention is that when the realm of possibility is opened up, then design becomes possible through the application of the Quadralectic. *Based on our phenomenological analysis, the Quadralectic is all the points of view that one may have within schematic consciousness.* In the last chapter four points of view were identified. These correspond to *author, reader, narrator, and character* in relation to the structure of the novel and the Four Zoas⁵⁵⁰ of Blake. If we were to consider Hegel's Phenomenology of Spirit⁵⁵¹ as a kind of philosophical novel, then we would notice that there are several voices using the term "we" within that saga. In his lectures on Hegel, Jay Bernstein⁵⁵² suggests there are at least three voices using the word "we" in the Phenomenology of Spirit: Natural Consciousness, which is not self-conscious at the beginning, Observer Consciousness, which is self-consciousness in the middle, and finally the resultant Totalized Consciousness who realizes complete satisfaction at the end⁵⁵³. Natural Consciousness is the Character who is taking on each form of consciousness as a self-evident truth in each stage in the journey. The Observer Consciousness is the self-conscious Narrator, who is standing back and philosophically commenting on the fate of Ordinary or Natural Consciousness at each stage in the genealogy of consciousness. The Reader is the one who achieves complete satisfaction of Absolute Spirit by having read the entire progression of the transformations of consciousness along the way to Absolute Spirit. In this example, i.e., Phenomenology of Spirit, Hegel is the writer who, by actually penning this first book on the history of consciousness shows that it can be written⁵⁵⁴. Thus, *we* have achieved the level of spirit because *we* have completed the 'teaching and learning process' that such a book represents. The Phenomenology of Spirit is possibly the

⁵⁵⁰ Op. cit. Four Zoas was written sometime between 1797 and 1803 but first published in 1893 by Yeats. Hegel's Phenomenology of Spirit was published in 1807. Thus these two vastly different meta-novels are roughly contemporaneous in terms of their writing. See http://library.uncg.edu/depts/speccoll/exhibits/Blake/four_zoas.html accessed 090101

⁵⁵¹ Hegel, Georg Wilhelm Friedrich, and J. B. Baillie. The Phenomenology of Mind Dover Philosophical Classics. (Mineola, N.Y.: Dover Publications, 2003); Also Hegel, Georg Wilhelm Friedrich. Phenomenology of Spirit. (Delhi: Motilal Banarsidass, 1998). Translated by A.V. Miller. See also <http://www.wpunj.edu/cohss/philosophy/courses/hegel/> accessed 090101.

⁵⁵² <http://www.bernsteintapes.com/> Course on Hegel at New School for Social Research. See also Bernstein, J. M. Adorno: Disenchantment and Ethics. Modern European Philosophy (Cambridge England: Cambridge University Press, 2001).

⁵⁵³ Which is given in the realization of the meaning of forgiveness as Pure Spirit.

⁵⁵⁴ Giving an existential proof for his Transcendental Induction.

first Meta-novel⁵⁵⁵, i.e., a meta-romantic novel that follows the development of consciousness, to self-consciousness, to reason, to spirit in which the four viewpoints on the novel that we have outlined are *explicitly* delineated as viewpoints. In fact, Hegel's Phenomenology of Spirit succinctly follows a course that progresses from Monolectic, to Dialectic, to Trialectic (in his definition of *work*), to a Quadralectic of viewpoints on the narrative of the *journey into spirit*. The monolectic is the beginning point in 'sense certainty,' i.e., pure presence without any intermixed invisibility. From out of that the dialectical moments appear as the various structural positions that deal with the 'introduction of conceptuality' as the 'mediation of experience.' These dialectical explorations of structural possibilities continue until Hegel defines *work* as a trialectic, and then uses *work* (circumstance, means, purpose) as the template for introducing the transition to spirit. *The Quadralectic formalizes this idea and makes it the center of our theory of design*. It is implicit in the four voices who say "we" in Hegel's Phenomenology of Spirit. Even the concept of *trace* is implicit here because in each instance it is necessary to find which voice is saying "we". The traces of the "we" in the text are embedded in the *context*. They are protean reference pointers, which together are the *We that is an I* and the *I that is a We* of Spirit. Spirit is the meta-consciousness of the *We* that is embroiled in the tragedy and trauma of History. So, Hegel implicitly employed this concept of the Quadralectic even though he only explicitly spoke of Dialectics. We can see that his construction of an implicit framework of the Quadralectic in Phenomenology of Spirit is based on the traces of 'who the *reference indexical* is pointing toward' in each case where it appears in the text. The Monolectic (sense-certainty) and Trialectic (*work*) are points of development that are also implicit within his argument. We are suggesting that the Quadralectic is *not* disconnected from our tradition, but is merely a more explicit development of what has remained implicit in the tradition. At this juncture we need to proceed step by step because we are producing a formal theory of the *a priori* structure that underlies design. Kant demonstrates transcendental deduction⁵⁵⁶, and Hegel demonstrates transcendental induction⁵⁵⁷. Kant is operating in Pure Being and Hegel opens the door to Process Being in the form of the Dialectic by claiming that *being* and *nothing* are the

⁵⁵⁵ Four Zoas by Blake was written earlier but published later.

⁵⁵⁶ Förster, Eckart. Kant's Transcendental Deductions: The Three Critiques and the Opus Postumum Stanford Series in Philosophy. (Stanford, CA: Stanford University Press, 1989).

⁵⁵⁷ Simpson, Peter Alan. Hegel's Transcendental Induction (Albany, N.Y.: State University of New York Press, c1998).

same⁵⁵⁸. Now we are moving beyond the ideas of Plato, M. Heidegger, J. Derrida, and M. Merleau-Ponty who have outlined the higher meta-levels of Being⁵⁵⁹. But, in addition, we are also going beyond G. Bataille⁵⁶⁰, A. Plotnitsky⁵⁶¹, J. Derrida⁵⁶², and N. Bohr⁵⁶³ who have created models of the Meta-system. Plotnitsky wrote In the Shadow of Hegel⁵⁶⁴ to show how the Meta-system⁵⁶⁵ relates to the System of Hegel's totalizing philosophy. Thus, we have specific bridges between these two philosophical approaches. Derrida is one such bridge⁵⁶⁶. The System is transformed at each meta-level of Being, and it is also transformed by its duality with the Meta-system. The System and the Meta-system have two different essences at the meta-levels of Being and that transforms what they are in relation to each other. That necessitates this two-fold movement up the meta-levels of Being and into the dual of the Meta-system. This duality is representative of the nature of Hyper Being.

⁵⁵⁸ Hegel, Georg Wilhelm Friedrich. Hegel's Science of Logic. Muirhead Library of Philosophy (London: Allen & Unwin, 1969). Hegel defines "Nothing" as the Buddhists describe Emptiness and identifies it with Being, thus, the illusion of Being is basic to his philosophy. He lauds Heraclitus as giving the synthesis of Being and Nothing as Becoming.

⁵⁵⁹ We can call this effort a 'Transcendental Abduction' in the spirit of Peirce, which completes the Transcendental Deduction of Kant and the Transcendental Induction of Hegel.

⁵⁶⁰ See Accursed Share, Op. cit.

⁵⁶¹ See Complementarity, Op. cit., Plotnitsky mentions the contributions of Derrida, Bataille, and Bohr in the formulation of the concept of the Meta-system.

⁵⁶² "From Restricted to General Economy a Hegelianism Without Reserve" in Derrida's Writing and Difference Op. cit. p. 317.

⁵⁶³ Plotnitsky, Arkady. Reading Bohr: Physics and Philosophy Fundamental Theories of Physics, v. 152. (Dordrecht, The Netherlands: Springer, 2006). See also Murdoch, Dugald. Niels Bohr's Philosophy of Physics (Cambridge UK: Cambridge University Press, 1987).

⁵⁶⁴ Op. cit.

⁵⁶⁵ The 'General Economy' of G. Bataille.

⁵⁶⁶ Derrida appears as the "floating signifier" in the two series of names. Cf. Deleuze, Gilles. The Logic of Sense European perspectives. (New York: Columbia University Press, 1990).

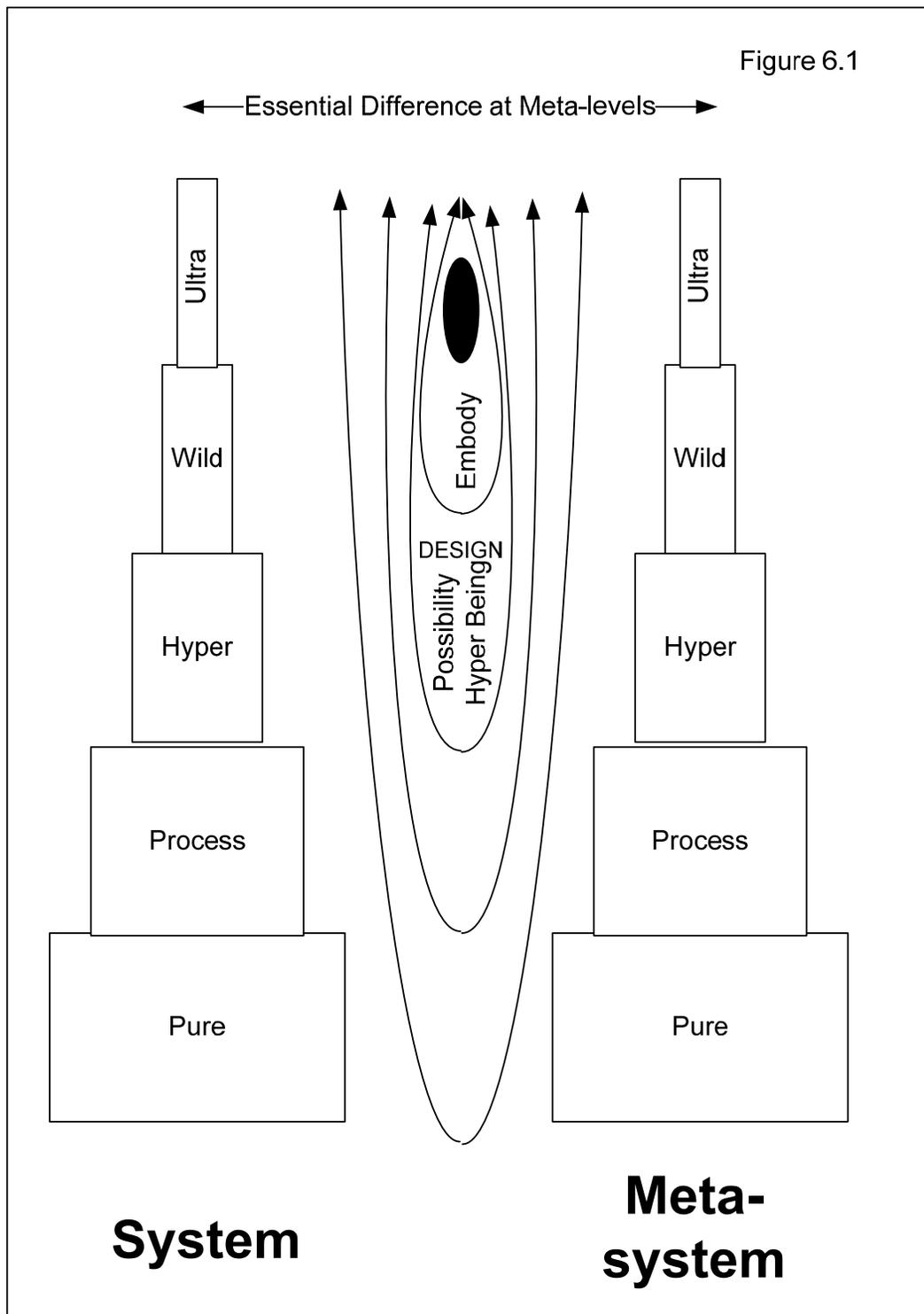


Figure 6.1. Meta-levels of Systems and Meta-systems

Ennead in the Context of the WorldSoul

While exploring the foundations of Emergent Design we have discovered the dual structure that exists between Hyper Being and Wild Being, which mirrors that of Pure Being and Process Being. Comparing and contrasting these dualistic structures immediately opens up

a new vista that needs to be outlined and developed. Recognizing that the kinds of Being appear in Plato's Timaeus is an important step. Plato's Timaeus is the ancient design manual for the Cosmos and our research demonstrates that Plato's concept of the WorldSoul plays an important role in the relationship of the levels of Being to Emergent Design. Pieter Wisse set the stage for the further development of theoretical approaches for Design Engineering with his own theory of Sign Engineering based on Peirce's Theory of Signs. Prior to his dissertation⁵⁶⁷, Wisse developed a meta-method that he termed Metapattern⁵⁶⁸. In that work he proposed the Ennead as a conceptual framework that could be used to ground his meta-method. In the process of exploring the Ennead we discovered that it has an archetypal pattern⁵⁶⁹. We also discovered that Moritz Schlick's General Theory of Knowledge⁵⁷⁰ can be used to understand how the Ennead could function as an axiomatic framework. Schlick built upon the work of Hilbert⁵⁷¹ and realized that only a set of totally self-referring concepts that are unconnected to any precept could serve as a stable basis for a conceptual system. It is possible to interpret Wisse's Ennead as both an archetypal pattern⁵⁷² as well as a conceptual axiomatic platform, which gives us a basis for incorporating it into Emergent Design. However, because the structure of the Ennead has nine elements that are intertwined in a matrix form, there is a question as to how this archetypal conceptual structure could fit into the wider progression of the WorldSoul⁵⁷³ suggested by Plato. In that progression there are two series that start from one. One series consists of the powers of three: 1, 3, 9, 27, but the other series diverges into a progressive bisection, i.e., the powers of two: 1, 2, 4, 8. As a result, much of the initial work in this research project was to surmise *how* these two series were related, as well as analyzing the relationship between the Ennead and the next higher level of complexity, which is the Icosaheptad ("27-ead").

⁵⁶⁷ Semiosis & Sign Exchange: Design for a Subjective Situationism, including Conceptual Grounds of Business Information Modeling Op. cit.

⁵⁶⁸ Metapattern: Context and Time in Information Models Op. cit.

⁵⁶⁹ It appears as a specific layer in Plato's WorldSoul related to the numbers 9 and 4.

⁵⁷⁰ Op. cit.

⁵⁷¹ Foundations of Geometry Op. cit.

⁵⁷² Appears as the structure of the marriage of Peleus and Thetis which is the origin among the Gods of the Trojan War where the Trojan Horse was the ending gambit.

⁵⁷³ Plato, and Francis Macdonald Cornford. Plato's Cosmology: The Timaeus of Plato (New York: Liberal Arts Press, 1957) p. 49. See also Robinson, T. M. "Demiurge and World Soul in Plato's Politicus" The American Journal of Philology, Vol. 88, No. 1 (Jan., 1967), pp. 57-66, The Johns Hopkins University Press, Stable URL: <http://www.jstor.org/stable/292727> accessed 080905; Silverman, Allan Jay. The Dialectic of Essence: A Study of Plato's Metaphysics (Princeton, N.J.: Princeton University Press, 2002) pp. 256-257.

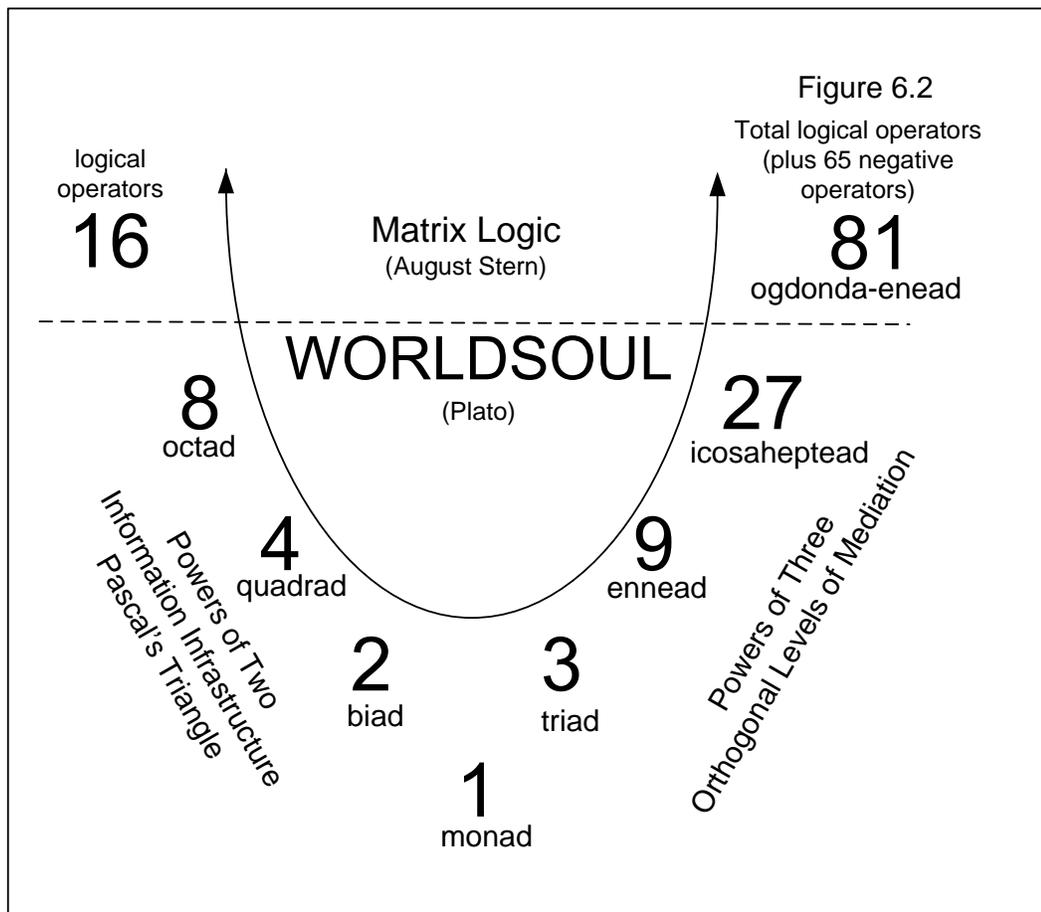


Figure 6.2. Levels of Plato's WorldSoul

Enneadic Axiomatic Platform in Absolute Geometry

In order to understand what is meant by the Ennead as an Axiomatic Platform⁵⁷⁴, we need to go back to the most venerable of the axiomatic systems, that of Euclid's Geometry. There are five axioms, the fifth of which is controversial⁵⁷⁵ because it generates non-Euclidian geometry⁵⁷⁶. But the other four axioms, called Absolute Geometry⁵⁷⁷, are accepted universally, and they each speak of mediated relationships:

⁵⁷⁴ Cederberg, Judith N. *A Course in Modern Geometries*. Undergraduate Texts in Mathematics (New York: Springer, 2001). See p. 4 and the rest of Chapter 1 in which "four point" geometry is defined as an example of an axiomatic system. This presentation is similar to my own given here.

⁵⁷⁵ Trudeau, Richard J. *Non-Euclidean Revolution* (Boston: Birkhauser, 2001).

⁵⁷⁶ Hofstadter, Douglas R. *Gödel, Escher, Bach: An Eternal Golden Braid* (New York: Basic Books, 1999). pp. 221-222.

⁵⁷⁷ Beckmann, Petr. *A History of Pi* (New York: St. Martin's, 1974) p. 53.

1. Two points are mediated by a straight line segment.
2. The line segment mediates between two indefinite extents in opposite directions extending the line segments.
3. The line segment, which is called a radius, mediates between a point and a circular line to define a unique circle.
4. A congruency mediates between two orthogonal right angles composed of two line segments each which can be superimposed upon each other.

If we take these four mediations⁵⁷⁸ and set them in a square (Figure 6.3), then on one side we have *two points* mediated by a line segment, and on the other, we have *two extents* mediated by a line segment. Between the two sides are two radii that connect the point and the extent where the circle appears as sweeping around the lines in the extent. The circle is a closed extent rather than an open extent of the infinite line. Now, let us take one side of this square, which is composed of a point and an extent and twist it to create another square where extents and points are diagonal from each other. This new square (Figure 6.4) has two line segments extending from each diagonal point. These line segments form a right angle, and the lines form radii that define overlapping circles emanating from each point. These two right angles defined by the square are mediated at a second order level by the concept of congruency, which interestingly implies the possibility of moving the figures so that one right angle will be superimposed upon another (Figure 6.5).

⁵⁷⁸ <http://en.wikipedia.org/wiki/Axiom> accessed 080905. See for traditional definition of axioms.

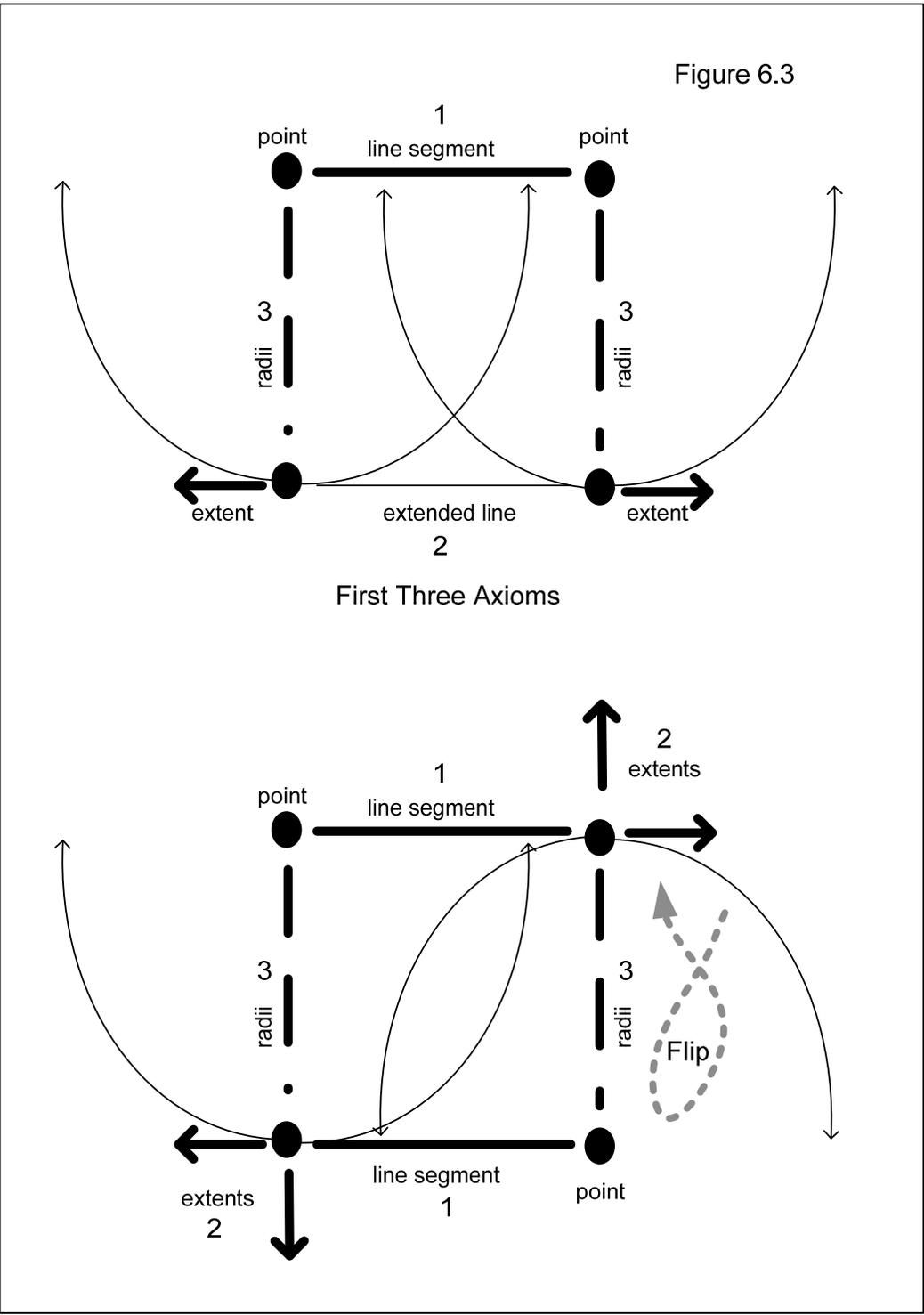


Figure 6.3. First Three Axioms of Geometry Diagrammed with Flip.

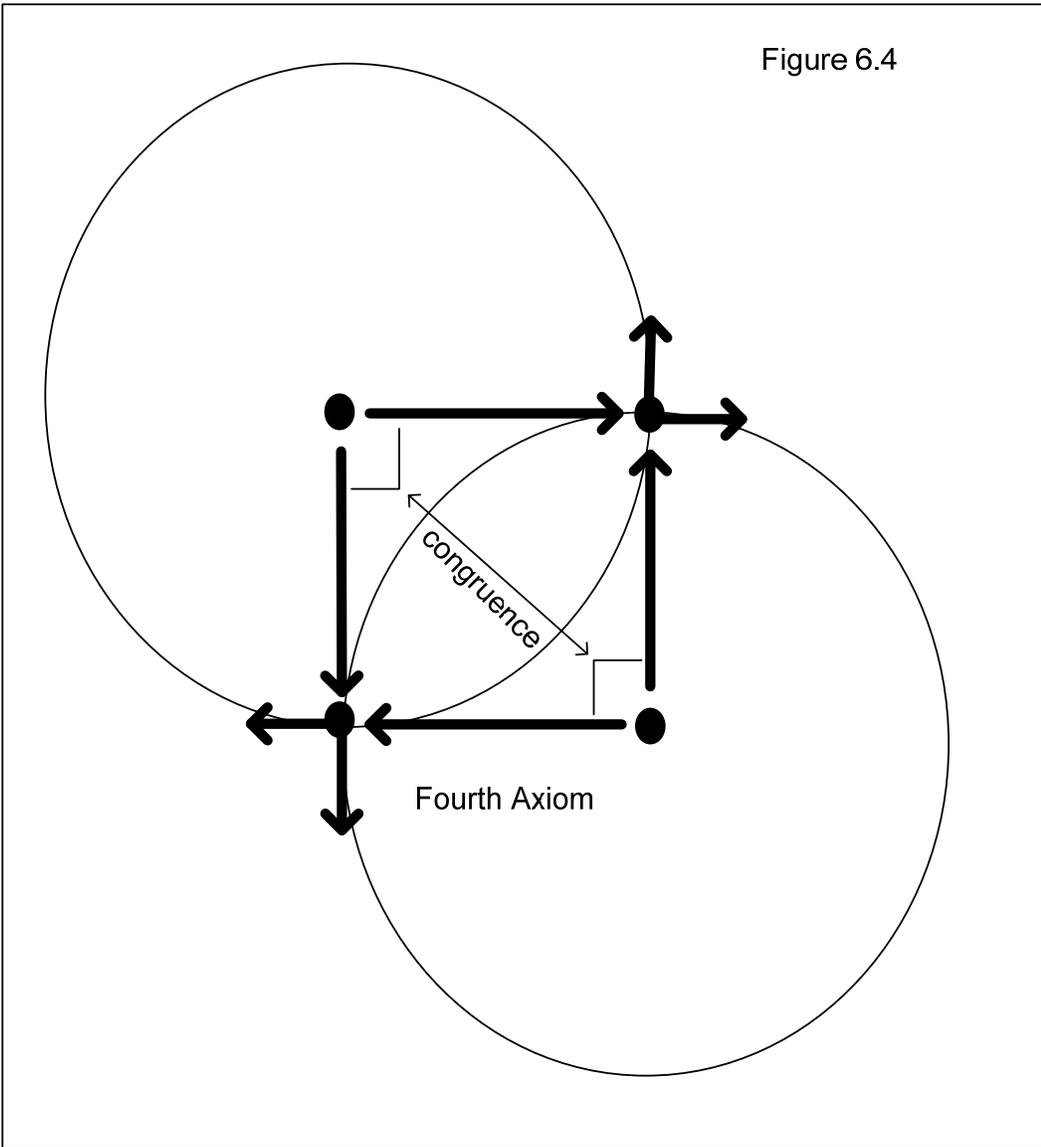


Figure 6.4. Fourth Axiom of Geometry showing Congruence.

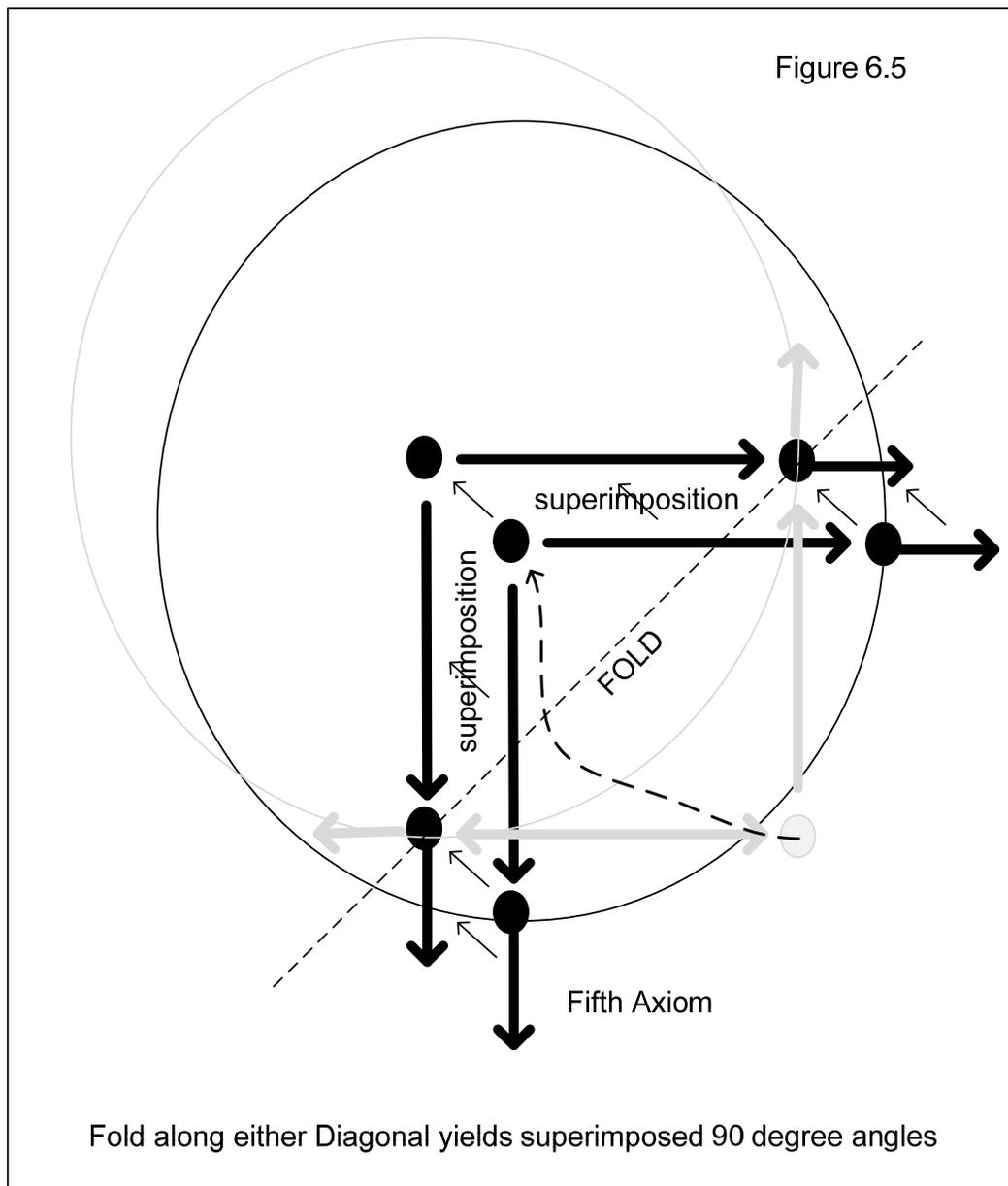


Figure 6.5. Fifth Axiom of Geometry as Fold with Superimposition.

What we see here is a perfect model of the Ennead, where the pair of points and the pair of extents are the elements, and the lines, in every case, are the mediations. The lines (mediations) form the sides of the square. The congruency of opposed right angles is the middle term at the center of this square. All nine points of the Ennead are represented in their canonical form as a matrix. Thus, the four non-controversial axioms of Absolute Geometry form an axiomatic platform in the configuration of an Ennead of the type described by Wisse, which has both first (line segment) and second-order (congruent) mediations. Viewing the traditional axioms of geometry in this way allows us to see that the Ennead, as an axiomatic platform, is a serious concept implied in the structure of the Axioms of Geometry from the very beginning. Normally the axioms are presented as

independent statements, which are not related to each other. But here, we see that what is being modeled in the axioms is a very specific structure of the Ennead that is being represented as a system of zeroth (points and extents), first (line segments), and second (congruent) order mediations in the simplest possible form in such a way that these mediations can be understood simultaneously in a mathematical and logical structure. The four axioms are precisely structured in relation to each other, such that there are two kinds of first-order points without mediation, points, and extents. This makes sense because monads⁵⁷⁹ can either be points or lines. So the two types of monads are brought together here in pairs. Each of the connections is a line segment. In two cases it is a normal line segment, but in the other cases the two line segments are the radii of circles. The two circles emanate from the points and appear as sweeping radii in the extents so that the motion of extending lines and drawing circles is brought together by the square of line segments. There is also a flip on one side of the square so that point and extent are exchanged. This creates a symmetrical structure, and in that structure, the congruence between the two right angles is clearly within the square, and the circles that appear from the points are overlapping and have radii at right angles. The second-order mediation of congruency appears in the overlapping of the circles at the center of the square. The superimposition occurs if we fold the square along the diagonal that connects the extents. The other diagonal is between the points and it is along that diagonal that the congruence is posited.

⁵⁷⁹ Monads are schematic points in spacetime that are embodied as atoms, particles, quarks or whatever is the smallest point observable as an isolate.

Figure 6.6

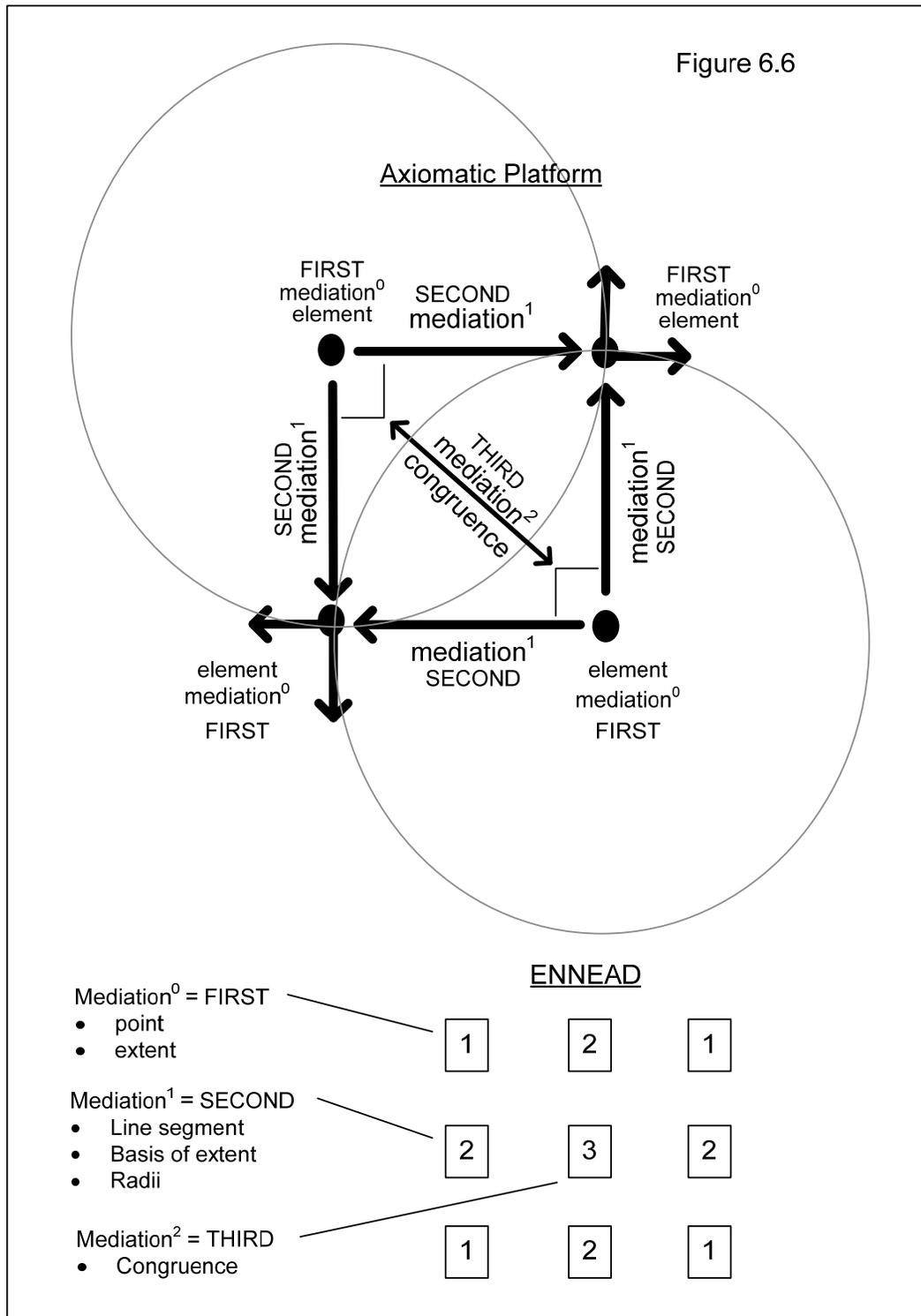


Figure 6.6. Axiomatic Platform.

Geometry as Proto-semiotics

In the Greek language, the word for *point* means *sign* and the word for *line* means *mark*. These geometrical elements are purposely undefined in later geometry so that we can interpret them quite liberally to say that the *points* are *signs* and the *extents* and *line segments* are signifying *marks*. So, we can think of geometry as a proto-semiotics⁵⁸⁰. Thus, we see that geometrical figures are combinations of signs and marks that are monadic, while the mediations are patterns, which appear as lines or surfaces. The surfaces are defined either by circles or right angles. This gives us a basis for thinking about the Peircian Categories⁵⁸¹ of Firsts, Seconds, and Thirds. In this light, the Enneadic formation becomes very interesting because it embodies the relationships between Firsts, Seconds, and Thirds in a form that Peirce was possibly unaware of because he used logic rather than geometry as the basis of his philosophy. We know this because he did not recognize the Fourth of Synergy that appears only in Geometry. However, we can appreciate the fact that geometric axioms can give us a concise model of the Ennead as a whole and in a form that Hilbert and Schlick could appreciate, which is as a set of elements that are self-defining and self-related through first and second-order mediations. The fact that there are four monadic points that form a tetrahedron in three-dimensional space, and five mediating points that form a pentahedron in four-dimensional space⁵⁸², will prove to be a useful elaboration, which will become more relevant as we progress⁵⁸³.

⁵⁸⁰ Saint-Martin, Fernande. Semiotics of Visual Language (Advances in semiotics. Bloomington: Indiana University Press, 1990).

⁵⁸¹ Helm, Bertrand P. Time and Reality in American Philosophy (Amherst: University of Massachusetts Press, 1985). p. 23. See also Rosenthal, S.B. "Pragmatic Experimentalism and the Derivation of the Categories" in Brunning, Jacqueline and Forster. Paul. The Rule of Reason pp. 120-138, Op. cit.

⁵⁸² In other words, the four monads form a tetrahedron, while the first and second order mediations form a pentahedron, thus the axiomatic platform can be understood as an interaction between the tetrahedron and the pentahedron. When fused or interpenetrated with itself, tetrahedra give rise to the octahedron and the cube. But, five tetrahedra form the pentahedra, which has the same group as the icosahedrons and dodecahedron. Thus, there is a definite geometrical progression that can be coded into the axiomatic platform.

⁵⁸³ The Quadralectic can be extended to the Pentalectic, which is treated in later chapters of this dissertation.

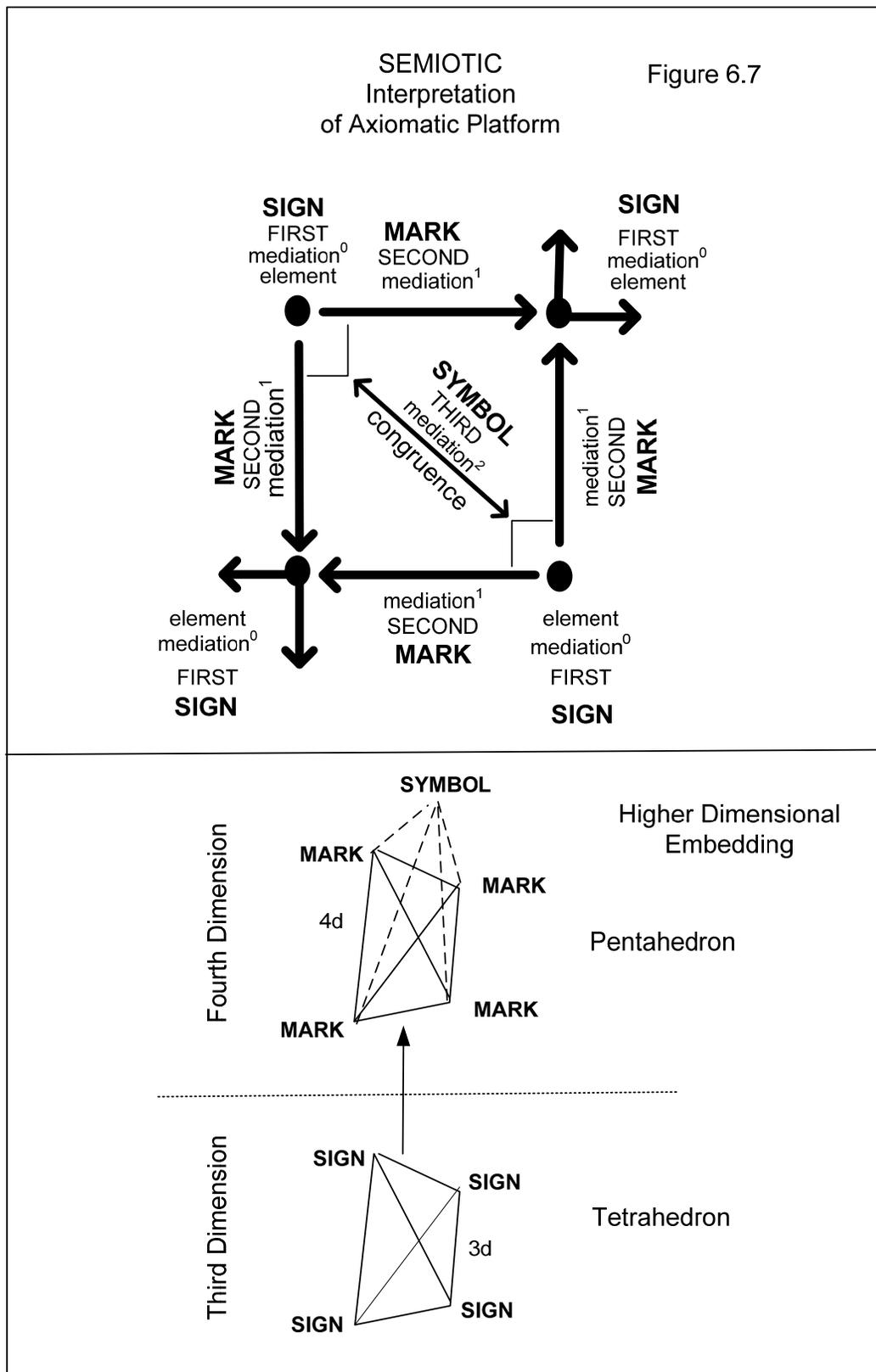


Figure 6.7. Interpretation of the Axiomatic Platform as a Semiotic and also as a Higher Dimensional Embedding.

Peirce introduced the Trichotomous sign⁵⁸⁴. Wisse took that very seriously and used it as the basis of his Sign Engineering⁵⁸⁵. Wisse's innovation was two-fold. First, he asserted that each element of the Trichotomous sign has its environment (its meta-system)⁵⁸⁶. Secondly, he introduced the sign (representamen), behavior, interpretant, and their independent meta-systemic environments, which are the situation, context, and background. Then, Wisse made a crucial move and introduced a *second order mediation* between the System and Meta-system, which he called focus, object, and signature. We can quibble with his terminology, but by introducing second-order mediation into the sign, he produced the Ennead as a conceptual axiomatic framework based on the orthogonality between the first and second-order mediations. This means that if we take Wisse's proposal seriously, then it must be possible to have third and fourth order mediations as well, and *that* is what would generate the next higher levels of the *odd* (Powers of Three) side of the WorldSoul series. The proliferation of mediations is what takes us up through the odd series of the WorldSoul's unfolding, and this points out the difference between the two divergent series that are embodied in the WorldSoul. On the one hand we have the 'information infrastructure' of Pascal's Triangle, and on the other we have the higher levels of mediation. This second series of mediations are Powers of Three numbers, which are a sub-series of the Square Numbers that include both series. The two series of odd and even numbers intersect at *one*. Using the ideas of Deleuze from The Logic of Sense⁵⁸⁷ we can say that *one* is the "floating signifier" between the two series where they intersect. However, this allows us to impose a particular meaning for the Icosaheptad, which is the next higher level of unfolding in the Ennead, which, in turn, is important for establishing the Ennead as an axiomatic platform. The Icosaheptad can be understood as the model for the Holoidal⁵⁸⁸ Foundational Mathematical Category. Once we realize that, then it will be possible to bring together several of the series that will play an important role in the development of this work.

⁵⁸⁴ Rather than the binary sign of F. de Saussure as seen in the Course on General Linguistics. Op. cit.

⁵⁸⁵ Sign Engineering means engineering based on sign systems, such as specifications, drawings, code, figures, tables etc. used by engineers to capture the structure of the systems they are designing.

⁵⁸⁶ In his first definition of the Sign Peirce has four elements, one of which he calls the Ground. Thus, it could be said that Peirce had the same idea that Wisse developed, although Peirce abandoned the Ground as part of his Semiotic treatment of the nature of signs. See Mladenov, Ivan. Conceptualizing Metaphors (Oxford: Routledge, 2006) Chapter 2 p. 36ff. See Freadman, Anne The Machinery of Talk (Stanford CA: Stanford U.P. 2004) p. 12. See Peirce Chronological Edition 2:4 p. 53.

⁵⁸⁷ Op. cit.

⁵⁸⁸ Holoidal means interpenetrating, and was coined by George Leonard in The Silent Pulse. Op. Cit.

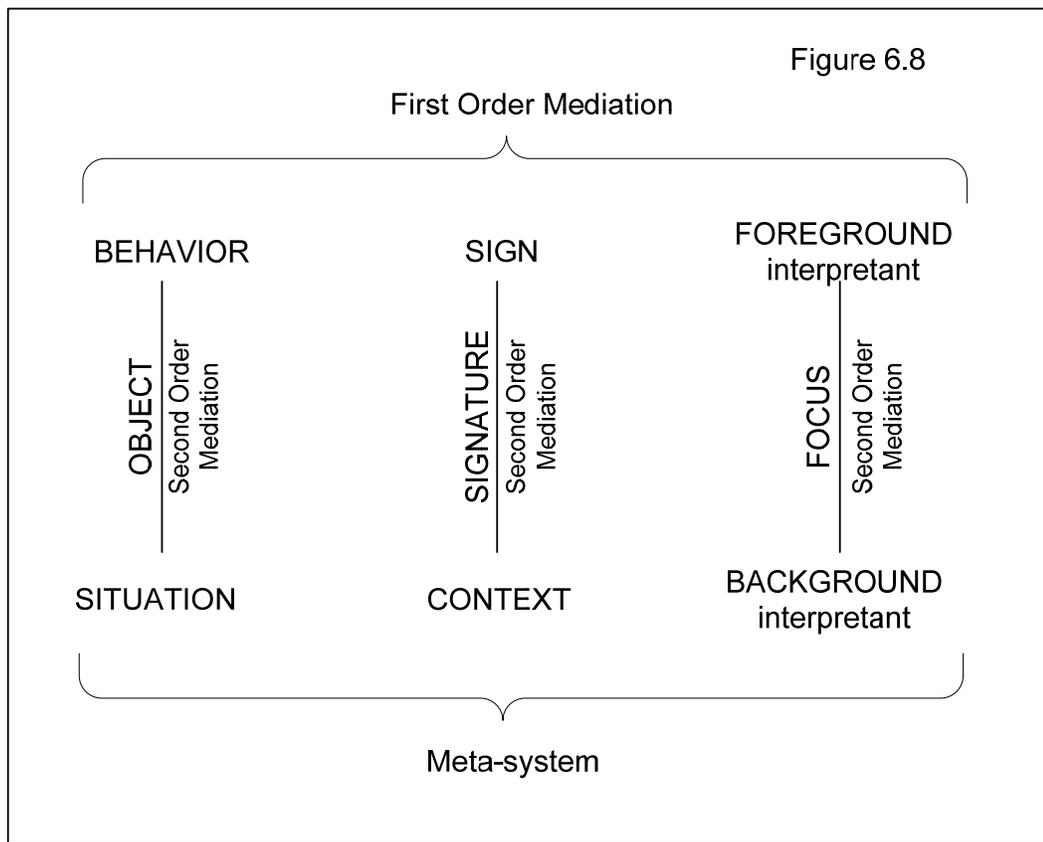


Figure 6.8. First and Second Order Mediation in the Ennead.

Figure 6.9

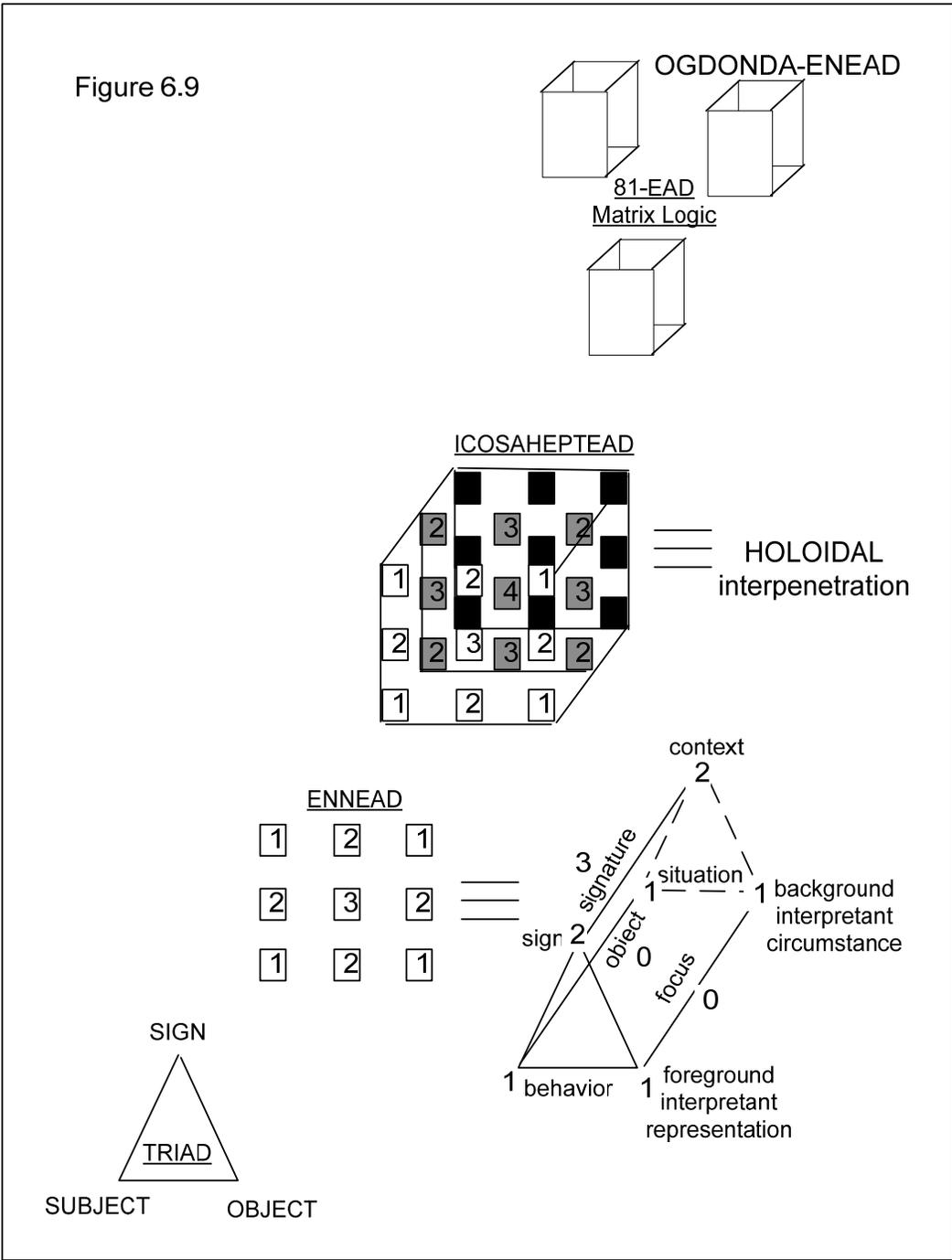


Figure 6.9. Series of Orders of Mediation.

Foundational Mathematical Categories and the Lifecycle of the Emergent Event

Certain ideas expounded in Alain Badiou's Being and Event⁵⁸⁹ have had a very strong impact on the overall direction of this research⁵⁹⁰. Badiou proposes that Ontology is essentially Set Theory. Upon studying his work it became apparent that there were several associated theoretical positions that needed further examination. Badiou does not consider the fact that Sets *have* a dual; this dual is Mass. Nor does he consider other suggested foundations of Mathematical Theory such as Mathematical Category Theory⁵⁹¹, or Mereology⁵⁹². He also contradicted his own thesis by extending Set theory with the addition of Multiple, and Site/Event extensions. One of the goals of this research program has been to rework Badiou's system by recognizing that there is a wider set of philosophically relevant possible bases for Mathematics and by doing so we have revealed that there is a Series of Mathematical Categories that could be considered foundational. In other words, just as a *particular* mathematical category has an axiom set, mathematics, *in general*, can also have a set of categories upon which all the others could be based. Our research reveals that there are eight axiomatic platforms, which define this set of Foundational Mathematical Categories that form a series, these are: singularity, site/event⁵⁹³, multiple⁵⁹⁴, set⁵⁹⁵, mass⁵⁹⁶, whole⁵⁹⁷, holon/integra⁵⁹⁸, and holoidal⁵⁹⁹. Set and

⁵⁸⁹ Op. cit.

⁵⁹⁰ See Emergent Engineering, Foundations of Emergent Science and Engineering, Elements of the Metanomos: Beyond Metaphysics and Metalogos a series of working papers by the author for a complete analysis of the subject.

⁵⁹¹ Arbib, Michael A., and Ernest G. Manes. Arrows, Structures, and Functors: The Categorical Imperative (New York: Academic Press, 1975).

⁵⁹² Burkhardt, Hans, and Barry Smith. Handbook of Metaphysics and Ontology (Munich: Philosophia Verlag, 1991). Harte, Verity. Plato on Parts and Wholes: The Metaphysics of Structure (Oxford: Clarendon Press, 2002). Martin, R. M. Logical Semiotics and Mereology Foundations of Semiotics, v. 16. (Amsterdam: J. Benjamins, 1992).

⁵⁹³ Defined by Badiou as an extension of his Set Theory Ontology, which introduces Spacetime as local structures that are related to Quantum Measurement and its logic.

⁵⁹⁴ Defined by Badiou as what precedes the number one, as ultra one, as pure heterogeneity, not merely the false heterogeneity and difference of Deleuze, which is an expression of Univocal Being. See Badiou, Alain. Deleuze: The Clamor of Being Theory Out of Bounds, v. 16. (Minneapolis: University of Minnesota Press, 2000).

⁵⁹⁵ Suppes, Patrick. Axiomatic Set Theory. The University Series in Undergraduate Mathematics (Princeton, N.J.: Van Nostrand, 1960).

⁵⁹⁶ Wisniewski, Edward J. et al (Lamb, C.A., Middleton, E.L.) "On the Conceptual Basis for the Count and Mass Noun Distinction" in Moss, Helen, and James Hampton. Conceptual Representation (Hove England: Psychology Press, 2003) pp. 583-624.

⁵⁹⁷ Part/Whole as in Mereology. Ibid.

⁵⁹⁸ Mathematical Category Theory. Ibid. Holon and Integra are two ways of expressing a logic of mutual dependence and harmony, which is one step prior to interpenetration according to C.Y. Cheng. See Cheng, Chung-Ying. "Toward Constructing a Dialectics of Harmonization: Harmony and Conflict in Chinese Philosophy" Journal of Chinese Philosophy Volume 33, Issue 1, pp. 25 – 59, 2006, Journal of Chinese Philosophy. Holon was coined in Koestler, Arthur. Janus: A Summing Up. (New York: Random House,

Mass are the standard categories and they are dual, but all the others are either deficient or excessive categories. The entire series forms a model of the Lifecycle of the Emergent Event as inscribed in the Nomos⁶⁰⁰. This discovery of the series of the Foundational Mathematical Categories is basic to the position put forward in this dissertation, and in addition to this, we have found that the Foundational Mathematical Categories are implicitly present in the definitions, axioms, and common notions of Euclid's Geometry⁶⁰¹. Thus, we recognize that Euclid's Geometry is a foundational ontological text *as well as* a mathematical text that establishes the structure of the Western worldview beyond its role as a text book for geometry⁶⁰². As we develop the concept of Emergent Design, we will apply this series of the Foundational Mathematical Categories to the basic structure of emergence. As we discuss Emergent Design, the Foundational Mathematical Categories will provide us with a blueprint of the structure of the lifecycle of emergence, as well as a mathematical basis for describing the emergent properties of our design formalisms⁶⁰³.

1978). It means a whole whose parts are wholes in a hierarchy. Integra was coined by me to represent the context of the holons in reciprocal mutual relationships, which are integral.

⁵⁹⁹ Means interpenetrating. Coined by George Leonard in The Silent Pulse, Op. cit.

⁶⁰⁰ A major discovery of this research has been that the Lifecycle of the Emergent Event is inscribed through the Foundational Mathematical Categories in the Nondual Nomos, which is revealed by Mathesis. Although emergent events are ephemeral in either the physis or the logos, the emergent event that is the advent of mathematics is well nigh eternal as it is imprinted on the emptiness of the nomos. Emptiness and Void have internal and implicit structure. They are not a merely blank slate.

⁶⁰¹ See Emergent Engineering, Foundations of Emergent Science and Engineering, Elements of the Metanomos: Beyond Metaphysics and Metalogos series of working papers by the author for a complete analysis.

⁶⁰² It spells out the meaning of Being for Plato and his school.

⁶⁰³ McGregor, William. Semiotic Grammar (Oxford: Clarendon Press, 1997). For instance, we can impose a Semiotic Grammar such as the one developed by McGregor on our design formalisms.

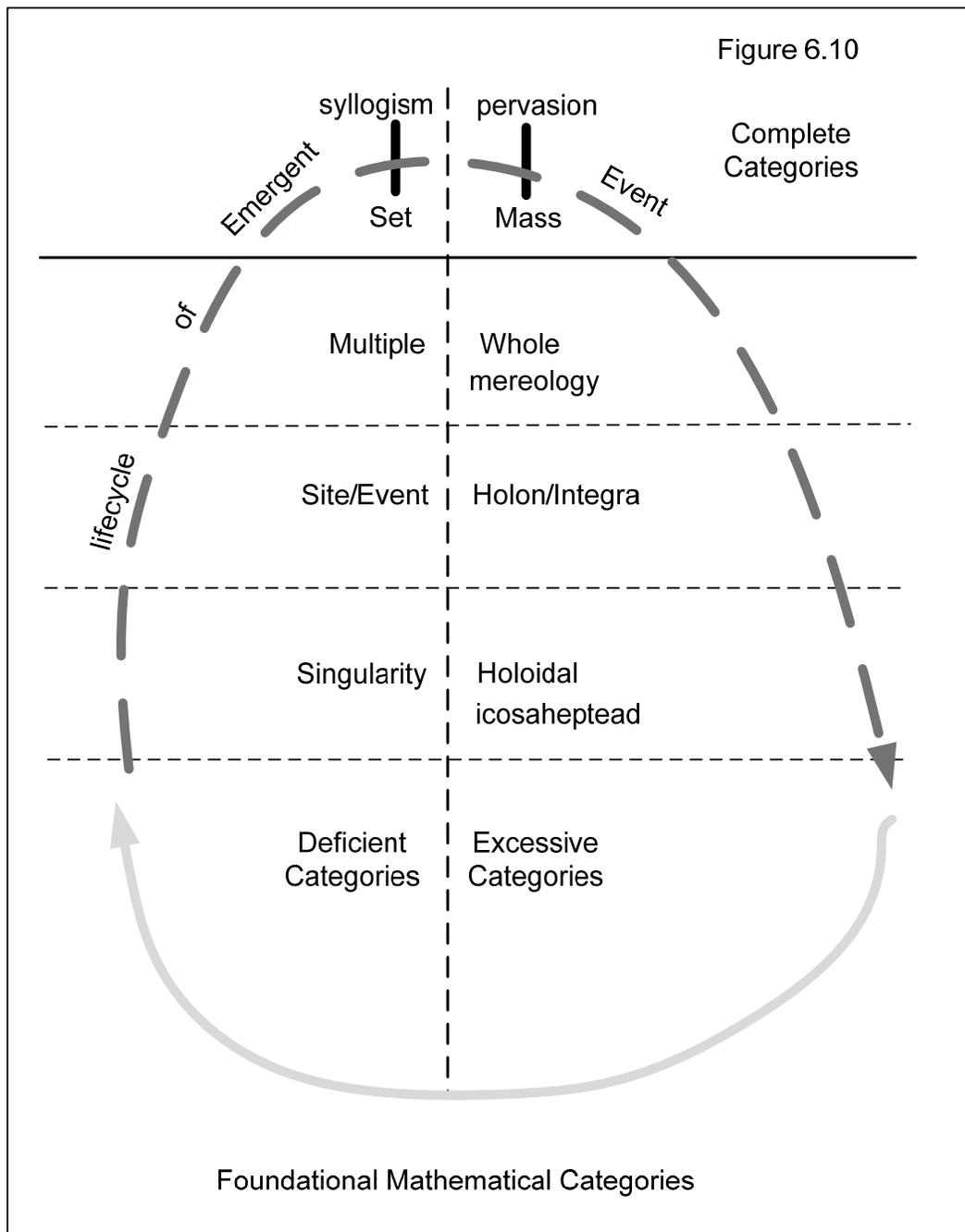


Figure 6.10. Foundational Mathematical Categories as Lifecycle of the Emergent Event.

Ennead and Icosaheptad in relation to the Foundational Mathematical Categories

Let us now return to the relationship of the Ennead and the Icosaheptad to the Foundational Mathematical Categories. We take it as given that the Ennead is the minimal structure that conforms to Schlick's idea of an independent, conceptual, axiomatic platform. That is why the Ennead can serve as a foundation for Sign Engineering. We will also give the following argument as to why the Icosaheptad is a model for The *Holoidal Mathematical Category*. This category is the highest in the series of the Foundational Mathematical Categories. The Holoidal Mathematical Category manifests through *interpenetration* and *intra-inclusion* as described by Fa Tsang⁶⁰⁴ in *Hua Yen Buddhism*⁶⁰⁵. The holoidal has three formal elements. In the Lifecycle of the Emergent Event, after the holoidal, there is a return to singularity that moves through the Foundational Mathematical Categories and at that time *an emersion*⁶⁰⁶ occurs. Within our own tradition, Hegel uses the concept of interpenetration in Phenomenology of Spirit. Aczel's "non-well-foundedness"⁶⁰⁷, which assumes that a class can be a member of itself, which violates Russell's rule⁶⁰⁸, is another example. This means that we need two images of the Class⁶⁰⁹, one as a *subsumptive* and another as a *subsumed thing*. Beyond that, there is also a call for a *mediation of self-inclusion* through *otherness*. So there must be a third element of the *Other*, which mediates the relationship of 'self to self' in the self-subsumption. In other words, *I is I through non-I*, which is Hegel's idea that *self-consciousness* can only take place through the mediation of the *other*⁶¹⁰. The key idea here is that by having *three copies* of the Enneadic Axiomatic Platform we can simulate the possibility of the non-wellfounded set that violates B. Russell's rule that a class cannot be a member of itself⁶¹¹. This same Axiomatic Platform, as three images, is: a class that subsumes itself (Set), a class that is subsumed (Set_{op}), and a mediation (Mass) between the two that turns itself into

⁶⁰⁴ Zhang, Zhenji. [Also known as Garma Ch'eng Chi Chang] The Buddhist Teaching of Totality: The Philosophy of Hwa Yen Buddhism (University Park: Pennsylvania State University Press, 1971).

⁶⁰⁵ Cook, Francis Harold. Hua-Yen Buddhism: The Jewel Net of Indra (University Park: Pennsylvania State University Press, 1977).

⁶⁰⁶ i.e., emergence.

⁶⁰⁷ Non-well-founded Sets Op. cit.

⁶⁰⁸ A class cannot be a member of itself. Rule for avoiding paradox enunciated in Whitehead, Alfred North, and Bertrand Russell. Principia Mathematica (Cambridge Eng.: The University Press, 1925).

⁶⁰⁹ By "Class" we mean a Class that is a member of itself, but not directly, only through some other intervening class.

⁶¹⁰ All of Hegel's philosophy is based on this principle.

⁶¹¹ With Whitehead, Principia Mathematica Op. Cit.

its *own other*. We presume this to be the minimal structure of interpenetration that we see modeled in the Quaternion imaginaries that appear as the Triality⁶¹² property in the Octonion⁶¹³. This is precisely what appears in the Icosaheptad as a model of the third level self-mediation. Thus, all we need to do is to move up one step beyond Pieter Wisse's improvement of Peirce's Sign and we will have produced a simple and straight forward model of the Holoidal⁶¹⁴. This makes it possible to see that all the other Foundational Mathematical Categories are bound by that structure, which brings together the structure of the WorldSoul and the Foundational Mathematical Categories in a surprising but elegant way.

⁶¹² Fulton, William, and Joe Harris. Representation Theory: A First Course (New York: Springer-Verlag, 1991). p. 313 for a purely geometrical representation of triality.

⁶¹³ Springer, T. A., and Ferdinand D. Veldkamp. Octonions, Jordan Algebras, and Exceptional Groups (Springer Monographs in Mathematics. Berlin: Springer, 2000). p. 37, Chapter 3 on Triality. Dixon, Geoffrey M. Division Algebras: Octonions, Quaternions, Complex Numbers, and the Algebraic Design of Physics. (Dordrecht: Kluwer Academic Publishers, 1994) p. 165.

⁶¹⁴ In the manner that interpenetration and intra-inclusion was advocated by Fa Tsang and developed in Hua Yen Buddhism.

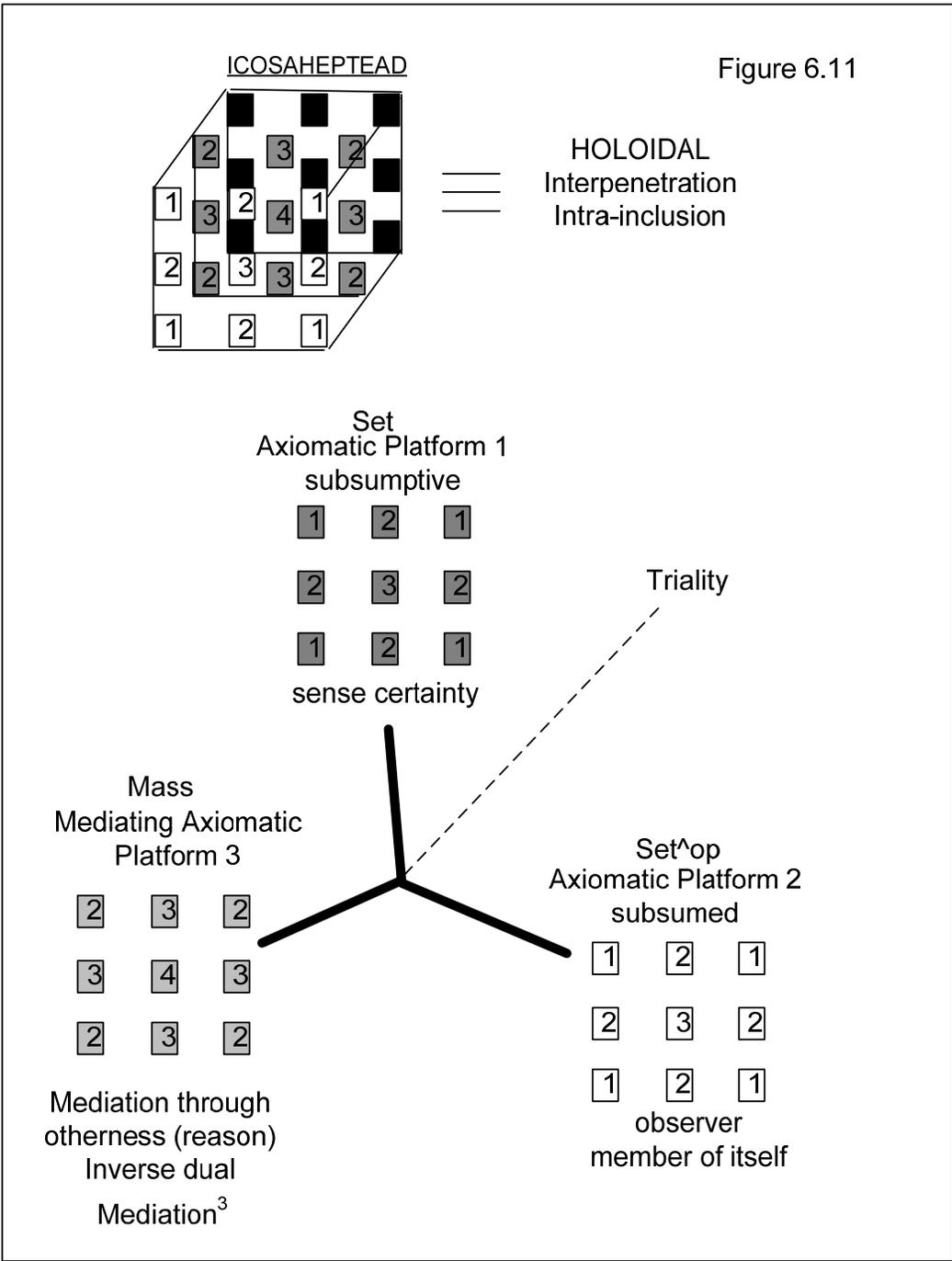


Figure 6.11. Triality in the Icosaheptead.

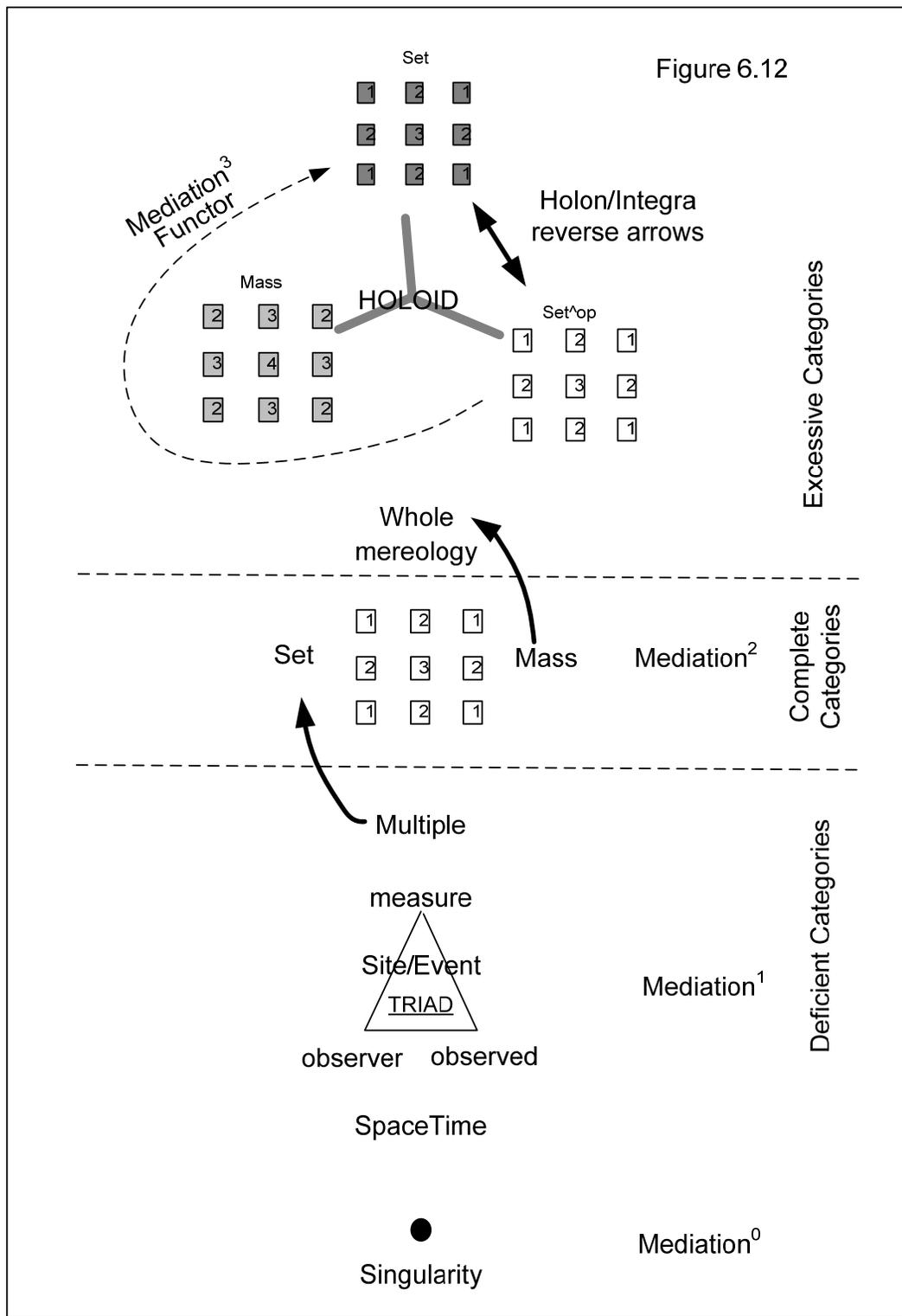


Figure 6.12. Relation between the Orders of Mediation and the Foundational Mathematical Categories.

The next step in this argument is to show how the Foundational Mathematical Categories present a series of degenerations from the holoidal model of the Icosaheptad⁶¹⁵ to the less complex Foundational Mathematical Categories until we reach the Singularity⁶¹⁶. This series will end in the One, which is the origin of both the Pascal Triangle (Powers of Two) Series and the Powers of Three number series. Keep in mind that the Pascal Triangle provides the basis for all *informational distinctions* and is the infrastructure for encoding all *informational differences*. It is the Powers of Three series, which is also part of the series of Square Numbers that gives us various levels of self-mediation through which the information is comprehended. So, both of these series are important to our purposes and are used within Design that is viewed from a Semiotic perspective⁶¹⁷. If we think of the Icosaheptad as being composed of three Enneads within a relationship of triality, then we can understand its significance as a model of interpenetration and intra-inclusion within the Holoidal Mathematical Category. This is significant because our only other model of this is the Quaternion imaginaries, which cannot be visualized, and the ‘Triality of the Octonion’ that is expressed through a complex algebra. This is significant because this same three-way complementarity occurs between axiomatic platforms. That means that it is an example that we can contemplate while it provides us with insight that will allow us to transform one minimal axiomatic platform into another, based on the mediation of a *third* axiomatic platform. Functors⁶¹⁸ act as a direct mapping between categories, and this *third mediation* is an extended functor⁶¹⁹ that allows transformation between axiomatic platforms via another mediating axiomatic platform that is supplying the difference that generates the transformation. This is how triality⁶²⁰ is introduced into the relationship, i.e., as a mediation by the *other*. If we remove the *other* axiomatic platform, then we merely have a conjunction of two, although we can re-situate them by reversing the categorical arrows that define the two axiomatic platforms, which will reduce them to a pure duality. In this way we see how we can generate the Holon/Integra Mathematical Category by

⁶¹⁵ If we think of lines rather than points, this is embodied in the 27 lines on a cubic surface. See <http://enriques.mathematik.uni-mainz.de/cubicsurface/> (accessed 080905) for a visualization. See Henderson, Archibald. *The Twenty-Seven Lines Upon the Cubic Surface*. Michigan Historical Reprint Series (Ann Arbor, MI: University of Michigan University Library, 2005).

⁶¹⁶ The Singularity as a Foundational Mathematical Category is modeled by the Catastrophe Theory of Rene Thom. See Thom, Rene. *Structural Stability and Morphogenesis: An Outline of General Theory of Models* (Cambridge, Mass: Perseus Books, 1989).

⁶¹⁷ Elkins, James. *The Poetics of Perspective* (Ithaca, N.Y.: Cornell University Press, 1994).

⁶¹⁸ Pareigis, Bodo. *Categories and Functors* (New York: Academic Press, 1970).

⁶¹⁹ A functor is a meta-relation between Mathematical Categories. Or we can say a functor is a meta-arrow between arrows of a mapping in Mathematical Category Theory.

⁶²⁰ Triality is a three way complementarity. The Other is complementary to the two aspects of the self, i.e., seer and seen, or self-consciousness and consciousness.

removing the 'three-way complementary opposite' *and* by turning the triality into a duality. Furthermore, these two axiomatic platforms could manifest in a part-whole relationship that could generate a Mereology. In this case they are no longer equals, because one axiomatic platform has been subsumed into the other (but without the 'other mediation'). When we consider Set and Mass, we see that they are related to a single axiomatic platform, and that they are inverse duals of each other⁶²¹. Each is associated with its own logic. Sets have syllogistic logic⁶²² while Masses have pervasion logic⁶²³. Masses supply the boundaries to Mereologies to create what we think of as 'wholes' that must be addressed in terms of Mereotopology⁶²⁴. Our Designs are nearly all Set-like. The Mass is a *suppressed dual* of the Set that shows up in Geometry and Topology. But in Mathematics in general, the Mass is not as well developed as the Set (as a basis for describing mathematical categories). Masses and their logics are useful for understanding the relationship between Design and Implementation. In general, a Design becomes a Mass when it is executed or operationalized. And thus, a way to understand Systems and Meta-systems, is to understand them in terms of the relationship between Sets and Masses. Just as Meta-systems are suppressed by Ontotheology, so too is the Mass approach, even though it is present in the grammar of our language as an alternative⁶²⁵. There are other languages that are completely 'mass-like,' such as Chinese. Indian Logic and Buddhist logic are entirely 'Mass oriented' and the Set is the exception, which is the opposite of our tradition. Each of these categories, Set and Mass, with their logics, Syllogism and Pervasion, are fully formed and correspond to an axiomatic platform. They are inverse duals⁶²⁶ of each other, as well as categorical opposites.

⁶²¹ Bunt, Harry C. Mass Terms and Model-Theoretic Semantics. (Cambridge UK: Cambridge University Press, 1985).

⁶²² Łukasiewicz, Jan. Aristotle's Syllogistic from the Standpoint of Modern Formal Logic (Oxford: Clarendon Press, 1957). See also De Morgan, Augustus, and Peter Lauchlan Heath. On the Syllogism, And Other Logical Writings (New Haven: Yale University Press, 1966).

⁶²³ Matilal, Bimal Krishna, Jonardon Ganeri, and Heeraman Tiwari. The Character of Logic in India SUNY Series in Indian Thought. (Albany: State University of New York Press, 1998). In India Pervasion Logic was used instead of Syllogistic Logic. See also Wayman, Alex. A Millennium of Buddhist logic (Delhi: Motilal Banarsidass Publishers, 1999). Hegel understood Pervasion Logic and mentions it in his Phenomenology of Spirit. It is the same as a Boundary Logic. Bricken, William. "Syntactic Variety in Boundary Logic" in Diagrammatic Representation and Inference (Berlin / Heidelberg: Springer 2006) Volume 4045, pp. 73-87. See also Bricken, W., "Boundary Logic from the Beginning", 2000. A Thorough Introduction to Boundary Logic at <http://www.boundarymath.org/> accessed 080905; See also <http://www.lawsofform.org/logic.html> accessed 080905.

⁶²⁴ Galton, Antony. Qualitative Spatial Change. Spatial Information Systems (Oxford: Oxford University Press, 2000). p. 70 Section 2.5 on Mereotopology. See also Donnelly, Maureen. Layered Mereotopology (Leipzig: Ifomis, 2003).

⁶²⁵ In Non-count nouns such as 'furniture'.

⁶²⁶ The duals are Set and Set_{op} or Mass and Mass_{op}, where X_{op} means the opposite category. Set and Mass are not only Category Theory duals, but inverse duals, in other words, they do not only exchange features in the functor between the categories, but they also invert the relationships between the features in the

Devolution and Evolution of the Axiomatic Platform within the Foundational Mathematical Categories

The first devolution from the complete axiomatic platform of the Set and Mass categories is the Multiple, which was added by Badiou in Being and Event⁶²⁷. The Multiple appears before the advent of the ‘ultra one’⁶²⁸, which would make the Multiple consistent and countable. The un-countability of the Multiple and its inherent heterogeneity, leaves it inconsistent prior to the advent of the countable one. Interestingly, the Multiple, or aggregate, when it becomes *one* can be compared to the relationship of the part to the whole. It is only here that there is a relationship between one *site/event* minimal ensemble and another subsumed *site/event* minimal ensemble. The *site/event* ensemble was also introduced by A. Badiou as the basis for understanding the Event, which is an essential disruption of time in the stasis of mathematics that goes beyond the disruption of the regime of number through the heterogeneity of the Multiple. The *site/event* minimal ensemble is equivalent to *observation* in Observer Mechanics⁶²⁹ or Quantum Mechanical observation⁶³⁰. The Multiple is an aggregation of these observations in which local space and time are constituted locally as *determinate*. The Multiple is a reference to the *indeterminate global*, which only becomes determinate when it is countable, although it is composed of many local and irreconcilable ensembles whose relationships to each other cannot be determined. Finally, we come to the most degenerate case, which is that of the *Singularity*, which is by definition *singular*, as in an *indeterminate one*. Notice that we have begun with the Icosaheptad, which is holoidal, and, step by step we have moved down to the Ennead and then to the trichotomy of the transitive property between *site/event local instances* (such as appear in the three-fold sign) and finally to the *one* of Singularity.

transformation. Similarly, Syllogistic and Pervasion Logics are also inverse duals of each other. In such duals you cannot merely reverse the categorical arrows to reach the dual. Set and Mass are the Other for each Other, we call this the inverse dual. It is different from the mere reversal of arrows in the categories, which gives us Set_{op} and Mass_{op} but does not lead us to their non-self-dual Others. This might be expressed by R. Kaehr's idea of saltatory, which is the opposite of a categorical morphism because it is a jump or discontinuity rather than a continuous mapping. See his work at <http://www.thinkartlab.com/>. He has offered a critique of my concept of inverse duals and showed that these do not conform to the normal notions of either inverses or duals. However, the combination of these terms was meant to go beyond their separate meanings. His concept of the saltatory shows how this might be accomplished in a better way. His critique is on the supplementary disk associated with this dissertation. Op. cit.

⁶²⁷ Op. cit.

⁶²⁸ A. Badiou coined this term “ultra-one” as the arising of number as “one” from the multiple in Being and Event. Op. cit. We see it as related to the advent of the embodiment of the Singularity of Ultra Being from the *virtual* to the *actual*.

⁶²⁹ Bennett, Bruce M., Donald D. Hoffman, and Chetan Prakash. Observer Mechanics: A Formal Theory of Perception (San Diego: Academic Press, 1989). <http://www.cogsci.uci.edu/personnel/hoffman/ompref.html> accessed 080905.

⁶³⁰ Laughlin, Robert B. A Different Universe: Reinventing Physics from the Bottom Down (New York: Basic Books, 2005) p. 51.

In this way we find that the levels of self-mediation relate to the evolution of the Foundational Mathematical Categories out of a Singularity that moves up until we get to the holoïdal nature of the Icosaheptad. In that movement, the point of balance is at the level of the Ennead, which is represented by the duals of Set and Mass. In the Axiomatic Platform there is a set of points, extents, mediating lines and circles that define the property of congruence. This set is given a specific structure that constitutes the Axiomatic Platform in which the basic operation of twisting the square occurs to produce the two diagonal right angles that are congruent out of the elements given in the set. But this Axiomatic Platform of Absolute Geometry assumes the mass-like continuity of the surface that its figures are drawn upon by the movements of the compass and straight-edge, which guides the pen or pencil in the drawing process. Once we are able to recognize the relationship between these two structures, then it is possible to understand how significant this unfolding of self-mediation can be. It defines the mathematical resources that can be incorporated into the information infrastructure supplied by the Pascal Triangle. This structure is not only the basis of the Peircian Trichotomous Sign, but emanates from the second level self-mediation that gives rise to the Enneadic axiomatic platforms that the mathematical categories depend on for their independence, such as the type of independence given to Set and Mass. The axiomatic platforms transform into each other based on the mediation of other axiomatic platforms, which appear at the level of the Icosaheptad, which is also the ultimate Foundational Mathematical Category. It is interesting that at the next higher level of the articulation of the WorldSoul there are 16 and 81 elements on the binary and the trianary sides. This is the level represented by August Stern's Matrix Logic⁶³¹. The sixteen elements are the classical logical operators, which have been studied by Shea Zellweger⁶³², which in Matrix Logic can be directly multiplied together without intervening terms in 207 legal combinations out of the 256 possible combinations⁶³³. These are combined with the 65 operators of a non-standard negative sublogic to give a total of 81 operators in Matrix Logic with a much larger operator multiplication table⁶³⁴. Thus, this next level that Plato does not mention in reference to the

⁶³¹ Stern, August. Matrix Logic (Amsterdam: North-Holland, 1988).

⁶³² Zellweger, S. "On the Deep Correspondence between Sign-creation in Logic and Symmetry in Crystallography" in International Association for Semiotic Studies, Irmengard Rauch, and Gerald F. Carr. Semiotics Around the World: Synthesis in Diversity: Proceedings of the Fifth Congress of the International Association for Semiotic Studies, Berkeley, 1994. Approaches to Semiotics, 126. (Berlin: Mouton de Gruyter, 1997) p. 821.

⁶³³ Multiplication table of Matrix Logic in Stern, August. Matrix Logic. (Amsterdam: North-Holland, 1988) p. 78, Table 3.1.

⁶³⁴ 'Ogdónda-én-ead' would be the Greek term for the '81-ead' if we wished to name the structure at this next level beyond the WorldSoul defined by Plato. Complete set of all 81 operators are given in Stern,

WorldSoul has its definition in Matrix Logic. However, Matrix Logic includes within itself all the lower levels of the WorldSoul⁶³⁵. So, Matrix Logic is the next level of complexity beyond the holoidal category, which makes sense because that naturally leads to Model Theory⁶³⁶, which is a synthetic combination of a mathematical category (matrices) and a logic. Thus, all the Foundational Mathematical Categories appear under the auspices of the Model Theory that is supported by Matrix Logic⁶³⁷. And so we can see how Model Theory overarches all the Foundational Mathematical Categories as well as encompassing them.

We will use Wisse's alternative to the Peircian Categories as a way to organize the specification of the *moments* of the Quadralectic and everything from this point forward in this dissertation will revolve around the interplay between these basic moments, which will be presented in contrast to each other in order to discover more about the nature of the Quadralectic. We will start by examining the relationship between the levels of mediation that we see in the WorldSoul and the Foundational Mathematical Categories. From there we will gain insight into the Lifecycle of the Emergent Event⁶³⁸, and by comparing that with the Emergent Meta-system Cycle⁶³⁹, we will further constrain the Quadralectic. The Emergent Meta-system is a combination of the System and the three Special Systems. But the three Special Systems are merely the first unfolding of self-mediation⁶⁴⁰, which is then incorporated into the Ennead. The term Ennead comes from the three sets of three gods that were worshiped by the Egyptians⁶⁴¹. We can trace it back to B. Fuller's numerology,

August. Matrix Logic and Mind: A Probe into a Unified Theory of Mind and Matter. (Amsterdam: North-Holland/Elsevier, 1992). p. 140-141.

⁶³⁵ See Stern, August. Matrix Logic. (Amsterdam: North-Holland, 1988) p. 180.

⁶³⁶ Doets, Kees. Basic Model Theory Studies in Logic, Language, and Information. (Stanford, CA: CLSI Publications, 1996).

⁶³⁷ Matrix Logic, with its truth vectors rather than truth scalars, contains the *showing and hiding logic* of the Greimas Square that embodies the Tetralemma (A, ~A, Both and Neither) together with a negative truth value that symbolizes a hidden state. There are nine states in all which are all the permutations present in the showing and hiding in the game of where you choose the hand in which something is hidden. See Stern, A. Matrix Logic, Op. cit. p. 137.

⁶³⁸ The Lifecycle of the Emergent Event, the process of emersion, is seen in terms of the process of moving from the Singularity to the Holoidal through the Foundational Mathematical Categories.

⁶³⁹ The Emergent Meta-system is a cycle composed of the Special Systems and the Normal System, which together produce the Meta-system, based on the unfolding of the Hyper-complex algebras that move from higher to lower energies in a relaxation process. This is a cycle because in the sedenion hyper-complex algebra zero divisor singularities are produced and they cause the cycle to repeat. It is hypothesized that this is possible because the cycle is caught in a potential trough that is defined by the Freudenthal-Titts Magic Square. See Reflexive Autopoietic Dissipative Special Systems Theory at http://works.bepress.com/kent_palmer by the author.

⁶⁴⁰ We hypothesize that the relationship of the special systems to each other is the actual basis of the trichotomous sign. The Quaternion demonstrates the relationship between the i, j, and k imaginaries, which is a version of triality.

⁶⁴¹ The pantheon of the Egyptian gods is structured in a manner that creates a comparable image of the Special Systems and their relationship to the Meta-system. This structure is also reflected in the works of

which gives us a picture of the fundamental nature of the number nine, which is the basic structure of counting in any base⁶⁴². We posit that between the System and Meta-system there are three Special Systems related to the hyper-complex algebras that are partial systems and partial meta-systems that form thresholds of organizations between the System and Meta-system schemas. When we contrast the System/Meta-system distinction against itself, then we generate the Ennead as the basic minimal structure of axiomatic platforms. This, in turn, further differentiates into the Icosaheptad and eventually into the 81 Matrix Logic operations⁶⁴³. This is a natural extension of Special Systems Theory and demonstrates the relationship of Systems to Special Systems that, in turn, generates the Emergent Meta-system.

Plato in many places as in the relation between his various imaginary cities. It was by studying the relations between these imaginary cities in Plato that the structure of the special systems was first discovered by the author. See [Fragmentation of Being and the Path Beyond the Void](http://works.bepress.com/kent_palmer) at http://works.bepress.com/kent_palmer.

⁶⁴² See B. Fuller [Synergetics](#) Op.cit. in section on numerology of the number nine.

⁶⁴³ Defining the 'Ogdónda-én-ead' which are the 81 operations of positive (16) and negative (65) sub-logics of Matrix Logic.. Because August Stern uses truth vectors rather than scalars his system deals with the tetralemma, plus hidden (-1) states, and the nine states of his truth vectors embody all the possible showing and hiding relations. Cf. [Matrix Logic](#) Op. cit.

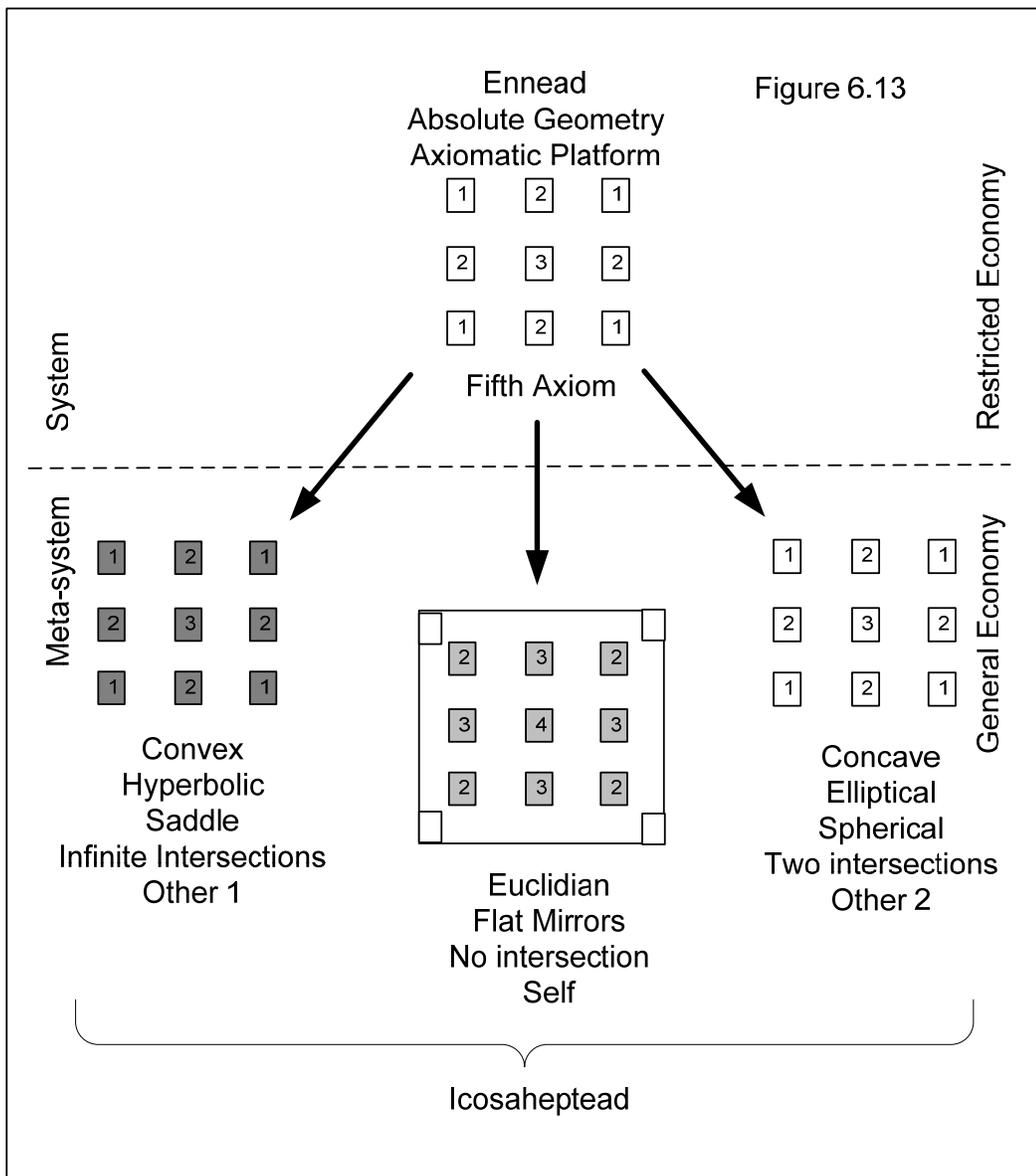


Figure 6.13. Relation of the Ennead to the Icosaheptad as the transition between System and Meta-system.

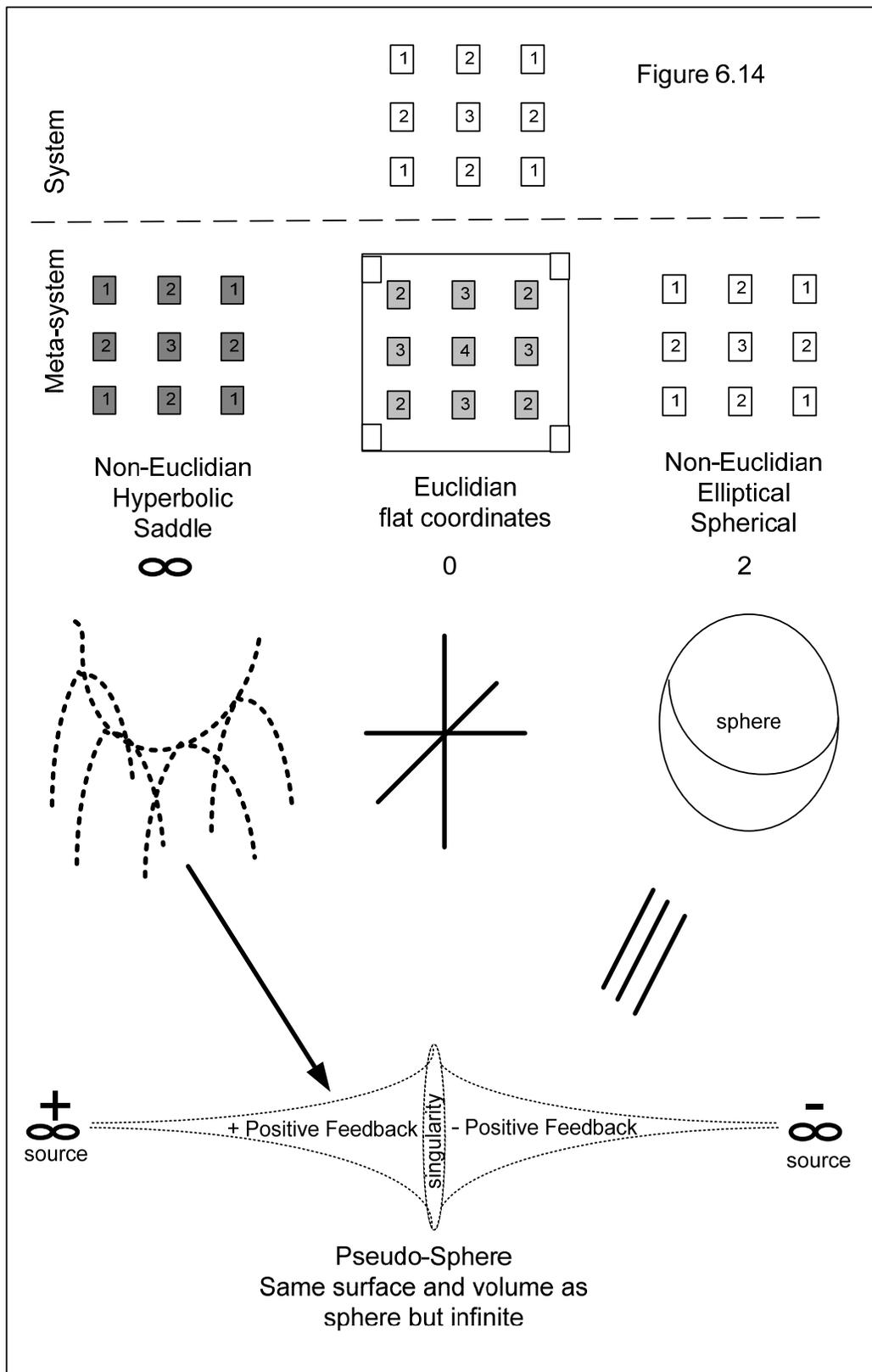


Figure 6.14. Relation between Geometries and the Axiomatic Platforms in the Icosaheptad.

The Fifth Axiom in Geometry as the Entry into the Meta-system

The fifth axiom of Euclidian geometry has always been contested because of its seeming complexity. There have been many failed efforts to derive it from the first four axioms of Absolute Geometry. Eventually it was discovered that the fifth axiom was the doorway to the Non-Euclidean Geometries. Thus, the fifth axiom has an inherent ambiguity that, when exploited, produces not one but three geometries, two of which are non-standard and are called Elliptical and Hyperbolic. *It is the heart of our argument that this transition represents the transformation between the System and Meta-system, because the Meta-system is represented as the complementarity of non-Euclidian geometries that lurk below the surface of traditional Euclidian geometry.* Therefore, the transition between System and Meta-system has always been a part of geometry, but never thought of as an analogy for the inverse dual⁶⁴⁴ of the System within Systems Theory. That inverse dual is inherently complementary and has two representations that are opposites as illustrated by the contrast between Hyperbolic and Euclidian geometry. This will prove to be an important mathematical analogy for the Meta-system, or *general economy* as contrasted with the System or *restricted economy*⁶⁴⁵. The ambiguity of seemingly unnecessary complexity leads to the discovery that there are really three versions of that axiom that are possible and these give rise to three completely different geometries within which the first four axioms form the unchanging kernel. The ambiguity between these possibilities is an example of the presence of Hyper Being, which exists between the System and Meta-system. To go further, because the System appears as the axiomatic platform, which is related to the structure of the Ennead, we can go on to think of the production of non-Euclidian geometries as an analogy for the Icosaheptad. The Icosaheptad is three versions of the Ennead related to each other by a third order mediation. *So, the Ennead of the System, as an axiomatic platform becomes replicated into three versions of itself at the level of the fifth axiom of geometry where the variation of possibilities for the adumbration of the axiomatic platform appears.* The interpenetration related to the Icosaheptad appears in the Common Notions⁶⁴⁶. So, in geometry, the basis of interpenetration is different from the adumbration of the four basic axioms that define the Ennead as the three-fold structure of the Icosaheptad. The Icosaheptad has three independent axiomatic platforms, all identical except for the different versions of the fifth axiom. The identity of the three

⁶⁴⁴ i.e., the Meta-system.

⁶⁴⁵ In biology, for example, we might contrast the Epigenome to the Genome. See Ferguson-Smith, Anne C., Robert A. Martienssen, and John M. Greally. *Epigenomics*. Springer EBooks. (Dordrecht: Springer Netherlands, 2009).

⁶⁴⁶ Found in Euclid's Geometry along with Definitions and Axioms.

platforms is guaranteed by the Common Notions. Each of these augmented axiomatic platforms are independent of the others, but the basic internal structure established by the first four axioms is operative in all three so that they have a core of similarity with a moment of ambiguous difference added. Thus, when these three axiomatic platforms are explored, they give three different versions of geometry that are like the distortions of Euclidian geometry as seen in convex and concave mirrors. Euclidian Geometry is in the flat middle alternative between these concave and convex mirrors, mediating between them as the basis for the transformation between their extreme opposite distortions. Elliptical Geometry is spherical and Hyperbolic Geometry has the structure of the anti-sphere (pseudo sphere⁶⁴⁷), which is made up of two long straight horns whose mouth pieces are at infinity and whose bells are glued together to form a single circle. The two infinities are the sources. The two horn shapes are the vortexes of miracles and black holes. And the circle is the singularity, which is a point of discontinuity where there is no negative curvature. The sphere and the anti-sphere have the same area and volume even though they are radically different forms, one finite and the other infinite.

Knot Theory can also give us insight into the System/Meta-system relationship. There are three kinds of knots⁶⁴⁸. There are torus knots that can be tied around a torus, satellite knots that reside inside a torus, and hyperbolic knots⁶⁴⁹. Almost all knots are hyperbolic. That means that when the knot is extracted from its space, the remaining space is hyperbolic, i.e., it has a negative curvature of some intensity. Different knots have hyperbolic intensities that are different. This is one way to see that there are actually three different combinations of knots and tori. These are two images of the minimal System. These two images of the System and Anti-system reside where the knots are either tied and wrapped around, or tied and strung inside the torus. The third image of the hyperbolic knot concerns the fact that it is extracted from its space, which defines the Meta-system for the System of the knot. So, there are two knot/torus combinations that show us System/Anti-system relationships, although there is one type of knot that is not related to the Anti-system, but rather to the surrounding Meta-system of the space itself. When you extract the 'system knot' from the space, or from the meta-system, the result is hyperbolic, which is one of the geometries. On the other hand, the geometry of the torus is elliptical and the knot is either

⁶⁴⁷ <http://mathworld.wolfram.com/Pseudosphere.html> accessed 080907. See also <http://en.wikipedia.org/wiki/Pseudosphere> accessed 080907.

⁶⁴⁸ Adams, Colin Conrad. The Knot Book: An Elementary Introduction to the Mathematical Theory of Knots (New York: W.H. Freeman, 1994).

⁶⁴⁹ <http://mathworld.wolfram.com/HyperbolicKnot.html>; http://en.wikipedia.org/wiki/Hyperbolic_knot; <http://www.knotplot.com/hyper/> accessed 080907.

within it or wrapped around it. The knots are the archetype of self-organization. This ‘self-organization’ is organized against itself and is self-interfering. A ‘self-interfering’ organization can either be internal to the System or external to the System, or related to the *space* of the Meta-system rather than related to another System. The torus, on the other hand, can be cut up and re-glued together to produce the Kleinian bottle⁶⁵⁰, which is two mobius strips⁶⁵¹ whose edges are joined. The edge is the string of the knot. So, the torus, itself, can be split into sub-systems of mobius strips if it is reconfigured. The torus is our image of the whole form⁶⁵², while the mobius strip, knot, and tetrahedron are images of the sub-schemas, i.e., picture, plan, and model. It is the tetrahedron where the representation is split into point, line, and surface and the three-dimensional solid is constructed from these three as you can see in the Elements of Euclid⁶⁵³.

We are trying to show that in geometry there is an image of the ‘Meta-system to System interface’ in the generation of non-Euclidean geometries, which are the distorted images of Euclidian geometry in convex and concave mirrors. They form a picture of the Icosaheptad, and through the Common Notions, which are a model of interpenetration, we see that those cores are identical. But, from the ambiguity of the fifth axiom we see that *difference* throws us into one of these three geometries, whose nature is reflected in the torus and the knot, which then refer back to the hyperbolic geometry as being the knot’s relation to the space of the Meta-system rather than another form of the System, i.e., the torus. These mathematical images are mutually reinforcing and give a specific model of the transition between the System and Meta-system. We can see that this picture exemplifies the interpenetration of the holoidal in as much as the Common Notions allow us to identify the three Enneads formed from the first four axioms that appear in various distorted forms where the differentiation of the various geometries occur. However, we can also relate this model to reason, and see the relationships of the three Axiomatic Platforms within the Icosaheptad as being similar to the relationship between the three types of syllogism as understood by Peirce, i.e., inductive, deductive, and abductive⁶⁵⁴. Thus, the holoidal interpenetration of the Icosaheptad can be seen as a model of Pure Reason, which is why

⁶⁵⁰ <http://mathworld.wolfram.com/KleinBottle.html>; http://en.wikipedia.org/wiki/Klein_bottle;
<http://www.math.rochester.edu/misc/klein-bottle.html> accessed 080907.

⁶⁵¹ <http://mathworld.wolfram.com/MoebiusStrip.html> http://en.wikipedia.org/wiki/M%C3%B6bius_strip
accessed 080907.

⁶⁵² i.e., the complete sub-schema taking form as an example. Complete sub-schema means the schema as a whole.

⁶⁵³ Euclid, Thomas Little Heath, and J. L. Heiberg. The Thirteen Books of Euclid's Elements (Cambridge: The University Press, 1908).

⁶⁵⁴ Magnani, Lorenzo. Abduction, Reason, and Science: Processes of Discovery and Explanation (New York: Kluwer Academic/Plenum Publishers, 2001).

Hegel defines it as a stepping stone to Pure Spirit. Reason is transparent to itself because it is a model of interpenetration based on the relationships of axiomatic platforms to each other such that they form a natural triality, which serves as a basis for the interpenetration of self-consciousness via the Other. Reason is based on interpenetration and this is what gives it its self-transparency, which allows proofs to be final and eternal. This helps us to understand why Plato developed the model of the WorldSoul. In that model, the first level is Oneness, the second level is the Trichotomous Sign, the third level is the Axiomatic Platform that appears in Euclid's Elements as its basis, and the fourth level is self-transparent Reason appearing as Holoidal Interpenetration grasping the "moving image of eternity" of the WorldSoul in the form of the Icosaheptead. The fifth level is Matrix Logic⁶⁵⁵, which allows us to understand the tetralemma⁶⁵⁶ which is also augmented with a negative truth value (hiding) as a *showing and hiding* dynamic process which can be applied to truth and falsehood, reality and illusion, identity and difference, and presence and absence, i.e., it gives us an ability to deal with the structural processes of the aspects of Being.

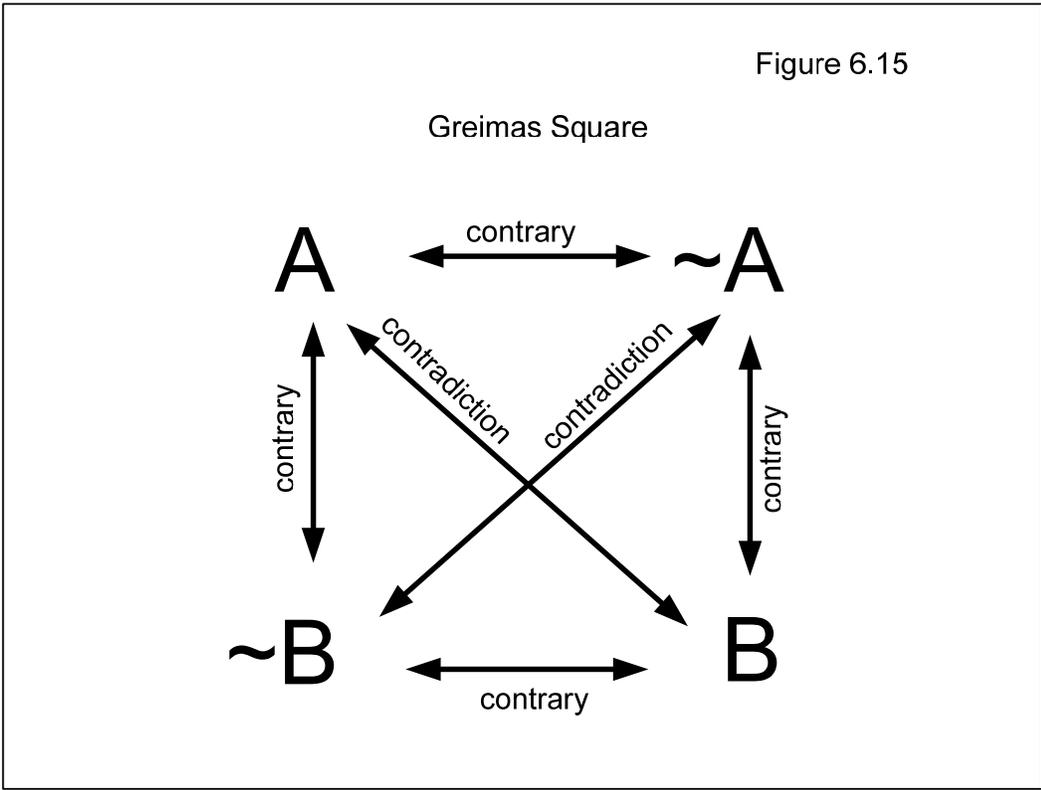


Figure 6.15. Greimas Square.

⁶⁵⁵ August Stern, Op. cit.

⁶⁵⁶ The tetralemma is A, ~A, both or neither; the four statements that define the limits of logic in Buddhism.

Figure 6.16

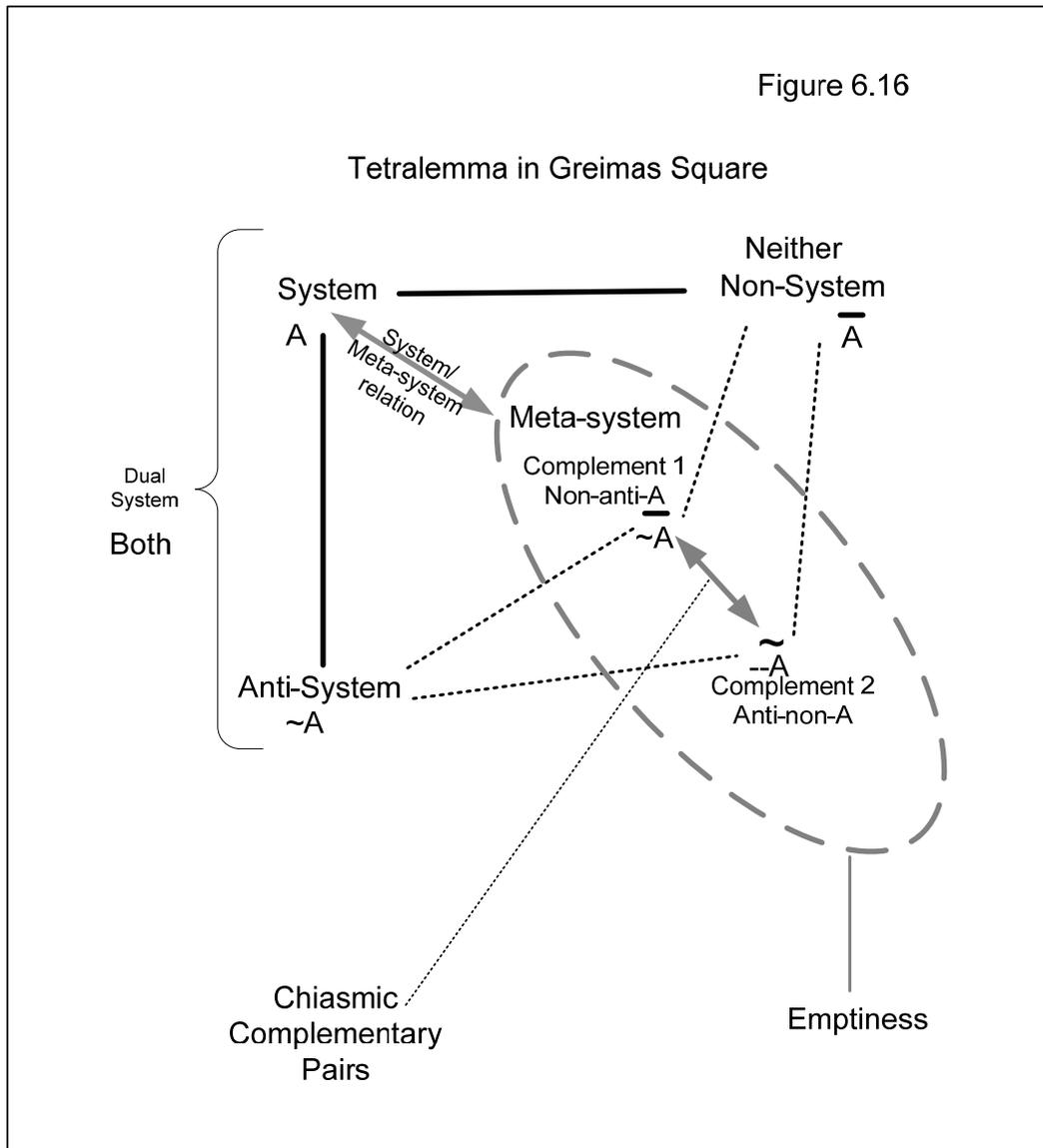


Figure 6.16. Tetralemma in the Greimas Square.

The Semiotic Greimas Square defines the System and Meta-system in relation to Dual-systems and Non-system

This brings us to the next point in our argument, which is to contrast the System/Meta-system and its dual: the Dual-system⁶⁵⁷/Non-system. The three Axiomatic Platforms in the Icosaheptad have a relationship of triality between them. This relationship can be seen in two ways, one view places the duality on the side of the Meta-system while the other places the duality on the side of the System (and vice versa). This duality between System/Meta-system and Dual-systems/Non-System can be seen within the Greimas Square⁶⁵⁸. There is a difference in the Greimas Square⁶⁵⁹ between the Anti-A and the Non-A and interestingly enough we can generate combinations of these as Anti-Non-A and Non-Anti-A. Thus, from any 'A' there are two directions that we can go and those two directions can be mingled in such a manner that they will produce *complementary chiasmic pairs*⁶⁶⁰. The complementary chiasmic pairs can be seen as the Meta-system in relation to the singular System model. The opposite of this would be to contrast dual systems, i.e., the System and Anti-system with the Non-system, which is singular. Together, both of these duals give us a complete Greimas Square, and thus we can turn whatever we say about the System/Meta-system duality into another form, which we will refer to as the Dual-system and Non-system formulation. This model of the System and Meta-system together, gives us an opportunity to understand the holoidal nature of the Icosaheptad formation. This model emanates from the dimensional cross between the Special Systems: the Ennead is the *two-dimensional external Cartesian cross* between the Special Systems, and the Icosaheptad is the *three-dimensional external Cartesian cross* between the Special Systems (See Figure 6.17).

⁶⁵⁷ System and Anti-System.

⁶⁵⁸ Called by Greimas the 'Semiotic Square'. See Schleifer, Ronald. A.J. Greimas and the Nature of Meaning: Linguistics, Semiotics, and Discourse Theory. Critics of the twentieth century. (Lincoln: University of Nebraska Press, 1987) p. 26.

⁶⁵⁹ Chandler, Daniel. Semiotics: The Basics (London: Routledge, 2002). p. 106; Greimas, Algirdas Julien. Structural Semantics: An Attempt at a Method (Lincoln: University of Nebraska Press, 1983).

⁶⁶⁰ Evans, Fred, and Leonard Lawlor. Chiasms: Merleau-Ponty's Notion of Flesh (SUNY series in contemporary continental philosophy. Albany, NY: State University of New York Press, 2000).

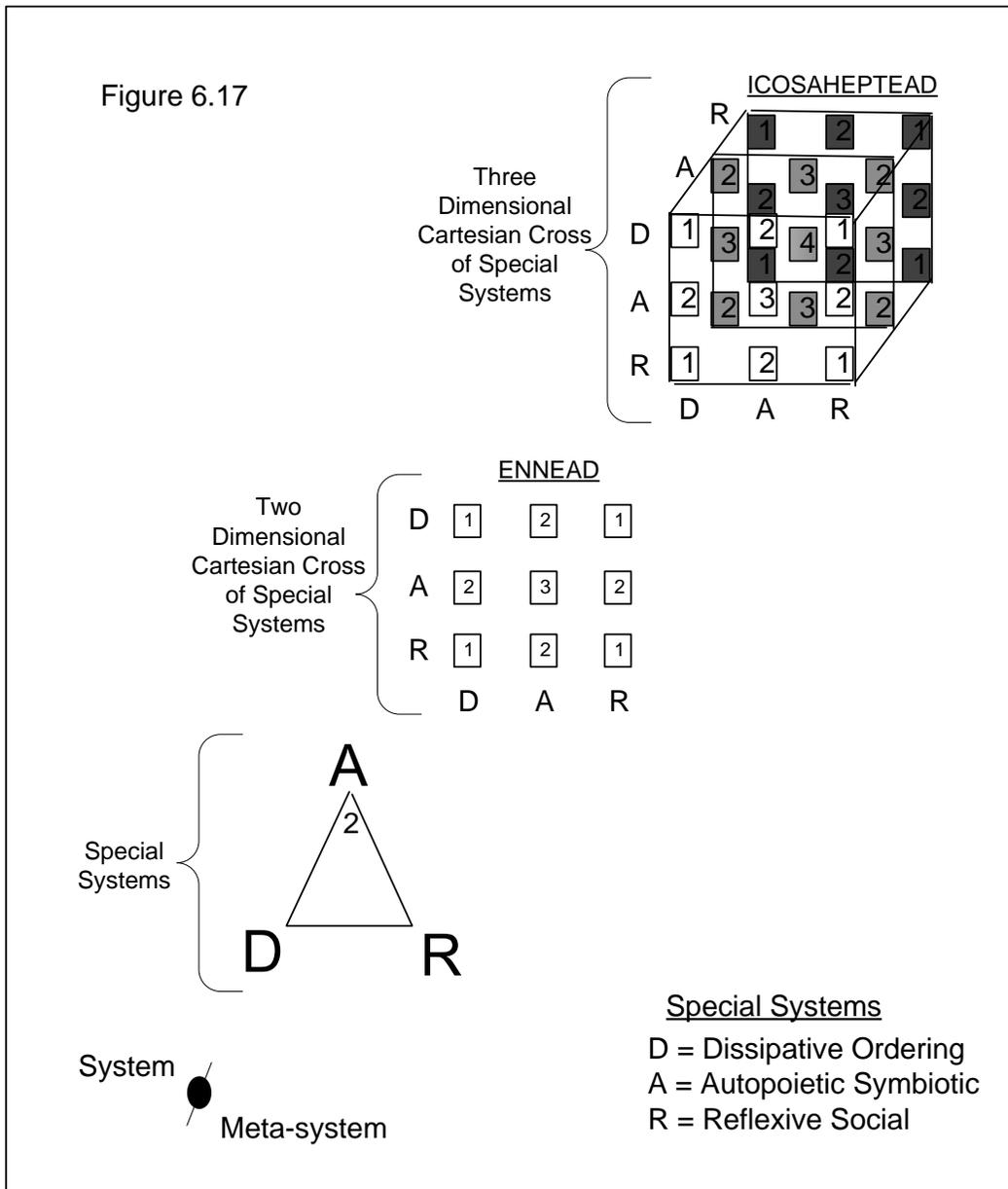


Figure 6.17. Orders of Mediation as Cartesian Crosses of the Special Systems.

We can see how these two complementary models fit together if we look at Greimas' Semiotic Square. The Greimas Square is built from the square of contraries and contradictions. Instead of viewing a model in terms of a universal and a particular, the Greimas Square illustrates how there is a difference between the *anti-x* and *non-x* as two types of negation that are orthogonal. Thus, we have a System and an Anti-system as opposed to a Non-system. On the other hand, when we look at the relationship between *anti-x* and *non-x*, we can see that there is a chiasmic relationship between them that produces the complementary twins: *anti-non-x* and *non-anti-x*. These complementary twins are the images of the Meta-system that are based on complementarity rather than totality, like the System. Thus, if we span between the *anti-non-x/non-anti-x* and the System, we

can assess the difference between the System and Meta-system, while, if we take *orthogonal directions* from the System we come up with a System/Anti-system and Non-system. The field of possible knots presents us with the *second case*, where we can have knots either inside a torus, or wrapped around a torus. Both of these are images of the minimal system, which give us two versions of the System/Anti-system: one as a knot around a torus, or as a torus containing a knot. A hyperbolic knot is a knot that is directly related in to the Meta-system. Since the torus is geometrically elliptical, we can see that these two scenarios, both within and outside of the torus, are actually opposites pointing at the two dual geometries. On the other hand, the geometries and their relationship to the Axiomatic Platform are related to the System/Meta-system split, with the two non-Euclidian geometries forming the *image* of the Meta-system in relation to the System, which is extended by Euclidian geometry. The Greimas Square presents these two images together as part of one structure, where System/Anti-system and System/Meta-system intertwine as complementarities at a higher level. There is always a *difference* between the *mediating* element and the *two different* elements, and these represent the regions and the relationships between the Duals and Nonduality.

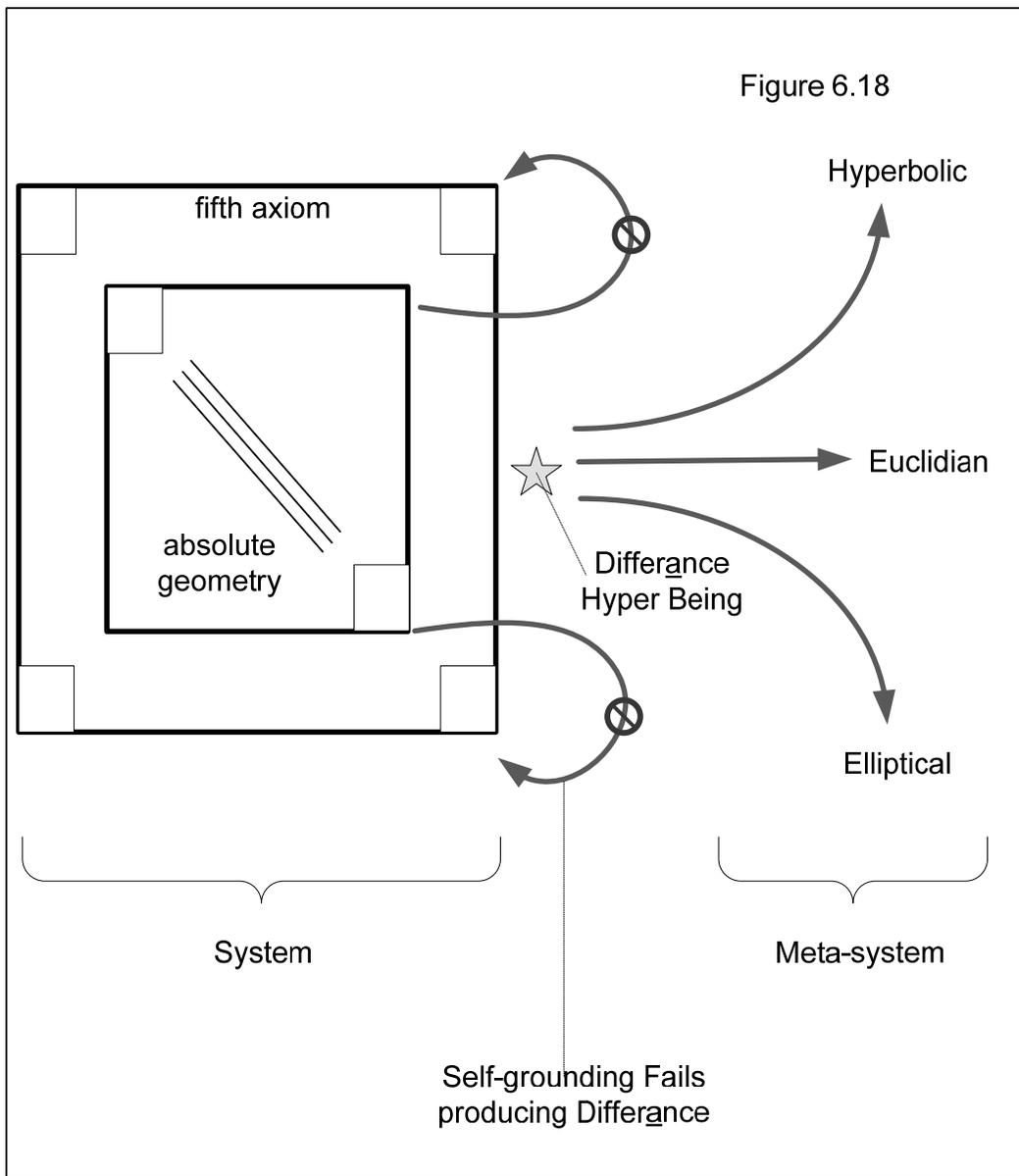


Figure 6.18. The Result of the Failure of Self-grounding.

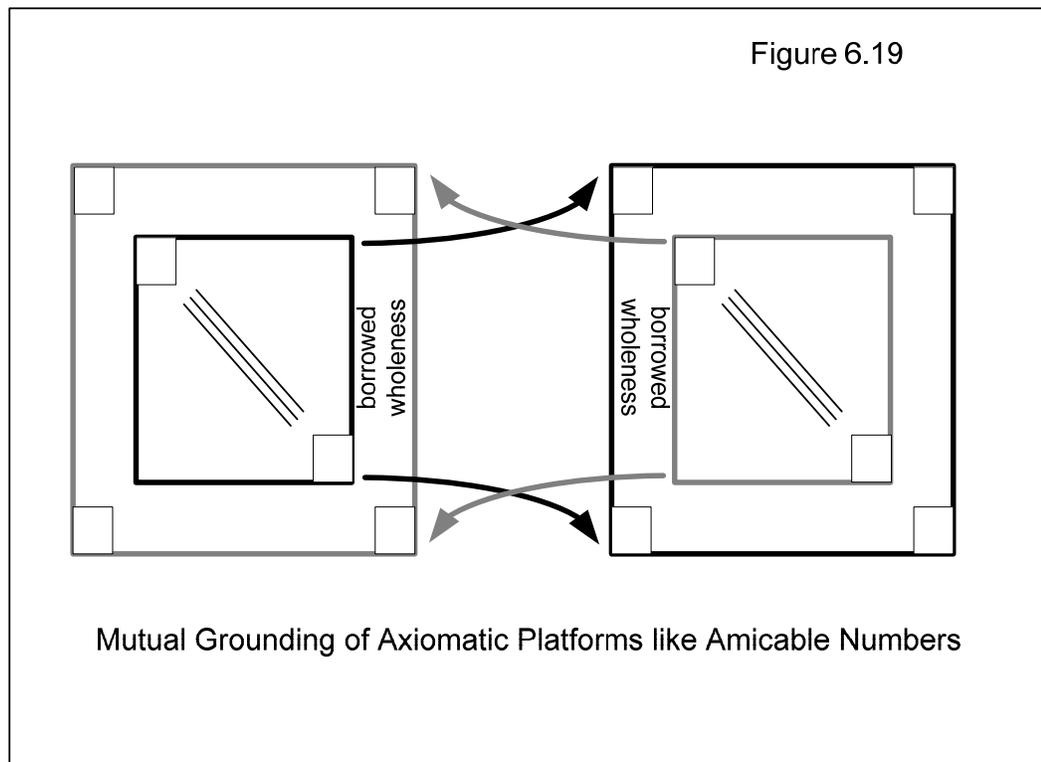


Figure 6.19. Mutual-grounding as an Alternative to Self-grounding.

Mutual Grounding

By framing this *image of the complementarities* of the Meta-system and its relationship to the System in the context of the Greimas Square, we can see that this image is opposite the Dual System (System and Anti-system) and the Non-system image. These two images are complementary. And the recognition of that duality leads us to posit that there is an alternative that is implicit within these two images, which has probably not been explored previously. We can think of the *Dual Systems* as grounding *each other*. In other words, a version of the fifth axiom is merely a square that has four right angles. Those four right angles make the Axiomatic Platform of Absolute Geometry a *whole*, and it is when we apply that *wholeness* to the Axiomatic Platform that we are thrown into the System/Meta-system duality, which is the diagonal of the Greimas Square. But, if instead we allow the fifth axiom of the System Axiomatic Platform to be applied to the Anti-system Axiomatic Platform, and then allow the fifth axiom of the Anti-system Platform to be applied to the System, they would not stand alone, but serve as a grounding, or as a support, for each other. This is precisely the same structure that appears in the Amicable Numbers⁶⁶¹, where the *divisors* of one number add up to the *whole* of another and vice versa. In this way the

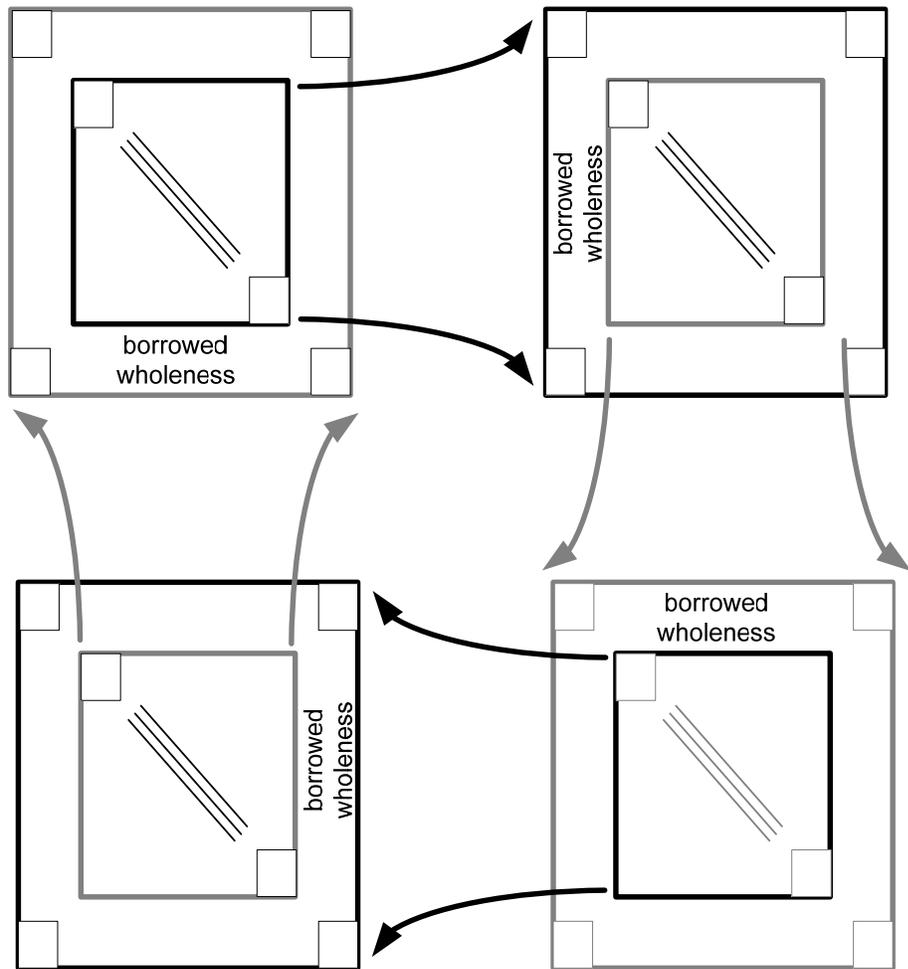
⁶⁶¹ Yan, Song Y. Perfect, Amicable, and Sociable Numbers: A Computational Approach (Singapore: World Scientific, 1996). See also <http://djm.cc/amicable.html> accessed 080907

System and Anti-system take on the configuration of an Autopoietic System, which is made up of two Symbiotic Dissipative Ordering Systems. We can extend this concept to the Reflexive Special System, which is made up of two Autopoietic Special Systems or four Dissipative Ordering Special Systems⁶⁶². In this way we can see *four* Axiomatic Platforms grounding each other in a way that is similar to the Sociable Numbers that have divisors that add up to each other in a circular series. As a set, Perfect, Amicable, and Sociable Numbers are the simplest possible mathematical analogy for the Special Systems. The Perfect Number is an image of the Autopoietic System as a unity, while the Amicable numbers are an image of intertwining Dissipative Ordering Special Systems. The Sociable numbers serve as an analogy for the Reflexive Social Special System. Now we see that there is a way for the Axiomatic Platforms to ground each other in what N. Rescher⁶⁶³ defines as a *cycle of axiomatic interpretation* much like the Hermeneutic circle. We see that the simplest Reflexive Social System of Axiomatic Platforms is a tetrahedron of four axiomatic platforms that are mutually grounding or giving *wholeness* to each other in a Sociable Number cycle. Such a system has eight images of the axiomatic system: four axiomatic platforms, and four fifth axioms that indicate wholeness. In this cycle, each axiomatic platform is conferring wholeness on the next platform in a cycle that is within the tetrahedron of axiomatic platforms. These eight images can be thought of as the basis of the Eight Foundational Mathematical Categories. In the Foundational Mathematical Categories there are eight images but they are in a spectrum of *excess* and *lack* around the perfection of the Set and Mass. But, we posit that the *excess* and *lack* of the Foundational Mathematical Categories add up to the eight mutually grounding categories of the Sociable Number cycle of Reflexivity between the four Absolute Geometries and their images of wholeness in their fifth axioms.

⁶⁶² See Reflexive Autopoietic Dissipative Special Systems Theory at http://works.bepress.com/kent_palmer.

⁶⁶³ Rescher, Nicholas. Cognitive Systematization: A Systems-Theoretic Approach to a Coherentist Theory of Knowledge (Totowa, N.J.: Rowman and Littlefield, 1979).

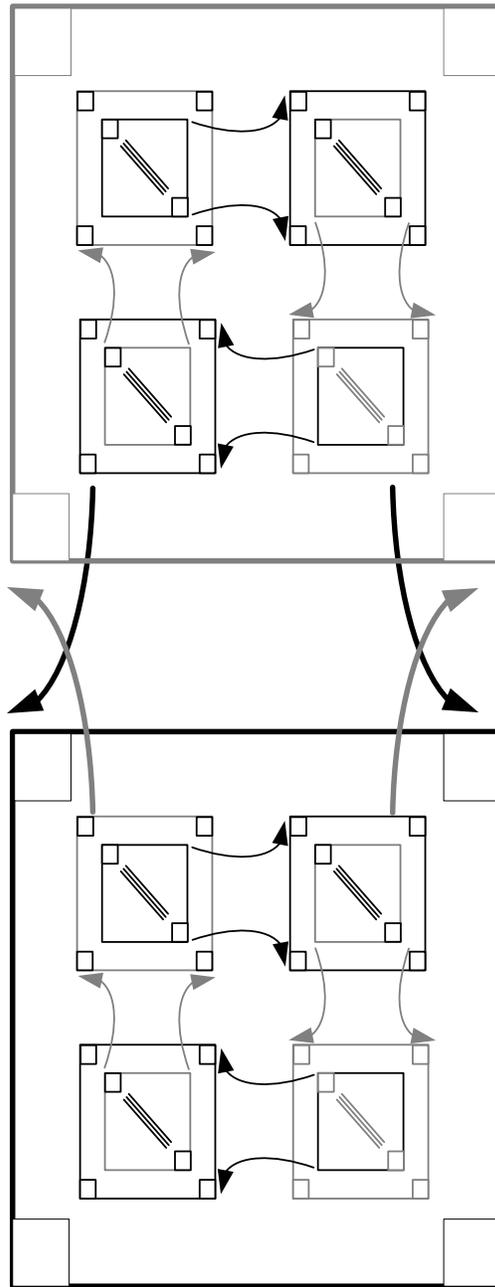
Figure 6.20



Mutual Reflexive Grounding of Axiomatic Platforms like Sociable Numbers

Figure 6.20. Reflexive Mutual Grounding.

Figure 6.21



Dual Reflexive Systems
give eight images of the
Axiomatic Platform



Foundational
Mathematical
Categories

Figure 6.21. Foundational Mathematical Categories as Dual Reflexive Mutual Grounding

Figure 6.22		
	<u>Aliquot sequences</u>	<u>Examples</u>
Meta-system	lacking	Divisors add up to less than the original number
Reflexive Social	sociable	12496 1264460 14288 1547860 15472 1727636 14536 1305184 14264 Mostly four but also 5, 28, 9 and other sets
Autopoietic Symbiotic	perfect	6, 28, 496 rare
Dissipative Ordering	amicable	(220,284) fairly common
System	excessive	Divisors add up to more than the original number

Figure 6.22. Aliquot Numbers

Reflexive Autopoietic Dissipative Special Systems Mirroring

The Foundational Mathematical Categories are the means of analysis of the elements of the Axiomatic Platform and its wholeness. The Singularity is the source of the axioms from which they differentiate themselves. The Site/Event category differentiates the *marked point*, the *void point*, and the *negative dimensional superimposed point*. This differentiation is seen as a local observation rather than as a global view. The Multiple is the inherent multiplicity of the points, open and closed extents, and the right angles. The Set describes these fundamental differences as elements between the point, line segment, and the open and closed extents. The fifth axiom describes the mass boundary of the System as a whole. Within that mass boundary of the whole, the whole/part differences can be differentiated, while the parts are distinguished by Mereology. The Holon/Integra allows the function of congruence to be defined as an arrow between the two catty-corner right angles within the square. The Holoidal is the identity between the point, line segment, open extent, and closed extent of the circle within the concept of the tangent. In other words, the Foundational Mathematical Categories are the means of understanding the relationship of the Axiomatic Platform of Absolute Geometry (the first four axioms) to its

fifth axiom. It is also a way of understanding the relationship between ‘mutually grounding sets’ of axiomatic platforms or ‘cycles of mutual grounding’ in a series, such as you would see in the Amicable and Sociable numbers. The difference of the axiomatic platforms and the hyper-complex algebras is this: in the case of the imaginary numbers, the elements are opaque and closed to the intellect and impossible to peer into, while the axiomatic platforms are open and comprehensible to the intellect and are possible to see. Once we understand that there is a tetrahedron of axiomatic platforms that are mutually grounding through lending each other their fifth axioms as well as giving each other wholeness, then we see that within this tetrahedron of axiomatic platforms there is a cycle between the four axiomatic platforms, which uses only four of the links out of the six that connect all the axiomatic platforms to each other. Thus, the two links that are not being used form autopoietic sets between the two pairs of axiomatic platforms that appear simultaneously with the cycle that they participate in. However, the Icosaheptad is made up of three of these platforms, which form a triangular surface of the tetrahedron. There are four such surfaces. That means there are four Icosaheptads within the tetrahedron of axiomatic platforms. The Icosaheptads are interpenetrated axiomatic platforms. As such, they are mirrors⁶⁶⁴. That gives us an inwardly mirrored tetrahedron whose surfaces are holoidal Icosaheptads, and furthermore, this inwardly mirrored tetrahedron is the image of the Reflexive Special System when analyzed in the context of the hyper-complex algebras. The Autopoietic Special System is equivalent to three facing mirrors that appear as a pair of mutually grounding Axiomatic Platforms. This triangular space is defined by the two orthogonal lines connecting the pairs of Axiomatic Platforms that make up the autopoietic images. One edge of the triangular space is in a corner of the triangle of mirrors and the other edge cuts across the opposite mirror. In this way, *orientation* is imposed upon the three mirrors, which would otherwise merely represent a triality. The Dissipative Ordering Special System is represented by two mirrors facing each other. In facing mirrors there is an *infinite regress in the reflections* rather than a *cycle of reflections*. These facing mirrors represent the relationship between the axiomatic platform and the fifth axiom. If the fifth axiom is lent to an adjacent axiomatic platform (the Anti-system) then the mirrors face outward rather than toward each other. But, if the ‘fifth axiom of wholeness’ is applied to the axiomatic platform from which it originates, then the mirrors face inward and that

⁶⁶⁴ During a collaborative discussion in the late nineteen nineties between Onar Aam, Tony Smith and Ben Goertzel and myself, Onar Aam suggested that the Hyper-complex numbers can be seen as sets of facing mirrors. An unpublished transcript of this collaboration exists. See Goertzel, Ben; Aam, O.; Smith, F.T.; Palmer, K., "Mirror Neurons, Mirrorhouses, and the Algebraic Structure of the Self" Cybernetics & Human Knowing, Volume 15, Number 1, 2008 , pp. 9-28(20)"

produces a breakdown that leads to a degenerate mode of the relationship between the System and the Meta-system, which is seen in the infinite regresses that appears when we view an angle between the facing mirrors. Depending on the angle, there is either a foreshortening or lengthening of the reflection in the infinite regress. This is similar to the effect of having convex or concave mirrors that would represent elliptical or hyperbolic geometries. The Meta-system images appear when one tries to add a fifth or higher number of mirrors to the configuration. In that case, the mirrors can no longer be regular or unwarped, but must be either warped or separated from each other in space⁶⁶⁵. The irregular and warped mirror configurations provide us with the analogy for the breakdown of the System into the Meta-system that results from using the fifth axiom to give wholeness to its own axiomatic platform rather than lending that support (or grounding) to another anti-axiomatic platform. The axiomatic platform is a figure on the ground of the holoïdal Icosaheptead within a tetrahedron of mutually grounding axiomatic platforms. The axiomatic platforms on the Icosaheptead triangular surface can have a cycle of mutual grounding between them.

⁶⁶⁵ Many of the experiments in Physics that deal with laser light beams are based on the placement of mirrors separated in space. These experiments give us unique insight into the nature of some physical phenomena concerning the nature of light.

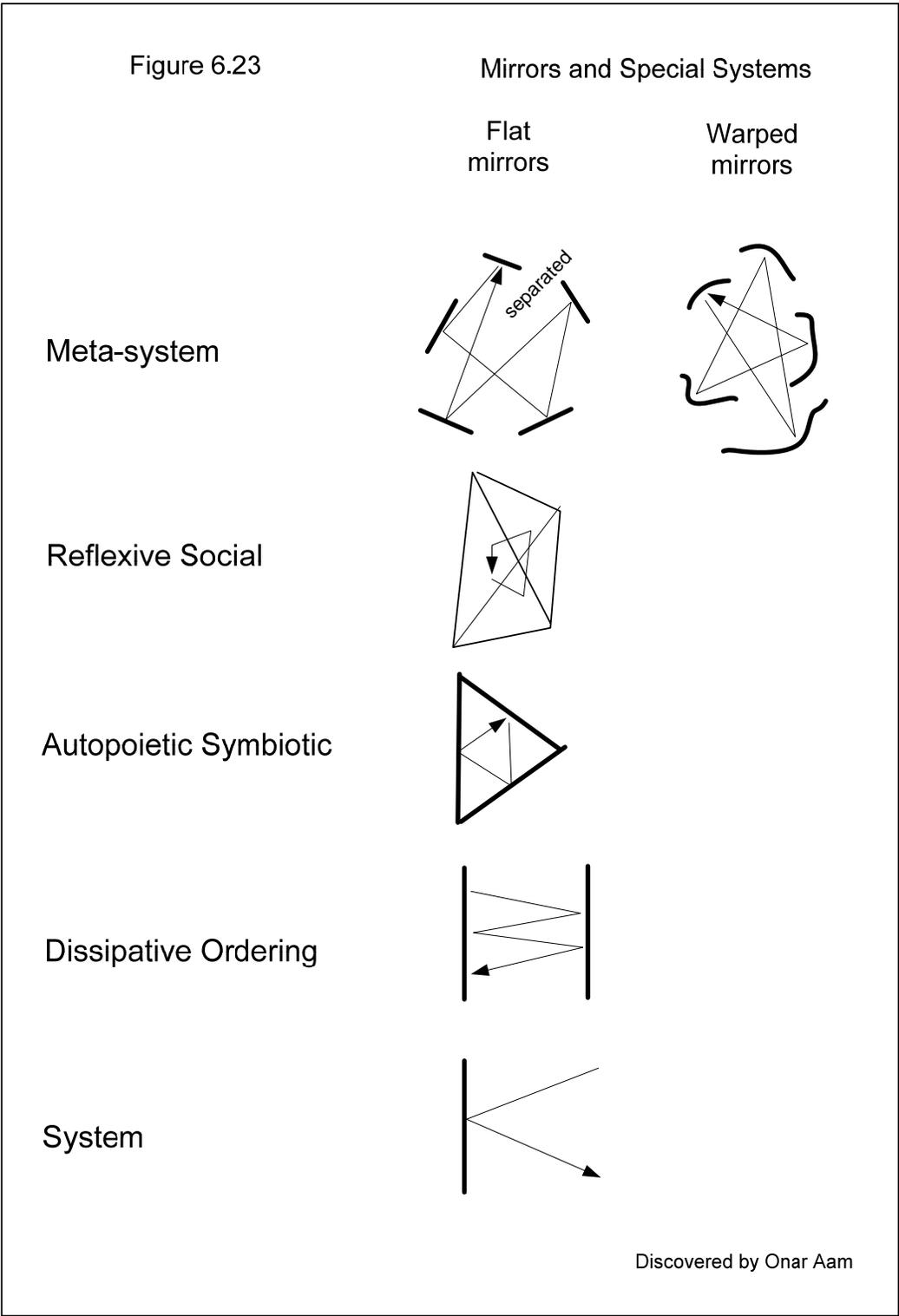


Figure 6.23. Special Systems as Mirror Configurations.

The Differentiated and the Undifferentiated

The infinite regress of images within the inwardly mirrored configurations that are within the Holoidal Reflexive Sociable Set of axiomatic platforms, as well as the mimesis that they suggest, become ramified into a progression of the kinds of Being that control the presentation of those representations. A theme that figures prominently within this dissertation is Heidegger's attempt to deal with the ramifications of the possibility of an infinite proliferation of the kinds of Being. His attention to this problem appears most prominently in Contributions to Philosophy⁶⁶⁶ and Mindfulness⁶⁶⁷. In these works he avoided the issue of Ontological Difference and suggested that we "jump over it". Following his own direction, Heidegger took a leap of faith and on the other side of that divide he found Beyng (Seyn), which is the dual of Being (Sein). Much of his later work dealt with defining the difference between Being and Beyng. We will use that leap here as a means of discovering a solution to the problem of Hermeneutics. As a result, this contrast between Being and Beyng will add a counterpoint to our analysis. Beyng is strange, unique, and onefold. With the advent of Beyng, it is as if the entire structure of the WorldSoul never opened up to give us insight into the differences in the kinds of Being. One of the key points is that the Foundational Mathematical Categories constitute a nexus for the interaction of Being and Beyng, as well as other striated and unstriated pairs of concepts that make up the structure of the Worldview. We must continually compare what has *unfolded* in Being to what was *always already* there *before that unfolding occurred*. This is the source of meaning: the comparison between the *differentiated* and the *undifferentiated*.

⁶⁶⁶ Heidegger, Martin. Contributions to Philosophy: From Enowning (Studies in Continental Thought. Bloomington, IN: Indiana University Press, 1999).

⁶⁶⁷ Heidegger, Martin, Parvis Emad, and Thomas Kalary. Mindfulness Athlone Contemporary European Thinkers. (London: Continuum, 2006).

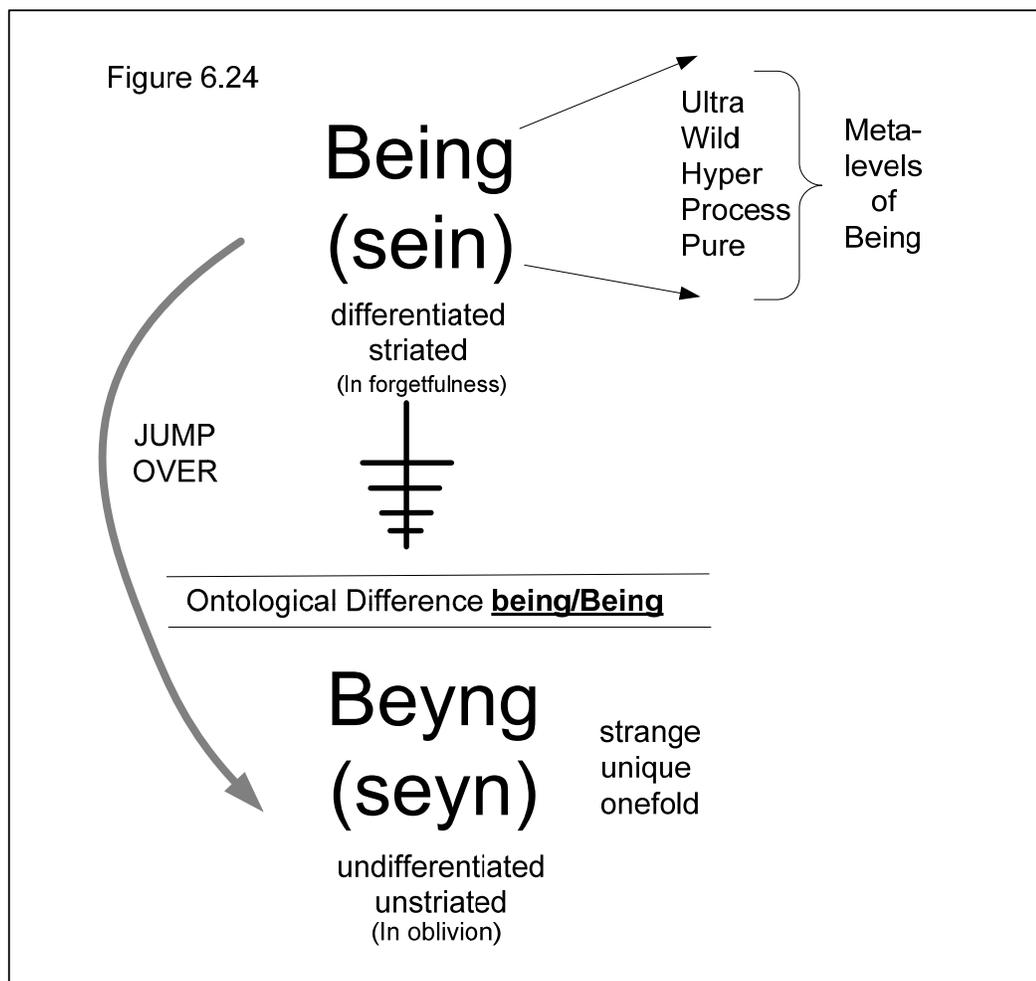


Figure 6.24. Being and Beyng.

This brings us to an additional point that appears throughout this work, which is the nature of the *striated* and *unstriated* pairs that make up the Worldview. We make the fundamental assumption that there are sets of dualities, such as those that always contain differences, as in Being, or others that contain sameness, as in Beyng. Other examples⁶⁶⁸ are Matrix/Time-space, Multiple/Aggregate (Global/Local), Oblivion/Forgetfulnesses, Void/Emptiness, Beyng/Being, Open/Clearing, and Infinite/Finite (Transcendent/Immanent). Surprisingly, these striated and unstriated pairs line up with the Foundational Mathematical Categories and the Trans-Peircean Philosophical Categories. Throughout this dissertation the existence of these striated and unstriated pairs will be taken for granted as the fundamental structure of the Worldview that makes this analysis possible. This means that the Western Worldview in the Metaphysical Era is viewed as being caught up in Ontotheology, which implies that it is , itself, an Emergent Event that

⁶⁶⁸ Here the Unstriated element will be mentioned first and the Striated pair will be mentioned second, which is not always the case.

exhibits these dualistic features at its own level of articulation. We will assume this deeper enfolding in order to analyze the Quadralectic within the concept of Being as it relates to the *Emptiness and Void of Existence*, which is the *dual of Being*⁶⁶⁹.

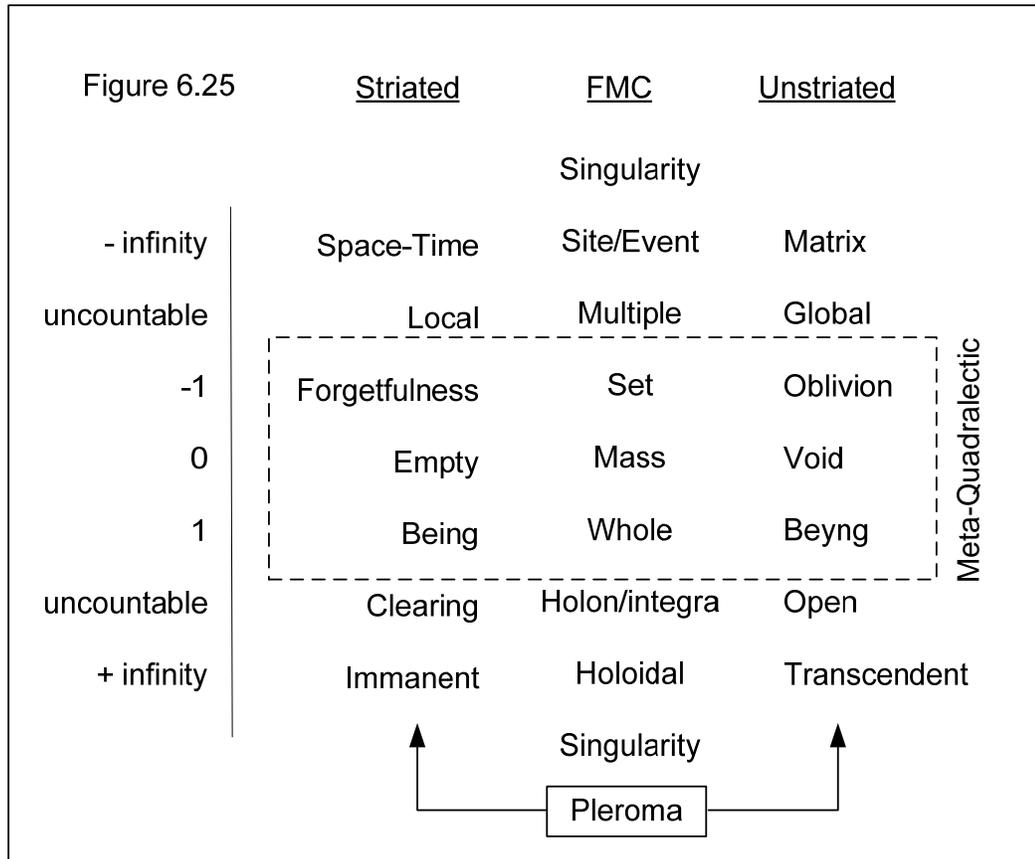


Figure 6.25. Striated and Unstriated Pairs in relation to the Foundational Mathematical Categories.

Essentially, the structure of the Worldview is composed of striated and unstriated pairs that can be taken as *undefined differences*. Because an Emergent Event established the Worldview, the striated and unstriated pairs have a loose affinity to the Foundational Mathematical Categories and the Philosophical Categories. They establish the *clearing* in Being, which is a Fourfold that is represented as Order, Ground, Light, and Uncovering (Aletheia), which are, in turn, related to the aspects of Being, i.e., Truth, Reality, Identity, and Presence. This Open/Clearing exhibits the persistence and intelligibility that we look for in Being but (at the same time) is undercut by Beyng. Being and Beyng stand in opposition to Void and Emptiness, just as Being is opposed to Existence. The

⁶⁶⁹ This will later be called the 'meta-Quadralectic'. In other works it will also be referred to as the Pleroma, which is made up of all the striated and unstriated pairs that constrain the worldview. Pleroma means fullness, and is taken from Greek Gnostic works, but the term does not refer to the same thing as it does in those works.

Open/Clearing activates *reification*, and *closure* into Existence, but it is differentiated by the schemas that are related to dimensionality. Thus, there is a relationship between the *finite* and the *infinite* that will always be called into question. The Open/Clearing stands opposite to Oblivion and Forgetfulness and both of these emanate from the SpaceTime/TimeSpace Matrix as well as the inherent heterogeneity of the Multiple/Aggregate, which appears as the difference between Global and Local. Within this structure of the Worldview, which we call the Pleroma, there is a structure of meta-dimensionality that defines the transcendentals and separates them from the immanences. In an Emergent Event the transcendentals become immanent, otherwise they are thrown into meta-dimensions that have a specific structure. Part of that structure defines the finitude of the Nonduals, the Limits, the Regions, the Aspects, the Standings, and the Schemas, as well as the Arche and other negative dimensional meta-dimensions. The structure of the Worldview is finite in the realm of positive meta-dimensions, and the schemas are at the zeroth meta-dimension, which is what we consider as our accepted understanding of the infinite dimensionality of spacetime. This is the *receptacle* or the *chora* that Plato mentions⁶⁷⁰ in the Timaeus in which he bestows the *being of Hyper Being*. Hyper Being lies between the System and the Meta-system in the order of the unfolding of the schemas in relation to the Foundational Mathematical Categories. There is a fundamental *centrality* to Hyper Being as it lies between the extremes of Pure Being and Process Being (on one hand) and Ultra Being and Wild Being (on the other). It also lies between the System and the Meta-system as the *medium of their interaction*. That is because it has a special place in relation to *design* in the context of the Quadralectic. Once the centrality of the Third Kind of Being is established, then it will be possible to utilize this centrality as an ambience where the Quadralectic can manifest in synchronization with the Lifecycle of Emergence in *Emptiness*, and with the Emergent Meta-system Cycle in the *Void*. Emptiness and Void are merely interpretations of Existence in contra-distinction to Being and its kinds. Existence is the Meta-system for the System of Being and that is why it has two complementary interpretations, Emptiness and Void. Existence is ‘what is found’ and Being is the ‘illusory continuities’ that we project onto *what is found*, one of which, at a basic level, constitutes the Schemas.

⁶⁷⁰ Bianchi, Emanuela. "Receptacle/Chopōra: Figuring the Errant Feminine in Plato's Timaeus". Hypatia; Fall2006, Vol. 21 Issue 4, p124-146, p.23.

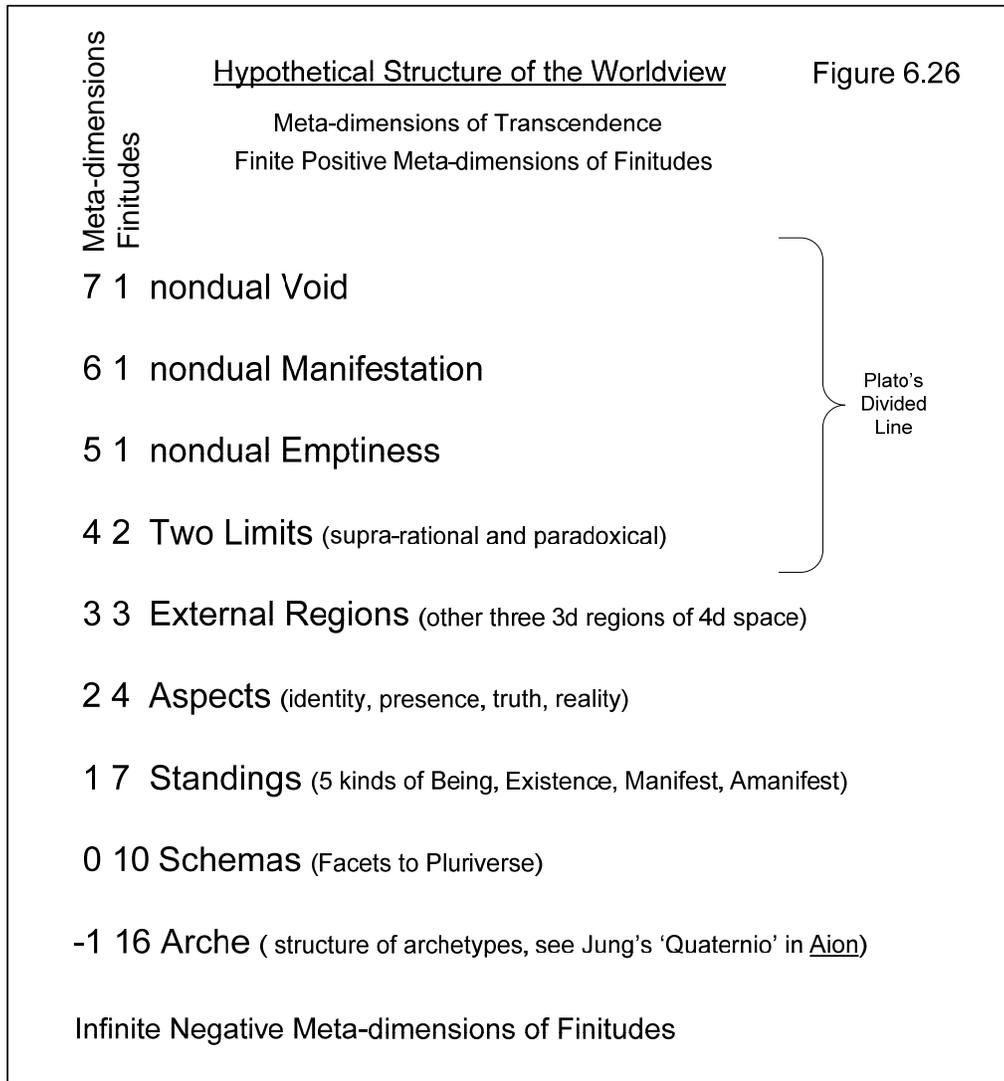


Figure 6.26. Hypothetical Structure of the Worldview.

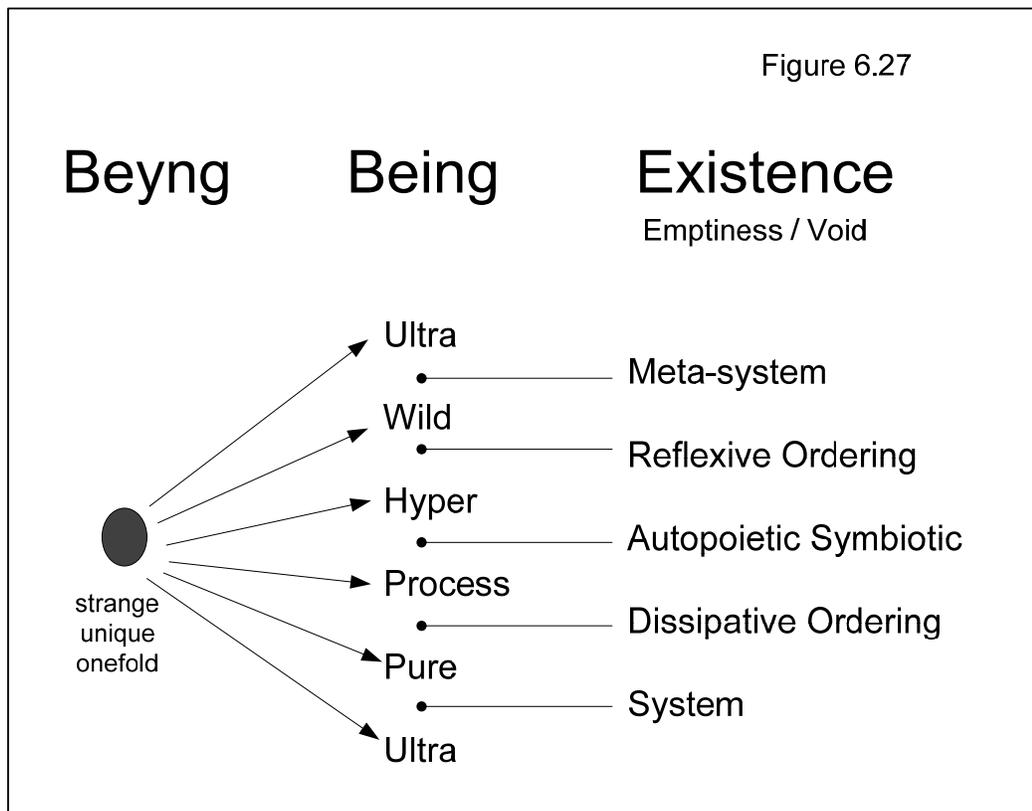


Figure 6.27. Beyng, Being, and Existence.

Examples of Hyper Being and the Transition into Design

Hyper Being is the first meta-level of Being that is entirely esoteric. *In other words, most people, especially most engineers, do not consciously know that Hyper Being exists, even though they are confronting it every day.* For example, one way that Hyper being is expressed is through the idea of Risk⁶⁷¹. Accepting Risk is understanding the possibility that something may occur although we try to limit its occurrence and effects. We talk about Risks in terms of *probability of occurrence* and *potential impact*. We treat Risk as objective but it is really subjective. And in truth, if we were wise, we would realize that Risks should actually be dealt with through an intersection of *subjective probability* and *fuzzy possibilities*⁶⁷² rather than merely multiplying subjective assessments. The difference is that probability sums to one, while fuzzy possibility does not sum to one and thus recognizes that possibility is open, not closed. In other words, fuzzy possibility recognizes that there are multiple possible worlds in the future and we are making *minima* and *maxima* assessments of these possible worlds instead of merely looking at the determinate

⁶⁷¹ Rescher, Nicholas. Risk: A Philosophical Introduction to the Theory of Risk Evaluation and Management (Washington, D.C.: University Press of America, 1983).

⁶⁷² Klir, George J., and Bo Yuan. Fuzzy Sets and Fuzzy Logic: Theory and Applications (Upper Saddle River, N.J.: Prentice Hall PTR, 1995).

subjective probability of the potential impact of a single possible world being actualized. The multiple possible world-lines in the future is what makes risk avoidable. The fact that most companies now look at *both* risk and opportunity shows that there is a growing awareness that *the future is a design landscape* and that if we behave *proactively* then it is possible to position ourselves within that landscape while engaging in a more realistic assessment of Risk. However, our current way of approaching Risk as a subjective probability and as a determinate potential impact, rather than as a fuzzy possibility, is very instructive in terms of how we attempt to reduce everything that is Hyper to what is Process, and everything Process to that which is Pure in terms of their kind of Being. In the current industrial climate, this *drive toward* and *emphasis on* a reduction to the lowest common denominator, whether it is appropriate or not, is applied to everything, not just Risk. But Risk is a good example. First of all, Risk Management⁶⁷³ is often seen as unnecessary and is avoided as much as possible. That is because much of what Risk Management deals with never really happens, and it is seen as wasted effort. Risk Management proposes that one look into the future and attempt to gage risks and opportunities that might occur sometime in the future. Identified risks are quantified in terms of the *probability of occurrence* and the *potential of impact* and are then multiplied in order to determine which set of risks would have the most potentially negative impact and should, therefore, be proactively avoided. Those risks are mitigated by creating plans for actions that will make it possible to minimize the Risk potential. If we were treating risk and opportunity correctly, we would make the *potential of impact* a fuzzy number, and the *probability of occurrence* would remain a probability. In other words, there is a differential impact for each possible future universe and that differential impact should be treated as a fuzzy minimum and maximum. On the other hand, the possible *realization* that one of those universes should be treated as a probability, must be seriously taken into account because one of those universes is going to become part of our worldline and produce an actuality. We need to recognize that this is a subjective possibility and that our calculations are probably Bayesian. If we *combine* the Bayesian calculations with the fuzzy impacts, we get a much more complex calculation than the ‘rule of thumb’ that is generally used now. But this more complex calculation recognizes that the elements come from the *combination of different universes*, one of which is *probabilistic*, and the other, which is *possibilistic*. It recognizes that the probabilities involved are *not objective, but subjective*.

⁶⁷³ Valsamakis, Anthony C., Robert W. Vivian, and Gawie S. Du Toit. The Theory and Principles of Risk Management (Durban: Butterworths, 1995). Muffee, Visemih William. Risk Management: Theory and Practice (New York: Nova Science Publishers, 2007).

And it recognizes, via the Bayesian formulation, that *history matters*, and the ‘set up’ values with which the series starts also matter. Doing the ‘rule of thumb’ calculation that treats both impacts and occurrences as the same not only *denies* the future, but also *suppresses* the possibilities for transformation. It treats the *process of becoming* as fated and arbitrary. This is just one example of what we mean when we say that Hyper Being becomes reduced to Process Being or Pure Being whenever possible and thus we avoid recognizing it and giving it its due. As a result, we pay high prices when the Risks become manifest and cause our plans to fail. This happens because we do not understand, or even accept, the dynamics of the historical development of problems as they appear and manifest from out of the realm of possibilities.

Let us take *plans* as another example⁶⁷⁴. We make plans for our projects. But it is a classic situation that no plan ever survives its first engagement with the enemy⁶⁷⁵. So planning is seen as a waste of time by many. But plans specifically orient us toward the future and help us to realize the *possibilities* that may occur in that future. Plans try to project a Pure Being grid on the future. Sometimes it is understood that plans need to be kept up to date and revised, in which case they enter into Process Being. But normally, plans are treated as products and are thus reified and become merely examples of Pure Being. *Keeping plans alive and thus engaged in the process of Becoming is a real challenge*. Often the plans move out of sync with the situation ‘on the ground’ and so they lose credibility, which creates a situation that can engender more liability than having no plan at all. Plans are seldom thought of as a means for reaching the potentials of possibilities that might be normally out of reach, i.e., *as ways of reaching into Hyper Being and pulling out a potentiality that could not be actualized otherwise*. Those kinds of plans are *not* rote plans, but they anticipate discontinuous changes in the landscape of possibilities, i.e., *designs*. In our language we say that “someone has *designs* on something”. That means that they are plotting to attain something through cunning or metis⁶⁷⁶ that they could not otherwise hope to achieve. Odysseus demonstrates this in The Odyssey⁶⁷⁷. Odysseus single handedly wins the Trojan War after years of stalemate via a trick that delivers victory in an unexpected and surprising way, i.e., via the designed ruse of the Trojan horse.

⁶⁷⁴ Allmendinger, Philip. Planning Theory (Houndmills, Basingstoke, Hampshire: Palgrave, 2002).

⁶⁷⁵ Clausewitz, Carl von, Michael Eliot Howard, and Peter Paret. On War (Princeton, N.J.: Princeton University Press, 1976).

⁶⁷⁶ Herzog, Don. Cunning (Princeton: Princeton University Press, 2006). pp. 15, 184, 196; See also Jullien, Francois. A Treatise on Efficacy: Between Western and Chinese Thinking (Honolulu: University of Hawaii Press, 2004). p. 191; Certeau, Michel de. The Practice of Everyday Life (Berkeley: University of California Press, 1984). p. 81.

⁶⁷⁷ Homer. Trans. Robert Fagles. The Odyssey (New York: Viking, 1996).

There are several practices such as risk management and planning that attempt to come to terms with the future and its possibilities. We suggest, in our study of Design, that without possibilities, there is no System or Meta-system design, *and possibilities only appear in the realm of Hyper Being!* So, to understand Design, we must enter into this strange and esoteric realm of Hyper Being and understand it as best we can. Here we will concentrate on Systems Architectural Design and upon Emergent Design. In other words, we will narrow our scope by only dealing with the highest level of design and the most difficult case, which is *design that shows emergent characteristics*. We recognize that design is an activity that reduces down to different fractal levels depending upon the project size. And we recognize that there is a difference between requirements, design, implementation, integration, testing, etc. and that all of these are fundamentally important and interrelated. We must narrow our scope and our method. We want to clear away the obstacles and consider the difficult concept of Emergent Design at the highest level within the System or Meta-system, and we advocate that Emergent Design can only happen if we at least breach the Hyper Being level as we consider the System or Meta-system. Furthermore, we posit that there are different *moments* to the process of Emergent Design that correspond to the *moments of the Quadralectic*. Thus we claim that the Quadralectic is the basis for Emergent Design. Up until now we have been struggling to reach the level of Hyper Being in order to arrive at the right level for making a possible entry into design. Yet, now that we have entered into Hyper Being, we *insist* that the Quadralectic is what drives design at this meta-level of Being. And we claim that the Quadralectic is a straight forward development of the dialectic through the trialectic into a higher form that is the conjunction of two dialectics.

Risk Assessment, Planning, and Design are forward looking practices in Systems Development, although it is actually *Design* that is central to making a complex, developmental system work. Thus, we will consider Design to be the essence of Systems Development, particularly when we are forming a theoretical basis for bringing the concept of *Being* into Emergent Systems prior to our practical applications. We wish to regard Design from the point of view of Semiotics, and so we will appeal to the study of Semiotics in order to discover the truer nature of Design. Systems Phenomenology plays a central role as we are in the *process* of designing a system, but Semiotics is the bearer of *meaning* and makes it possible to develop representations of a System before it is built. The Emergent System comes into Being through the various *kinds* of Being by passing through them as the stages of an Emergent Event. The relationship between these *representations of the Design* is assumed to be *dialectical*, and the process by which these

dialectical representations appear is considered *Quadralectical*, which is an interaction between two dialectics that subsumes them both into a higher *super-synthesis*.

We will proceed by enlisting the research of Pieter Wisse whose work is the only example we have found that attempts to develop a sophisticated Semiotic approach to Engineering. Wisse's Sign Engineering has a specific structure that we will extend in order to produce a model of the Quadralectic. He calls his theoretical structure the Ennead. We will take the Ennead and extend it to create a picture of the Quadralectic. Wisse understands the importance of *context*, and this makes his method useful for comprehending the relationship of the System to the Meta-system. Yet, Wisse does not understand the necessity of Hyper Being, and so we must continue to perfect our development of his system with this essential concept in mind. Wisse also builds on Peirce and Schopenhauer. Schopenhauer scheduled his philosophical lectures at the same time as those of Hegel, but no one came to Schopenhauer's lectures, which was a source of un-ending bitterness for him, and because of this lack of recognition for his accomplishments, Schopenhauer gave up his pursuit of a career in Philosophy. Thus, Schopenhauer's philosophical contributions are often overlooked. Both Schopenhauer and Hegel were reacting to Kant and both were somewhat influenced by Oriental sources that were just becoming available. One way of characterizing the difference between Schopenhauer and Hegel is that Schopenhauer realized that the *thing in itself*, i.e., the *noumena*⁶⁷⁸, was the *will within each of us*. Hegel, on the other hand, was a 'system builder' who wanted to understand the progression of consciousness, to self-consciousness, to reason, to spirit, i.e., the *we* in history itself. Our own inclination⁶⁷⁹ is much more toward Kant and Hegel than toward the pessimism of Schopenhauer⁶⁸⁰. Both Kant and Hegel are system builders in philosophy. Schopenhauer tends to open the way to the unconscious⁶⁸¹ followed by Nietzsche⁶⁸², Freud⁶⁸³, and Jung⁶⁸⁴. Kant and Hegel were attempting to understand the *form* and *motion* of consciousness and its transformations in the light of day rather than exploring the dark recesses of the unknown *interior of the subject* (that the subject, himself, may not even

⁶⁷⁸ Priest, Graham. Beyond the Limits of Thought (Oxford: Clarendon Press, 2002) pp. 96-98.

⁶⁷⁹ Kaufmann, Walter Arnold. Discovering the Mind (New Brunswick (U.S.A.): Transaction Publishers, 1991).

⁶⁸⁰ Scruton, Roger. German Philosophers: Kant, Hegel, Schopenhauer, Nietzsche (Oxford: Oxford University Press, 2001).

⁶⁸¹ Ellenberger, Henri F. The Discovery of the Unconscious: The History and Evolution of Dynamic Psychiatry (New York: Basic Books, 1970).

⁶⁸² Simmel, Georg. Schopenhauer and Nietzsche (Amherst: University of Massachusetts Press, 1986).

⁶⁸³ Assoun, Paul-Laurent. Freud and Nietzsche. (London: Athlone Press, 2000).

⁶⁸⁴ Bishop, Paul. The Dionysian Self: C.G. Jung's Reception of Friedrich Nietzsche Monographien und Texte zur Nietzsche-Forschung, Bd. 30. (Berlin: W. de Gruyter, 1995).

know exists). In previous chapters we have discussed this underside of Transcendental Idealism especially with the mention of the work of Abraham and Torok⁶⁸⁵. Our approach toward the work of Wisse will be to recognize and affirm how he based his ideas on the philosophy of his mentor Schopenhauer, and with that in mind, we will first examine Wisse's understanding of Peirce, and then move on to study and elaborate upon his own system, which he calls the Ennead. In our discussion we will contrast the differences between the categories of Peirce and Wisse and attempt to distinguish them, although we will continue to use those of Wisse as a basis for our extension of the Ennead to the Quadralectic.

Peirce was a Kantian, and was against the excesses of the Romantic Hegel⁶⁸⁶. Pragmatism was a reaction against Hegel and an attempt to return to Kant⁶⁸⁷ by understanding the nature of Logic in a more fundamental way. Yet, Peirce was influenced so profoundly by Hegel that many could not tell the difference between the two philosophical approaches because both stressed a 'mediation of the unmediated.' We are incorporating Wisse as an important and substantial precursor to the concept of the Quadralectic because he defines the semiotic approach to engineering, as Sign Engineering. We want to build upon his work in order to connect with the tradition of systems building as much as possible. The Metapattern method of Wisse is extremely engaging because it is a meta-method that applies to *both* the System and Meta-system. The Gurevich Abstract State Machine⁶⁸⁸ is the only other meta-method we know. Thus, in our judgment, the contribution of Wisse is very important. Although, upon closer examination of Wisse's doctoral justification of his Metapattern⁶⁸⁹ method, we recognize that there is a need for some re-formulation and restructuring that will help to correct his position as well as clarify our own. Wisse's investment in Schopenhauer can be summarized by his belief that the sign production of the engineer is a "request for compliance" as well as a denial of the relevance of social considerations. Throughout the book he argues against the Marxist positions of V.N. Voloshinov⁶⁹⁰ on the importance of

⁶⁸⁵ Abraham, Nicolas, Maria Torok, and Nicholas T. Rand. The Shell and the Kernel: Renewals of Psychoanalysis (Chicago: University of Chicago Press, 1994).

⁶⁸⁶ McGann, Jerome J. The Romantic Ideology: A Critical Investigation (Chicago: University of Chicago Press, 1985).

⁶⁸⁷ Stern, Robert. Hegel, Kant and the Structure of the Object (London: Routledge, 1990).

⁶⁸⁸ Borger, E., and Robert F. Stark. Abstract State Machines: A Method for High-Level System Design and Analysis (Berlin: Springer, 2003).

⁶⁸⁹ Op. cit.

⁶⁹⁰ Voloshinov, V. N. Marxism and the Philosophy of Language (Cambridge, Mass: Harvard University Press, 1986). See also Bakhtin, M. M., Pam Morris, V. N. Voloshinov, and P. N. Medvedev. The Bakhtin Reader: Selected Writings of Bakhtin, Medvedev, and Voloshinov (London: E. Arnold, 1994).

language and the social. He takes Schopenhauer's position as a basis for defending individualism. Peirce's very concept of the sign as 'three fold' is about balancing the subject and object (socially designated as *real*) and mediating them in relation to each other. This emphasis on mediation places Peirce closer to Hegel for whom *all relationships must be mediated*. So, although Peirce was a Kantian, he could not help but be influenced by Hegel. We suggest that Wisse declares allegiance to Schopenhauer's romantic individualism⁶⁹¹ rather than Hegel's romantic socialism⁶⁹². Therefore, we must acknowledge that Wisse rejects the balance of Peirce's Semiotics⁶⁹³.

⁶⁹¹ Of course we cannot mention Schopenhauer without implying the presence of Nietzsche who, at first accepted, but then later rejected Schopenhauer's pessimism. Gooding-Williams, Robert. Zarathustra's Dionysian Modernism (Stanford: Stanford University Press, 2001).

⁶⁹² Marx, Karl, Loyd David Easton, and Kurt H. Guddat. Writings of the Young Marx on Philosophy and Society (Indianapolis, IN: Hackett Pub. Co, 1997).

⁶⁹³ Gorrée, Dinda L. Semiotics and the Problem of Translation: With Special Reference to the Semiotics of Charles S. Peirce Approaches to Translation Studies, v. 12. (Amsterdam: Rodopi, 1994).

Exploring Sign Engineering

Extension of the Ennead as the Basis for Defining the Quadralectic

The Ennead is introduced again as the basis of Sign Engineering as posited by Pieter Wisse. In this chapter Pieter Wisse's Ennead is placed in the context of the various kinds of Systems based on the Meta-levels of Being. We will use Wisse's dissertation as a basis for understanding his definition of the Ennead and then compare Wisse's Categories to those of Peirce in order to examine their differences. We choose to take Wisse's Categories at face value as his own contribution and use them to define the Ennead more precisely. We then add another moment that is based on perspective to the Wissan Ennead, which produces an image of the Quadralectic. The moments of the Quadralectic are then defined in terms of the System and Meta-system, their second order mediation, and their nihilistic traces and projections by using the trans-Peircean categories as our guide. We will also look at the problem of meaning in terms of the difference between Being and Beyng in order to understand how the separate moments of the Quadralectic produce single threads of meaning within the design process. Finally, we define the emergence of a new artifact as the transformation of the System into the Meta-system. This process, which creates a new System for producing a novel artifact is accomplished through the mediation of the Meta-system.

The Ennead

Pieter Wisse makes an important contribution to semiotics by building upon the ideas of Charles Peirce. Although he admits he does not completely comprehend Peirce's categories, Wisse *does* understand Peirce's three element definition of the Sign and he uses that to define the basis of Sign Engineering. Peirce defines a sign as a combination of an object, a sign, and an interpretant. Peirce's philosophy builds on, but is critical of Hegel. Peirce, following Hegel, realized that everything must be mediated and thus designated the sign to be the mediator between the subject and the object. He designated the interpretant to be the subjective view of the meaning of a sign. The sign is something external⁶⁹⁴. It is also called a representamen. The 'representamen' as a sign is a representation of the object. What is missing from the discussions of Peirce's theory is how triality exists as a three-way complementarity. As a trichotomy, or triality, the sign assumes a higher level tri-

⁶⁹⁴ Peirce's example of a sign is a Wind Vane. Thus he thinks of Signs as something external and dynamic.

synthesis that subsumes and sublates⁶⁹⁵ all the lower level dichotomies. P. Wisse states that a sign represents a request for compliance, as a result, the sign system is shifted to serving unconscious subjective ends that the subject is not even aware of because these unconscious subjective ends arise from the *Wille*. But, in terms of recognizing the three-way complementarity of the sign itself, we posit that unless this three way complementarity is achieved as a tri-synthesis beyond the dualities, meaning cannot be generated. Thus, as long as we live in a dualistic world, there is no real meaning from this point of view, only ineffective dualistic projections. In a way, we can learn something of this when we talk of the projection of the schemas from a Kantian view of the *a priori*. Hegel promulgates a more sophisticated view when he suggests that everything is mediated. Peirce extends Hegel's argument and gives it even greater weight when he contends that all representations are those mediations. This means that when we split the schemas into representations and repetitions, we are implicitly talking about the bare bones structure of those mediations and how they affect the relationship between a subject and object. This concept of triality is significant because these mediations exist in a larger, and more encompassing tri-synthesis that subsumes all the dualities within the triality. So, projections are received and combined with their contents, and that interaction, as a whole, is what is in question, not just the projection from the subjective side. Within this picture the object must somehow receive the projection as well, and the representation must be adequate to hold the subject and object together. This application of triality to the concept of Peirce's sign structure is sufficient to negate the force of the Schopenhauerian view as being predominant over that of Hegel. Both Schopenhauer and Hegel are correct to some extent, but they were participating in a broader coalition following the idealism of Kant. As Durkheim says, "Kant's Categories are Social"⁶⁹⁶. We could go further and say that the thing in itself is also social, even if it is the *Wille* in each of us, i.e., our desire for the Other among us, which is a mutual desire that we have for each other. In some sense Hegel and Schopenhauer's positions are two sides of the same coin. But as a sociologist the author tends to lean toward Hegel rather than the pessimism of Schopenhauer. Yet, it is important to note that from Schopenhauer comes our appreciation of the Unconscious, via Nietzsche, Freud, and Jung and this is something that cannot be ignored.

⁶⁹⁵ The English equivalent for Hegel's 'Aufhebung'.

⁶⁹⁶ Durkheim, Emile. The Elementary Forms of the Religious Life. (London: Allen & Unwin, 1968).

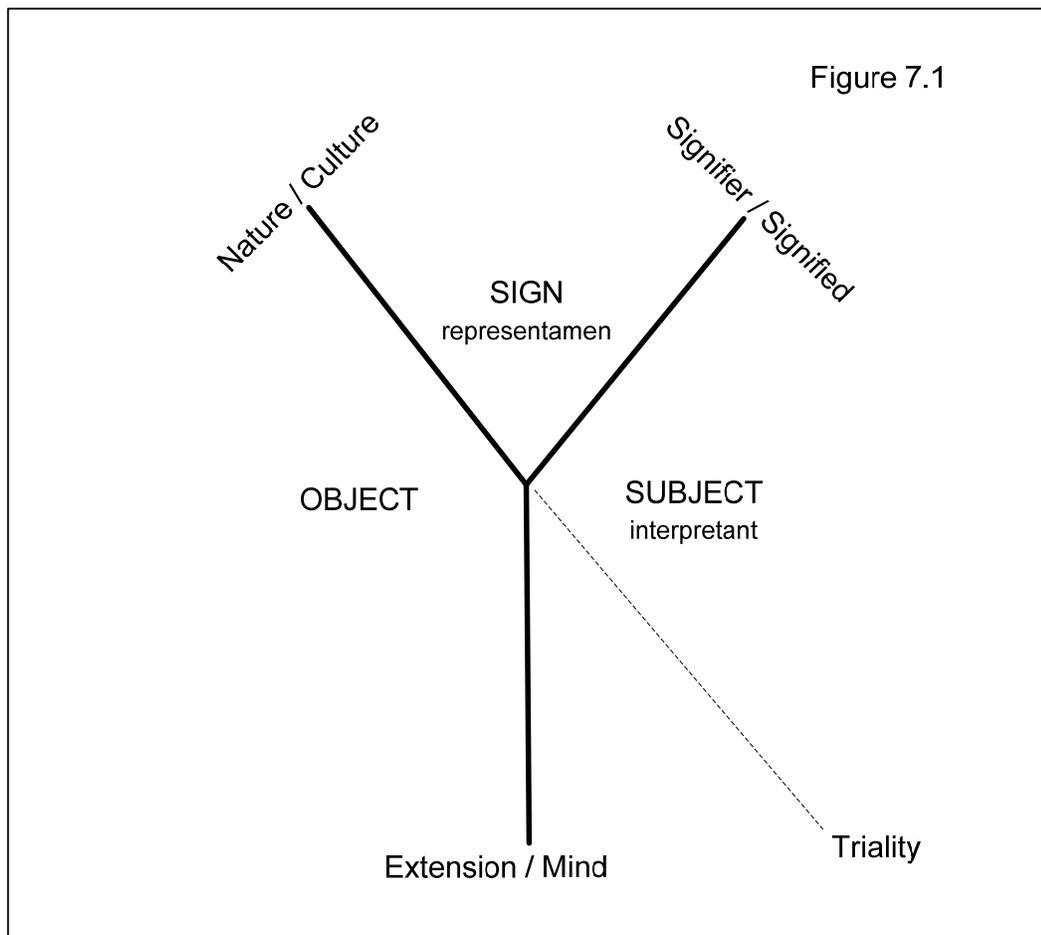


Figure 7.1. Triality of the Structure of the Sign in relation to the Subject and Object Dualism.

Wisse's innovation beyond Peirce's trichotomous sign is twofold. First he says that each of the elements of the sign need to have an environment that is recognized. To that end he first contrasts the behavior of an object to a situation, then the sign (representamen) to a context, and finally he contrasts the foreground interpretant to a background interpretant. We will call the foreground interpretant the representation (in the mind this is ultimately understood as a concept), and we will refer to the background interpretant as the circumstance. The relationship of the representation (in the mind) to the representamen is like that of an operator and operand, i.e., the representamen initiates a mental representation, which is an interpretation. This says that the relationship between each element of the sign and its environment can be likened to the relationship of a System to a Meta-system. This is the real strength of Wisse's work. He recognizes the significance of these relationships and applies them in his Metapattern method. His is one of the few methods that recognize that the *environment* of the *moment* of the sign is important for *understanding* the sign. Furthermore, Wisse goes beyond this and introduces the idea of a *second order mediation*, which is a brilliant move. In other words, rather than just settling

for the mediation of the sign between subject and object, he goes on to recognize that there should be mediation between the *sign moment* and its *environment*, and he specifies these as *second order mediations*. Between mental representation and circumstance there is a mediating *focus*. Between the behavior of the object and the situation there is the mediation of the *object*. Between the content (intext) and context there is the mediation of a *signature*. At this juncture, it is significant to stress that the mental representation within its circumstance indicates a concept, the behavior of the object within its situation indicates an essence, and the content of the signature within a context indicates a *design*. This terminology is somewhat awkward, but we will preserve it in order to preserve the link between the formulation of the Quadralectic and the Ennead. More is gained by preserving this link than is gained by shifting our rhetoric in order to make the terminology seem more natural. A key idea that we will add to Wisse's *second order mediation* is that these mediations are examples of triality too. And because these are examples of triality, the three together are *greater than the sum of their parts*, or duals of what they encompass. Yet, this also means that we will find that there is both a *lack* and an *excess* that exists in relation to these trialities and this gives a comprehensive mediation between the elements, i.e., every element mediates all the others in the set. This is why we will eventually define a 'lack,' related to the *representation-focus-circumstance*, as a concept and an 'excess,' as a sense. And we will define the 'lack,' related to *behavior-object-situation*, as an essence and the 'excess,' as a goal. We will also define a 'lack,' related to *content-signature-context*, as a design and an 'excess,' as the pragmata (the pragmatic target).

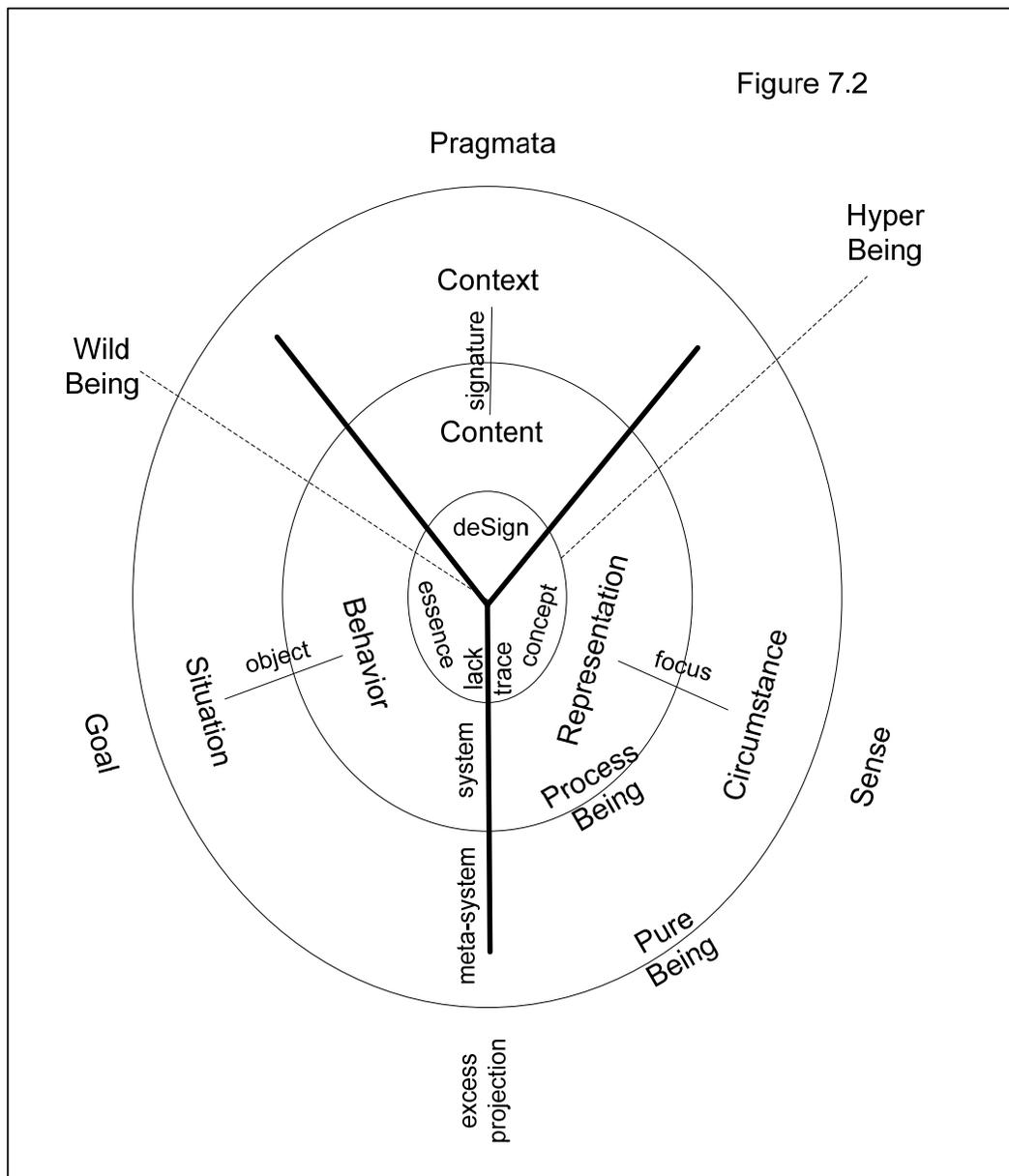


Figure 7.2. Concentric Layers of the Ennead.

Peirce defines a sign as threefold, comprised of: *object-representamen-interpretant*. Thus, he defines all meaning as mediated, just as Hegel insisted that everything is mediated. In the case of Peirce, the mediation is external, i.e., the mediation is a set of external signs, rather than internal signs (self-consciousness) as in the case of Hegel. Wisse goes on to recognize the importance of *environment* for each of these *moments of the sign*, and then he continues to apply a *second order mediation* to the relationship between the moment and the environment. We wish to introduce the idea that *triality governs each of these first and second order mediations*. We hold in reserve the idea that there may be third and fourth order mediations as well. But we posit that each self-mediating triality may have ‘lacking’ or ‘excessive’ modes. We will identify the ‘lacking modes’ with the traces in

Hyper Being and the ‘excesses’ we will associate with projections of Pure Being. This means that the mediation exists in Process Being. This motif of ‘lacking and excessive modes’ comes from the analysis of the Special Systems in relation to the System and Meta-system.

Wisse's idea of relating the *moments of the sign* to their *environments* and then providing *second order mediations* for that environmental relationship is brilliant. We appreciate this because it fits with the model of the relationship between the System and the Meta-system. So, let us call the *mental representation*: the *behavior*, and the *content*: the *system elements*. We will call the *circumstance*: the *situation*, and the *context*: the *meta-system element*. The *Focus*, *Object*, and *Signature* will be called: the *mediation*⁶⁹⁷. We will call the *concept*, *essence* and *design*: the *trace of lack*, and we will call the *sense*, *goal* and *pragmata*: the *excessive projection*.

The roots of Wisse's Ennead can be traced back to Moritz Schlick⁶⁹⁸ who followed David Hilbert⁶⁹⁹ in positing that concepts could be related to *each other* rather than to *observables* and thus be independent and autonomous. An Ennead is a minimal structure in this regard because it allows mediated concepts to intertwine and thus determine each other in a matrix formation. In a previous working paper⁷⁰⁰ it has been explained how this structure is related to the progression that Plato describes as the *WorldSoul*⁷⁰¹, which moves from 1 to 3 to 9 to 27 and can be further extended to 81 to 243 and to 729, which is placed opposite the binary progression from 1 to 2 to 4 to 8, which can be extended to 64 to 128 and to 256. The latter progression is seen in the unfolding of Pascal's Triangle and is the basis for the production of a medium for information exchange and inscription. The first series is the permutations of three elements rather than a progressive bisection. This means that it embodies a series of mediations. Wisse takes the mediation of the sign and adds a second order mediation, and this results in a self-mediating structure, which has 9 elements⁷⁰². The Wissan categories are part of the series of mediation, self-mediation, self²-mediation, and self³-mediation, etc. At the level of 64 or 729, i.e., n^6 , these structures

⁶⁹⁷ In this case it is second order mediation.

⁶⁹⁸ Schlick, Moritz. General Theory of Knowledge. Library of Exact Philosophy, 11. (New York: Springer-Verlag, 1974).

⁶⁹⁹ Reid, Constance, and Hermann Weyl. Hilbert. (Berlin: Springer-Verlag, 1970).

⁷⁰⁰ See “Timaetus and the Alchemy of Design” which is chapter 8 in Application of General Schemas Theory: Design Methods and Meta-methods at <http://holonomic.net> by the author.

⁷⁰¹ Plato Timaetus 29A-31B; 35a-39e

⁷⁰² An archetypal image of this exists in the story of the wedding of Thetis and Peleus, which sparked the Trojan War in the Greek Epic. We also discovered an equivalent scene in the Mahabharata. This self-mediating structure that Wisse has discovered is therefore archetypal.

have the property of being able to move between two and three dimensions without losing any information. Since Forms are two and three-dimensional, it means that these levels of *information encoding* and *self-mediation* are very important to the schema of Forms; they give a structural underpinning to the self-identity of the Form. Plato calls the union of these two series the *WorldSoul*. These two series differentiate along distinct lines of evolution, one of which generates an ‘information carrying capacity’ while the other develops the possibilities of ‘self-mediation’. Wisse has used Peirce’s trichotomy of the sign to discover how the second-order self-mediation works, and it is possible that we can take advantage of this advancement to further understand the higher levels of self-mediation. When the self-contained structure of self-mediation is combined with Schlick’s innovation that such structures are axiomatic and thus independent, *and* if we base them on *self-reference* rather than basing them on an *inter-referential* relationship to other perceptual structures, then you can see how they could provide a stable structure for our axioms, and produce a basis for the development of methods and meta-methods for design. We have taken these concepts to the next stage where we offer Quadralectics, which have a structural series of n^4 : 4, 16, 64, 512. This series, which is a subset of the Pascal Triangle series, generates the Quadralectic. Notice that the series is self-generating at the level of 16, which is also the level at which the logical operators appear, as studied by August Stern and Shea Zellweger. The next level of self²-generation occurs at the level 64, which is the level where the transformation between the second and third dimensions occur without an information loss. It is the level where there is a perfect structural transformation of the content of forms. This structural transformation of the content of forms surfaced in the I Ching as a central motif in Chinese culture and it also shows up in DNA as the basic code of life. In developing the Quadralectic, we are restricting the information carrier to the point where it reenters itself after self-mediation. It reflects a reentry into the information carrier after differentiation through self-mediation. The series is 1, 2-3-4, 4-9-16, 8-27-64, 16-81-512, 32-729-2048. What we learn from this is that the first binary represents the System and the second re-entry binary represents the Meta-system, and the odd power of three represents the differentiation of the space between the System and Meta-system. The first of these mediations is threefold, which represents the structure of the sign, and the second is ninefold, which represents the Ennead as an axiomatic conceptual structure. Wisse creates the Ennead to be a specific embodiment to serve as a model of self-mediation, although it can also be interpreted as a self-referential axiomatic

structure⁷⁰³. The next level contains three axiomatic structures interlinked and self-mediating. Each of these exemplifies triality. At this level, with 27 self-mediating elements in the Icosaheptad, there exists a relationship between the axiomatic platforms, such as those that make up the Foundational Mathematical Categories. Those mathematical categories act as an axiomatic system for the whole of Mathematics, but instead of the categories being founded upon the *axioms*, the foundations are *whole categories*, some of which are deficient or super-abundant. We posit that the interchange between these Foundational Mathematical Categories exist at this level where there is triality between the axiomatic platforms. If we continue to go up to the fourth level we will see August Stern's Matrix Logic with 16 logical operators in the Positive sublogic and logical operators in the Negative sublogic to give a total of 81 logical operators and where terms can have nine different showing and hiding aspectival (truth) states. Truth vectors are operated on by Matrix operations in which each truth table for a logical operation, is the means by which the result of the truth calculation is produced.

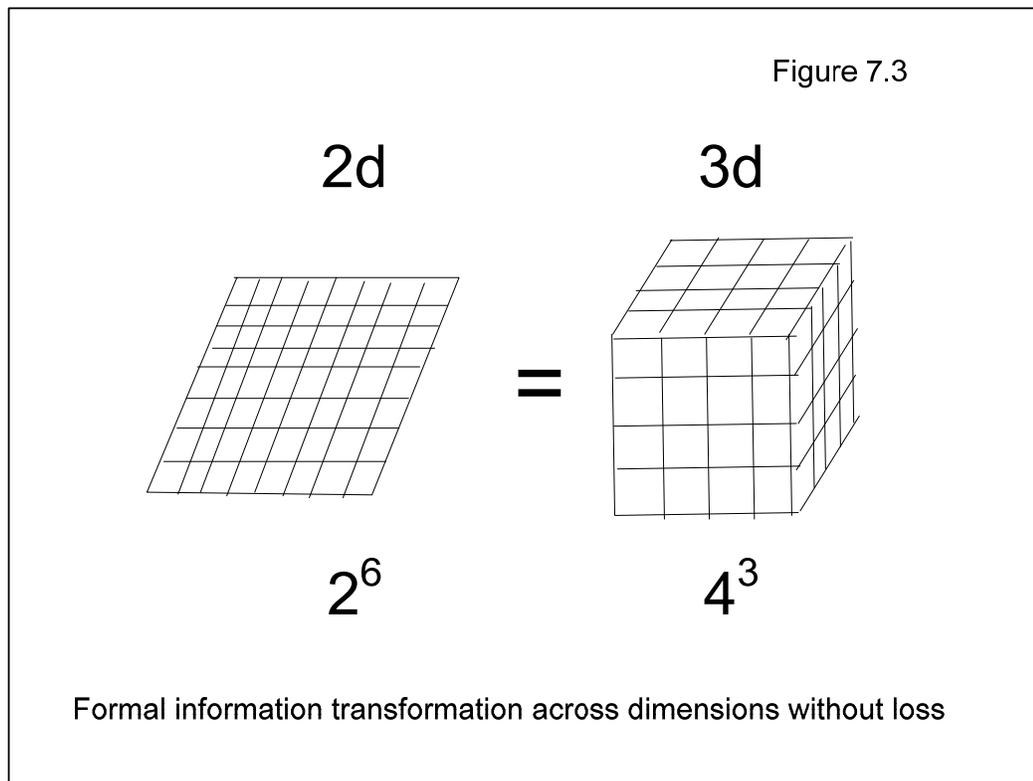


Figure 7.3. Formal Information Transformation across Dimensions.

⁷⁰³ This self-referential axiomatic structure is archetypal.

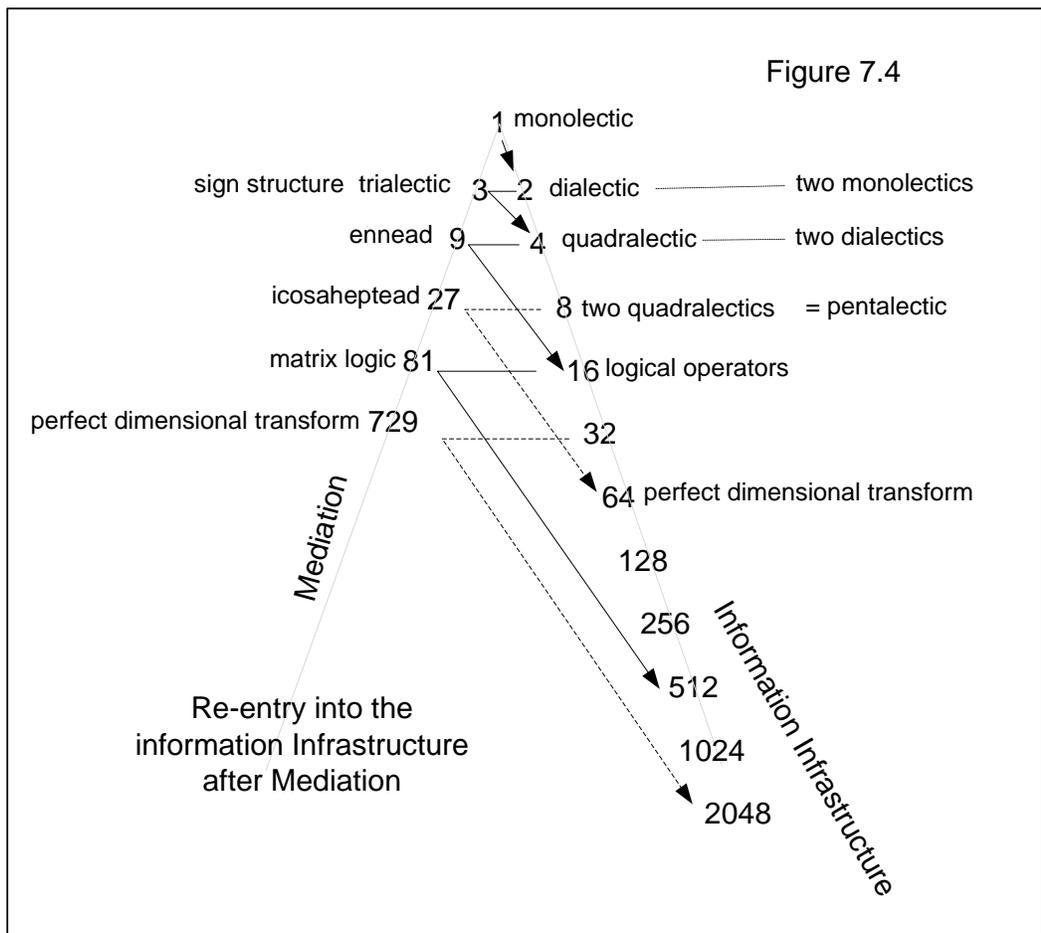


Figure 7.4. Re-entry into the Information Infrastructure after Mediation.

All this is a speculative introduction that presents the Wissian Categories as an innovative and challenging place to begin our attempt to develop Quadralectics. Quadralectics represent *a return to the information carrier of the Pascal Triangle after mediation*. The Wissian Categories give us a structure of self-mediation that we will build upon by adding another *moment* to Wisse's three moments, which will further complete the *trialectic of mediation*. It will then be possible to produce the Quadralectic at a level of self-consciousness within the information carrier. By understanding the Wissian Categories, we can understand the basis of the Quadralectic.

It is appropriate that we continue with Pieter Wisse's terminology in order to credit the heritage of the ideas contained within it. It is important that we understand how this conceptual machine works as an interesting elaboration on Peirce's triadic notion of the structure of the sign, which introduces the environment as a new triadic relationship with a mediation between the sign and its environment as a third triadic relationship. Together,

the whole set is called the Ennead, which includes the nine elements of the sign and its relationships, its environment, and its self-mediation.

Kinds of System

We are marching up the *stairway to nowhere*⁷⁰⁴ and at each stage we are encountering radically different ways of looking at systems. There is the Pure System, which is frozen as a three-dimensional configuration, and we have the dynamic, four-dimensional Process System, which adds the dimension of time. Process and System are two ways of looking at the same thing *in terms of gestalt and flow*. But if we consider them in *conceptual* terms we reach the level of the Hyper System. The Hyper System makes use of Heidegger's concept of ~~Being~~ (crossed out⁷⁰⁵) that Derrida calls "Differance"⁷⁰⁶, i.e., the differing and deferring of traces. Plato calls this the *third* type of Being in his Timaeus⁷⁰⁷. It is with the introduction of this type of Being that the philosophical constructs of the various systems take on a strange and inordinate nature⁷⁰⁸. The best way to think about this is the 'undecidable system' following Gödel⁷⁰⁹. Gödel demonstrates that there are statements that cannot be differentiated as to whether they exist inside or outside a given system. If those statements are added to a system then it will have emergent properties and those statements will become indicators of emergence. But, if they are taken away, then de-emergence sets in and the System becomes a Meta-system. So, at the Hyper System level there is indecision as to whether we are looking at a System or a Meta-system. ~~Being~~ (crossed out) is the difference between Pure Being and Process Being. It is a *difference that makes a difference*⁷¹⁰ between the two⁷¹¹. The difference between the two kinds of Being must be

⁷⁰⁴ The meta-levels of Being are called a 'stairway to nowhere' because there are only a finite number of steps in Being and before phase transition to Existence, which is characterized as Emptiness or Void. These steps are called "Standings" in the author's terminology.

⁷⁰⁵ "Being crossed out" was a method Heidegger invented to talk about the odd nature of Hyper Being. At that point there was no name for Hyper Being as such, but later Derrida called it Differance. Note: "In Zutr Seinsfrage "Being" is literally crossed out and, as crossed out, becomes a new symbol, which represents for Heidegger the horizon in which man and things confront each other, a horizon that exists only in and through this confrontation." in Dreyfus, Hubert L. "Wild on Heidegger: Comments" The Journal of Philosophy, Vol. 60, No. 22, American Philosophical Association, Eastern Division, Sixtieth Annual Meeting, (Oct. 24, 1963), pp. 677-680

⁷⁰⁶ Wood, David and Bernasconi, Robert. Derrida and Différance (Evanston, IL: Northwestern University Press, 1988).

⁷⁰⁷ Sallis, John. Chorology on beginning in Plato's Timaeus (Bloomington: Indiana University Press, 1999).

⁷⁰⁸ Gallagher, Shaun. The Inordinance of Time. (Evanston, Ill: Northwestern University Press, 1998).

⁷⁰⁹ Mostowski, Andrzej Sentences Undecidable in Formalized Arithmetic: An Exposition of the Theory of Kurt Godel (Amsterdam: North-Holland Pub. Co., 1952); See also Wang, Hao. Reflections on Kurt Godel (Cambridge MA: MIT, 1987).

⁷¹⁰ Cf. Bateson, G. Steps to an Ecology of the Mind Op. cit.

⁷¹¹ Hernes, Tor. The Spatial Construction of Organization. Advances in Organization Studies, 12 (Amsterdam: J. Benjamins, 2004). P. 48; See also White, Daniel R., and Gert Hellerich. Labyrinths of the

another kind of Being. At the level of Process Being we introduce *probabilities*, but at the level of Hyper Being we introduce *possibilities* and we also consider the use of rough fuzzy⁷¹² quantities, as well as normal probabilities, or determinate quantities. At the level of Hyper Being we are dealing with traces, or hinges⁷¹³, rather than objects bound into systems. Therefore we will talk about *the footprint* of the Hyper System, and the *joints* between its elements rather than the objects themselves. In doing this we will begin to move closer to the Meta-system, which is *indicated rather than described*. The Hyper System is indicated by the footprint of its traces, so when it ceases to be emergent, it easily falls into the meta-system way of looking at things.

One way of thinking about the Hyper System/Meta-system is in terms of the design landscape. Here the Hyper System is one possibility cut out from the whole of the Meta-system in the design landscape. We trace out its possibility within a realm of myriad possibilities that are all unrealized. In that realm, each possible system is hinged to another possible system, and it only exists when inscribed in our written sketches, plans, and models.

At this point we can begin to discuss the Quadralectic of Design and Non-design. With Hyper Being comes possibility, and possibility creates the potential for design. But design must interact with non-design. Thus, the elements of our ‘Quadralectic of Design and Non-design’ are: concept, essence, perspective, and design. We hypothesize that each of these persists at the level of Hyper Being. This is why these elements are so difficult to pin down. We are saying that if a System is inscribed as a trace, or if it is conceived as a possibility for emergence (that emanates from out of the de-emergence of the Meta-system), then it must be conceptualized. Once conceptualization takes place it may then arise as a hyper essence⁷¹⁴, which is dependent upon generating the perspectives of the

Mind The Self in the Postmodern Age. SUNY Series in Postmodern Culture (Albany: State University of New York Press, 1998). p. 181.

⁷¹² Dubois, Didier; Prade, Henri. "Rough Fuzzy Sets and Fuzzy Rough Sets" International Journal of General Systems 17.2 (1990). 07 May.

⁷¹³ These terms ‘trace’ and ‘hinge’ were introduced by Derrida in Of Grammatology Op. cit. The stand for non-representational phenomena like discontinuities and memory traces that appear in Hyper Being.

⁷¹⁴ Hyper-essence is distinguished from normal essence, see below. For a theological precedent see Millsaps, Kevin T. The Development of Apophatic Theology from the Pre-Socratics to the Early Christian Fathers (U. Tennessee, MA Thesis History, 2006) Dis-ontology “The passage implies that the transcendent is a “non-entity” or “no-thing” above being. Here, God cannot be defined; he is above or even totally independent of being. As Philo Judaeus had earlier reasoned, no concept of God’s essence could be formed in the mind, for the concept of the essence of a “thing” is formed by its definition.⁴⁰ In his other writings, Pseudo-Dionysius makes the distinction between entity and non-entity, thing and “no-thing”, by placing the Greek preposition *hyper* (hyper, i.e. beyond or above) in front of all predicates concerning the transcendent. Yet, even this distinction ultimately fails because “hyper-being” or “hyper-essence” leads the mind to conceive of a thing or

emergent entity that yields the design. Design is the third meta-level of Sign⁷¹⁵. We posit that there is the *sign*, then the *ensign*, then the *design*, then the *resign*⁷¹⁶, and finally the *obsign*⁷¹⁷. A Sign is a presence that points toward an absence. An Ensign⁷¹⁸ is a signifying process. In the human terms of our physical world, the *ensign* bears the signs of his signaling equipment that he uses to make signs. The Design is the third meta-level of the sign. The Design is the sign of the inscribed trace of a possibility that comes out of the landscape of *possible* designs. The design is hinged to the other possible designs, so we can play them off each other and discover which is a Pareto Optima⁷¹⁹. At the level of Wild Being⁷²⁰ we must Resign, because at that level things take on a life of their own. At the level of Ultra Being⁷²¹ we have the Obsign, which takes on the properties of a seal in which the sign encompasses the mysterious and enigmatic qualities of the Singularity as an oracle⁷²². In Semiotic Investigations⁷²³ A.W. McHoul had the insight to say that Semiotics cannot exist on its own and must instead interact with the non-sign. Here, we will add that the concept of a sign can exist at the third meta-level of Being *as a design*. Because of this a design is an interconnected field and its proper nature can be taken to a higher meta-level. In its fluidity, it interacts with non-sign elements to form a Quadralectic. Each of those other fluid, non-sign elements are essential to understanding how a design works. *We must be able to conceptualize the emergent effects of what we want to build. We must be able to peer into the 'hyper-essence' that constrains the emergent attributes of the new thing. And we must be able to see it from multiple perspectives.* When we say 'hyper-

entity to which these adjective may be applied. Therefore, such labels only send one back to the conceptual prison from which apophatic discourse attempts to escape.” pp. 20-21, EDT-0320106-222512 at <http://etd-submit.etsu.edu/etd/theses/available/etd-0320106-222512/> accessed 080910 try also <http://gradworks.umi.com.ezlibproxy.unisa.edu.au/14/33/1433061.html> accessed 091106.

⁷¹⁵ Sebeok, Thomas A. Signs: An Introduction to Semiotics. Toronto studies in semiotics (Toronto: University of Toronto Press, 1994).

⁷¹⁶ “Resign” means ‘to take away’ in a double entry bookkeeping system by recording twice. But it also means to give up control, or one’s position. It is used here in a special sense indicating the out-of-hand mode of the sign.

⁷¹⁷ “obsign.” is a Seal. Webster's Revised Unabridged Dictionary. MICRA, Inc. 06 May. 2008.

Dictionary.com <http://dictionary.reference.com/browse/obsign> accessed 080910. It is used in a special sense here to indicate the Ultra Being (no-hand) mode of the sign as Singularity, which is sealed from our view.

⁷¹⁸ “Ensign” is one who makes signs, and is also a position of signal-man on a ship. Here it is used in a special sense as the ‘becoming nature’ of the sign in process.

⁷¹⁹ Fleischer, M. “The Measure of Pareto Optima Applications to Multi-objective Metaheuristics” in Evolutionary Multi-Criterion Optimization (Berlin; New York: Springer, 2003) Lecture Notes in Computer Science Volume 2632/2003

⁷²⁰ Op. cit. Merleau-Ponty, The Visible and Invisible. cf. The chiasm of reversibility of ‘Flesh.’

⁷²¹ Only described by the author. It is the Being of the Singularity of the externality of Being as seen from the outside as Existence.

⁷²² The Obsign is a seal over the inaccessible Singularity, just like there are seals on the tombs of Pharaohs and Emperors that are meant to guard them from being molested after death. The seal is the only sign of what is “always already” absent, it is a warning and an admonition not to enter.

⁷²³ McHoul, A. W., Semiotic Investigations: Towards an Effective Semiotics (Lincoln: University of Nebraska Press, c1996).

essence' we recognize that the nature of the essence at each of the levels of Being is different. This 'hyper-essence' is the Hyper Being, or the third meta-level, of the Type⁷²⁴. There is a Pure static Being of the Type. When we categorize this is at the Process Being level, where we discover a 'process-essence' that is the locus of the 'showing and hiding' of the categorized kinds of entities. Hyper-essence is different than the 'process-essence' of Husserl. Husserl's 'process-essence' is a *kind* of something, a 'whatness,' which exists as a category that is merely a constraint on attributes. *Hyper-essence* is the *internal coherence* of that *envelope of constraint*. This hyper-concept can visualize an internal coherence that is different from an idea, which is actually an abstract gloss or static Type. This hyper-concept is also an internal coherence of a semantic envelope that understands the hyper-essence of a thing, except for the fact that hyper-essence must be viewed from different hyper-perspectives. *The hyper-design is the view of the emergent artifact from all the various perspectives contained within the hyper-perspective.*

In our work on "Software Ontology"⁷²⁵, we have shown that there are four different views of a real-time software system, these are: function, agent, event, and data. These four perspectives are necessary for pinpointing the essence of the real-time system. But they cannot capture it all. That is because software is a cultural artifact that exists at the Hyper Being level. There is a *Singularity* at the heart of the real-time software system which, according to P. Naur⁷²⁶, cannot be known unless we talk to the designer. No amount of documentation can capture the hyper-essence of the real-time system. But, if we create a *hyper-perspective* on the real-time system and coordinate this with the *design perspectives*, then we can gain insight into the essence of whatever system we are attempting to design. We use minimal methods to conceptualize the system in its design. Minimal methods are the bridges between the essential viewpoints on the system. Yet, the design is actually *one* thing despite its multiple interrelated representations. That one thing is the hyper-design, which exists as something that surrounds the singularity at the center of the designed system and limits the aspects of the system that can be presented. It does not allow the system to be presented all at once. There must be a 'showing and hiding' of 'presences and absences' through which we attempt to grasp the system under design. We must jump between viewpoints to get at different parts of the design as we approximate the essence of

⁷²⁴ There is an evolution of Type itself, as we push it up through the Meta-levels of Being. Note the Theory of Logical Types of Russell. At the Hyper Being level Type becomes Essence. At the process level it is a *category*, and at the pure level it is a *type*. See Application of General Schemas Theory: Design Methods and Meta-methods at <http://holonomic.net> working papers by the author.

⁷²⁵ See "Wild Software Meta-Systems" at http://works.bepress.com/kent_palmer by the author.

⁷²⁶ Op. cit. Naur, P.

the emergent artifact. We use minimal methods as our means of conceptualizing the design, but that conceptualization does not actually capture the hyper-essence. We are always prevented from capturing this hyper-essence because we have to continually span multiple mutually exclusive perspectives in order to get a view of the whole system under design. Concept, essence, design, and perspective all work together to produce the Quadralectic of the design and non-design moments.

We cannot truly grasp the system under emergent design by merely applying the concept and the sign as F. de Saussure⁷²⁷ suggested. Even Peirce's semiology is not adequate⁷²⁸. Peirce adds the *object*, which is the essence, to the *interpretant*, which is the concept, to the *sign (representamen)*. He defines the *sign* as all three together. Yet, even this is still not enough to cover the entire phenomena of the sign. Instead, a *four* part semiotic system is needed, which considers the concept, the essence, the perspectives, and the design at the Hyper Being level. Multiple perspectives on the same object take us into the realm of *synergy*. This is the realm of the Quadralectic whose interplay gives rise to the potential of an Emergent Design.

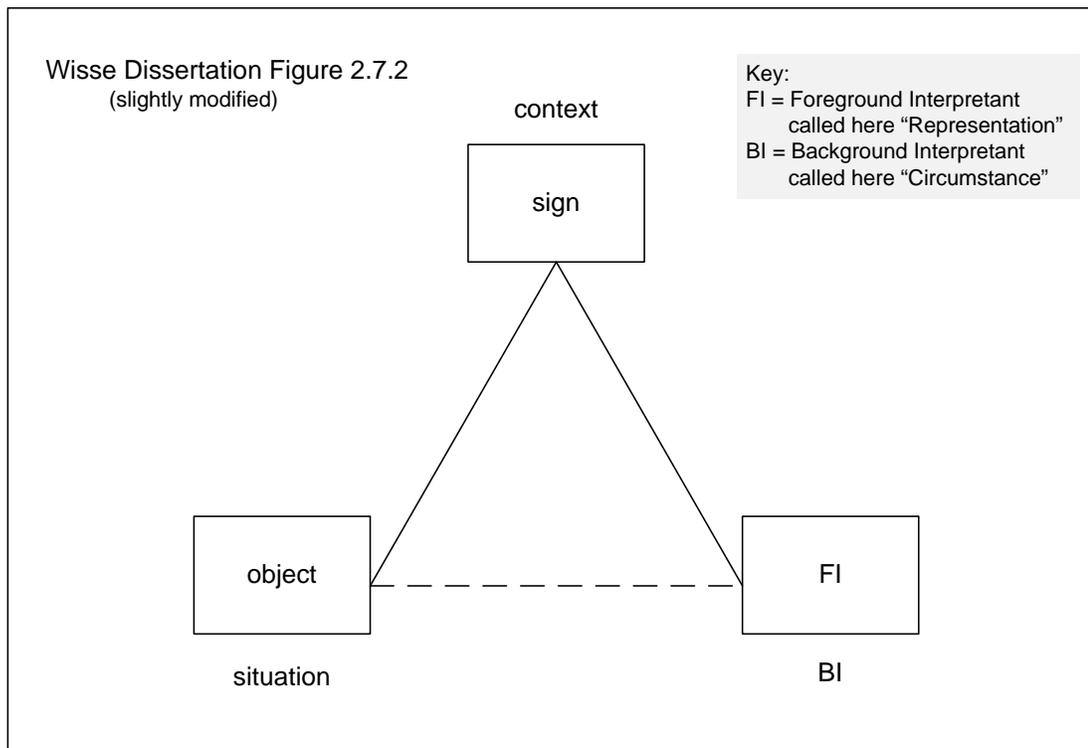
Wissian Ennead Defined

In this section we will consider the key points in the Dissertation of Pieter Wisse⁷²⁹ where he defines his concept of the Ennead. From our point of view, the work of Pieter Wisse is remarkable because at each stage of his argument he discusses the meta-system that surrounds the *moments* of his tri-alectic. The basic structure of his elaboration on Peirce's concept of the sign can be seen in diagram 2.7.2. It is important to note that he has added meta-systemic terms such as content, situation, and background to sign, object, and interpretant, which creates a 'meta-system-like' environment.

⁷²⁷ Op. cit. as Ferdinand de Saussure Writings in General Linguistics (Oxford; New York: Oxford University Press, 2006.).

⁷²⁸ Although Peirce added another element beyond the two of Saussure, he has still not approached the complexity of the minimal system specified by B. Fuller as being necessary for conceptual stability.

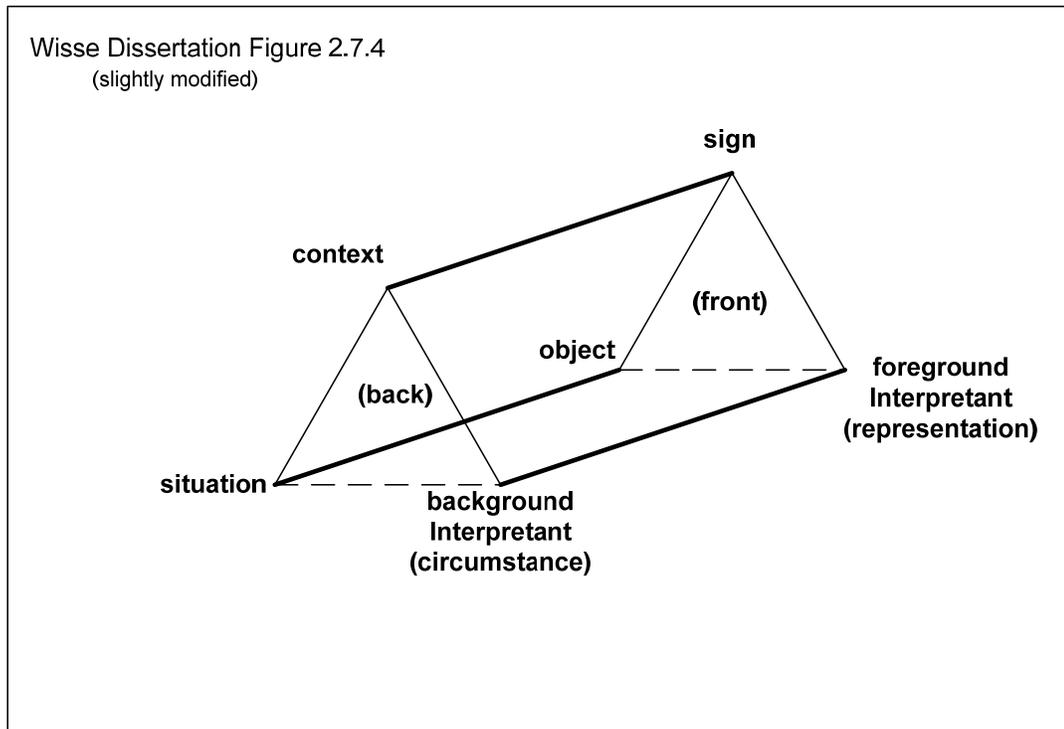
⁷²⁹ Wisse, Pieter homepage: <http://www.wisse.cc/> accessed 080910.



Wisse Dissertation Figure 2.7.2⁷³⁰

⁷³⁰ Wisse, Pieter. Semiosis & Sign Exchange Op. cit. Chapter 2, p. 74. Diagrams included in this section are from online version of Wisse's dissertation.

This is immediately expanded into the structure of a prism.



Wisse Dissertation Figure 2.7.4⁷³¹

Essence is revealed by the behavior of an object that appears in a certain situation. *Sign* is a *design* that appears in a *context*. A *foreground interpretation* is a representation of a concept that appears on a semantic background that we will define as a *circumstance*. But this does not take *perspective* into account. So, we will add a new *moment* to his prism to produce the Quadralectic.

⁷³¹ Ibid. Wisse, P., p 74.

A new perspective moment is added to the Wissian moments to produce an image of the Quadralectic:

representation⁷³² (concept, significance) **circumstance**⁷³³ <<Wissian Moment>>

object (essence, relevant signified) **situation** <<Wissian Moment>>

standpoint (perspective, recognition) **surroundings** <<NEW MOMENT>>

sign (design, signifier) **context** <<Wissian Moment>>

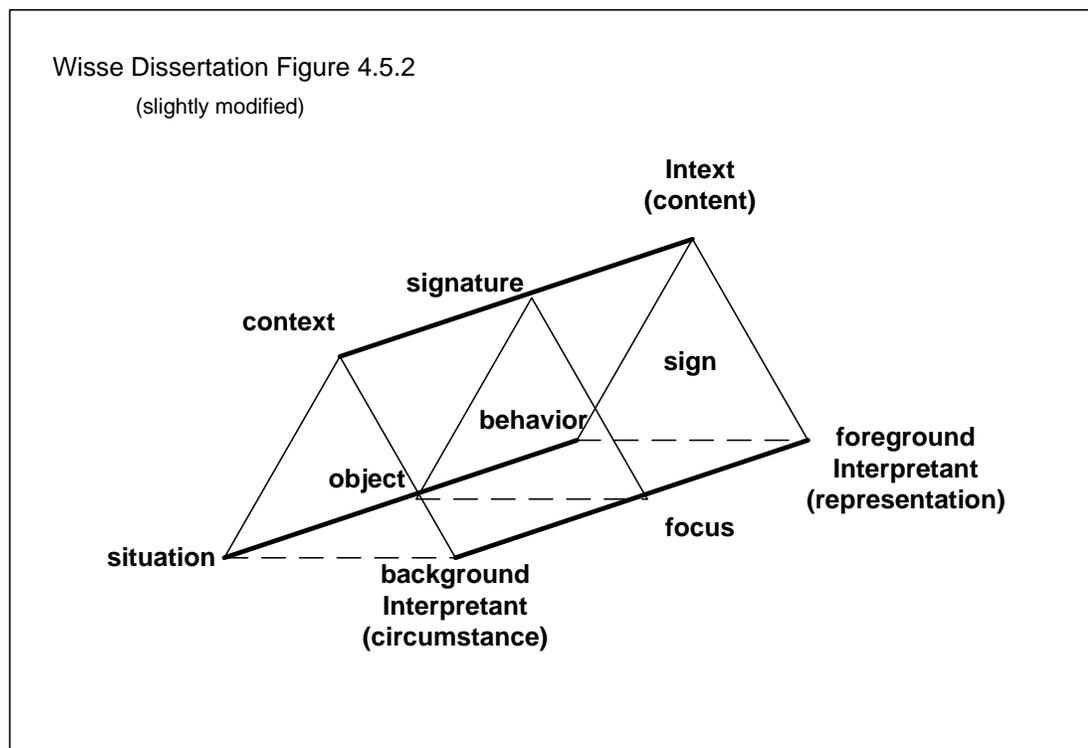
The novelty of Pieter Wisse's approach was to *mediate* the binary oppositions between the foreground and the background as gestalts on each of the three axes. This represents what he terms as the Ennead of Sign Engineering⁷³⁴, which is the basis of his Metapattern method⁷³⁵. This introduces a second order mediation into the first order mediation of Peirce's trichotomy of the sign.

⁷³² Foreground Interpretation (FI).

⁷³³ Background Interpretation (BI).

⁷³⁴ Defined in Wisse, Pieter. Semiosis & Sign Exchange Op. cit.

⁷³⁵ Wisse, Pieter. "Metapattern: Information Modeling As Enneadic Dynamics" (PrimaVera Working Paper 2001-04, July 2001).



Wisse Dissertation Figure 4.5.2⁷³⁶

A precursor of this mediation can also be seen in Hegel's Phenomenology of Spirit⁷³⁷ where *circumstance*, *means*, and *purpose* are distinguished when he refers to *work*. This formulation becomes the basis for the further distinction of consciousness, self-consciousness, and spirit. In each case the middle term is said to connect and sublimate the two other terms in the triad, and thus could be interpreted as a *trialectic*, which differs from a *dialectic*, which merely subsumes the *two parts* within *one whole*. Here, the third term also serves as a connection between the two terms that are sublated. However, Hegel does not specifically differentiate this usage from dialectics per se, he merely describes this different structure without labeling it. But he goes on to differentiate a fourth moment that he calls "work performed" or "realization" that clearly *is* a greater whole of which the three moments are parts. It is of interest to us that this structure is very similar to Wisse's *moments of second order mediation* in the Ennead. In other words, Hegel discusses how work, in general, has a structure that is *circular* based on a beginning, middle, and end, in which all three of the elements *assume each other*, such that you must have *all* of them in order to have *any* of them. His structure is such that the first and last moments are

⁷³⁶ Wisse, P. p. 146.

⁷³⁷ Hegel, G.W.F, The Phenomenology of the Mind (NY: Harper, 1967) pp. 419-431. Especially p. 423 and p. 426.

connected and subsumed by the middle term, which is the trialectical term in our terminology. This gives a whole that encompasses all the moments together as a 'realization', or *work*. Wisse does not mention Hegel, so we do not believe that he is aware of this precedent to his own formulation. One way of considering Wisse's work is to assume that he has connected the Peircian trichotomy of the Sign to the Hegelian concept of *work* as a trialectic. But neither Peirce nor Hegel had the idea of *second order mediation*, nor did Peirce or Hegel construct a model such as the Ennead with all its specificity, which Wisse posits as the basis of his Sign Engineering. It is interesting that Sign Engineering could be thought of as a combination of Peirce's trichotomous structure of the Sign and Hegel's Trialectical definition of *work*, and that this trialectic could then become a template for the relationship between consciousness, self-consciousness, and spirit. Hegel does not provide us with an image of Emergence in his Phenomenology of Spirit. *Work* never seems to produce the New, but only the *artificial*, which becomes a means of an embodiment of consciousness in the object so that consciousness can become aware of itself. Sign Engineering, on the other hand, is a condition for the production of emergent effects through the design of the *emergent new thing*. Hegel fashioned a teleology in which consciousness first becomes self-consciousness and then becomes spirit through stages. Along the way Hegel asserts that various degenerate forms of these moments must be worked through in a structural way, in which all their permutations are produced and then cancel with each other before we become aware of the flaws in a particular degenerate mode of consciousness, self-consciousness, or spirit. Thus, in history, as new forms of consciousness are produced, it is actually a way of working through the degenerate forms of consciousness until the perfection of self-consciousness, and then spirit, is revealed within history. The view presented here is Kuhnian⁷³⁸, which presents historical development as discontinuous and dependent upon the production of Emergent Events such as paradigm shifts, which are not teleological but reveal a deeper view of phenomena through the understanding of anomalies in new theories. In such a view Emergent Events are the key points of the transformation of history, and Sign Engineering plays a key role in this with respect to the technological infrastructure *because it represents the emergent system prior to its embodiment*. For Hegel, the Sign is the body itself. It is not as Peirce thought. Peirce saw the Sign as an externalization of mediation between *inside and outside*, and/or between *subject and object*. For Hegel these mediations are *always internal*. Hegel talks about this third mediating term as the *Minister*, a third role

⁷³⁸ Kuhn, Thomas S. The Structure of Scientific Revolutions. (Chicago: University of Chicago Press, 1970).

between master and slave. In Peirce and Wisse, the sign representational system is decentered *outside* the subject as something different from the object⁷³⁹. It is almost as if Hegel's system is turned inside out! But in that transformation, *work* gives rise to what is *emergent* rather than a merely artificial representation of Consciousness to Itself. Instead, Consciousness in Sign Engineering transforms itself by transforming the world at which point it can represent emergent objects, and bring them into embodiment through the production process. Thus, it transforms itself in an open ended and emergent way by opening up new possibilities for things, which, in turn, creates new possibilities for consciousness, self-consciousness, other-consciousness, and spirit (as intersubjectivity). This is in contrast to the closed teleology that Hegel sees in history. Thus, Hegel offers an interesting counterpoint to the development of Wisse's second order mediation as 'a suppressed precursor'. Hegel *also* offers a theory of trialectics as well as dialectics but this is a resource that Wisse does not use. Wisse was not aware that it was possible to connect the Sign trichotomy of Peirce with the definition of *Work* in Hegel, but his contribution is still of great importance because neither of them had the idea of *second order mediation*, which leads to an understanding of *higher orders of mediation* that was not foreseen by either Peirce or Hegel, although Plato alluded to this concept in his construction of the WorldSoul.

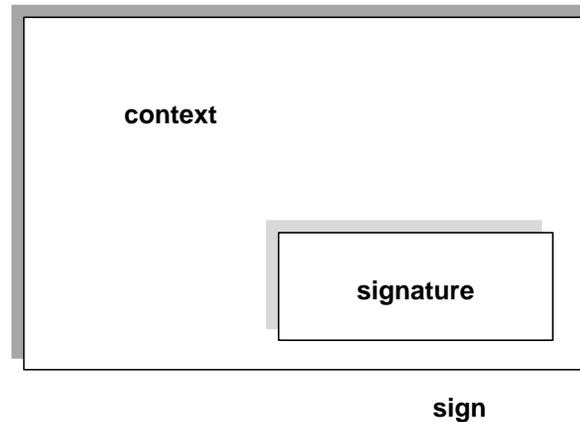
In the Ennead, Wisse defines the very specific structure of the interaction of the three moments of second order mediation, and it is fitting that we dwell on that formulation and its specifics in order to lay the groundwork for our own extension of his work. Therefore, we have taken some quotes from the dissertation of Pieter Wisse⁷⁴⁰ to show how he defines and uses the following terms: behavior, signature, intext, focus, and point of view.

⁷³⁹ Peirce gives the example of a weather vane as the example of the Sign function.

⁷⁴⁰ Wisse, Pieter. Semiosis & Sign Exchange: Design for a Subjective Situationism, including Conceptual Grounds of Business Information Modeling (Voorburg: Information Dynamics; Amsterdam: Universiteit van Amsterdam, 2002) http://www.informationdynamics.nl/pwisse/pdf/semiosis_signexchange.pdf accessed 091106

Wisse Dissertation Figure 4.1.2

(slightly modified)



In Wisse Dissertation Figure 4.1.2⁷⁴¹, it is shown how a sign consists of a signature in a context. Wisse makes the signature an index within the content, which he calls the *intext*. Signature in general, means a selection from a set of variables that are specific values that render a *particular* or an *instance* unique. It is the signature that makes something unique, such as the artist's signature on his painting. In our culture we use the signature as a sign of individual creativity, and it is a basis for establishing an identity for economic transactions. We can think of the *intext* as the *content* that is written by an agent in a certain *context* and then signed in such a way that it establishes uniqueness. Wisse's concern with establishing the identity and uniqueness of a particular agent in a given role is an important concept that he develops as a basis for his Metapattern method.

The following is a quote that introduces Wisse's concept of signature:

"Behavior is the joint result of object and situation. So, particular behavior is their relationship. Practically she has to start her model somewhere. It is by assuming greater importance for situation. Within this assumption, it is reasonable to speak of situation governing behavior."⁷⁴²

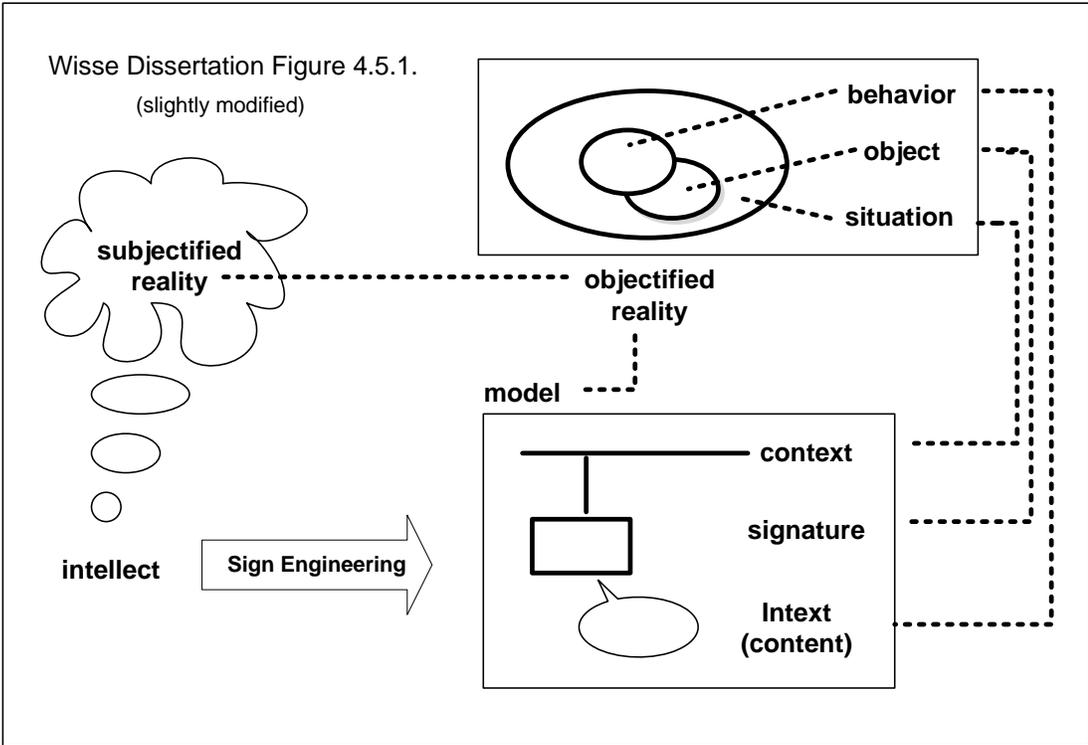
⁷⁴¹ Op. cit. Wisse, P. 2002 p. 130.

⁷⁴² Op. cit. Wisse, P. 2002 p. 139.

The situation governs behavior and defines the object. This sounds similar to W. Coutu’s TINSIT⁷⁴³, (tendency-in-a-situation), as the motive for behavior. The situation sets up a field in which behavior manifests and then tells us something about the objects toward which the behavior is directed.

“As Figure 4.5.1 indicates, the model-as-sign is a variable configuration, not of two, but of three concepts: context, signature, and intext.”⁷⁴⁴

We will interpret the “intext” neologism of Wisse as meaning ‘content’ in all cases.



Wisse Dissertation Figure 4.5.1.⁷⁴⁵

“Here, the engineer poses as the intellect with its subjective reality, creates a model of the objectified reality through Sign Engineering. The model has context, signature, and content (intext). Context corresponds to Situation. Behavior corresponds to content (intext) within the model. And it is the signature that brings together the context and content (intext) which corresponds to the object.”

“A signature itself does not carry information except for leading to an intext as a particular context directs, vice versa. This way, it stands for an object where it exhibits behavior in a situation. Figure 4.5.3 shows the model accordingly expanded.”⁷⁴⁶

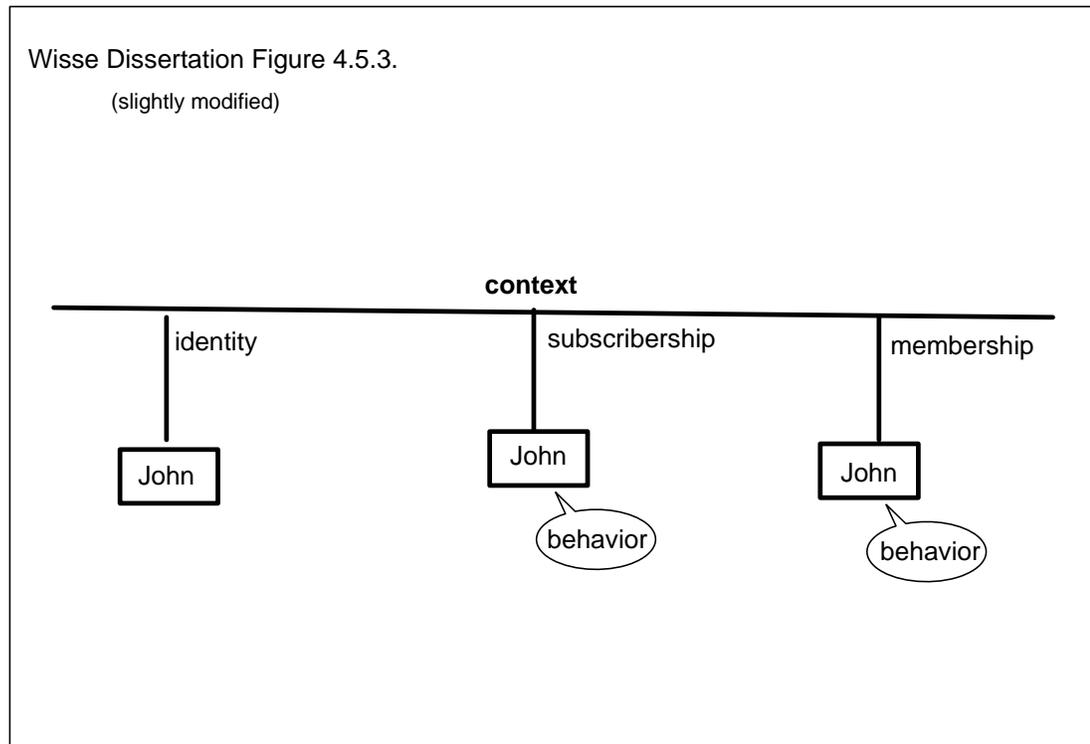
⁷⁴³ Coutu, Walter. Emergent Human Nature: A Symbolic Field Interpretation (Charlottesville, VA: Teleprint Pub, 1985).

⁷⁴⁴ Op. cit. Wisse, P. 2002 p. 146.

⁷⁴⁵ Op. cit. Wisse, P. 2002 p. 146.

⁷⁴⁶ Op. cit. Wisse, P. 2002 pp. 147-148 Content for intext is my modification of the quote.

What is being built here is an *isomorphism* between the model and the object's behavior in a situation. The *signature* names the object, which has a *context* within the model. The *name* relates to the *content* of that *object* within the model, which is called the *intext*. The *intext* is a description of the *behavior of the object* "in text". Signature is designated and identifies Name. It can also be the specific values of the variables of the attributes of the individual that identify it with a Name.



Wisse Dissertation Figure 4.5.3.⁷⁴⁷

A separate identity context.

This is a Metapattern model, which shows John acting in different roles in different situations. In each instance, John's name is shown in a different context in the model. The continuum of contexts is signified by the horizontal line. Each vertical line establishes a new context, which is identified by the role that John takes on in that context. With each different role, there is a different behavior for John. Wisse's key realization is as follows: As we model things, the different situations establish different modeling contexts, and the model should be driven by the relationship of the situation to the context as the means of

⁷⁴⁷ Op. cit. Wisse, P. 2002 p. 147.

establishing differences in the behavior of objects the (or agents), which will act differently in different situations. This is a simplifying assumption that goes against standard Object Oriented methods, which use categories to drive inheritance. *Wisse suggests instead, that we should utilize the differences in behavior that are based on the situations in which the objects exist as the way to drive inheritance, and in that way, our models will stay closely connected to the reality they are trying to model.* Sometimes our category schemas for inheritance do not fit with the situations that exist in the world, which can cause incongruencies in our models and affect our understanding of reality.

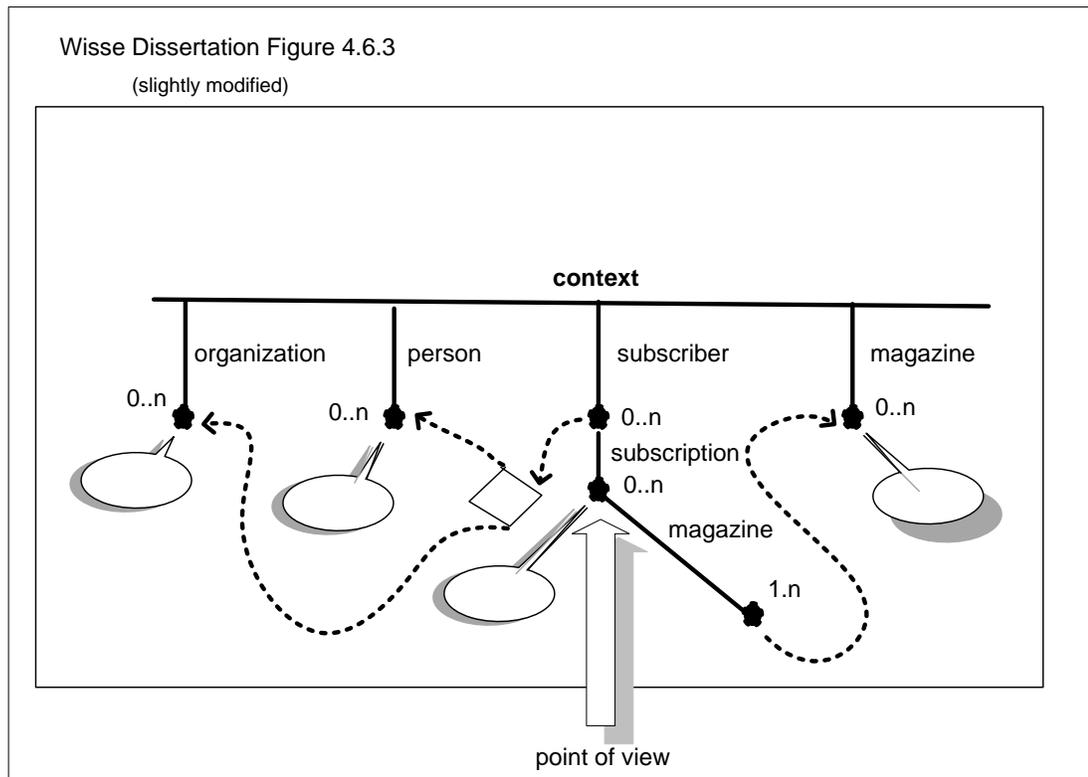
“Literally through the concept of signature, context and intext become concepts that are (more) independent from each other. For how instances of context relate to instances of intext can always change around signatures. This explains the modeling power of the Metapattern (Wisse, 2001).”

Wisse makes the point that if we allow *situations* to drive the object creation of our models, rather than our category schemas that are expressed in the inheritance hierarchies of our objects, then the objects in our models will become more independent of each other and are less likely come into conflict. This is because objects may display different behaviors in widely diverse environments even though we ideally think of an object as a self-identical entity. We project *illusory continuities of identity* that conflict with the *situation specific behaviors of objects*. It is better to recognize an object based on its behavior in a given situation, and to consider other types of projected identity as illusory because they cannot truly maintain a continuous identity across situations of different types.

“It is precisely a signature that supports a focus. The experience of a signature or a point of view is a focus, even. Starting from a particular signature, its context is the specification of the situation. Its intext is all that specifies behavior of the situational object. Every change of point of view/signature changes the context and the intext, too. The Metapattern thus supports a large variety of sign use with compact models.”

Signature is given as an ‘index’ to an ‘object of focus’ from a ‘point of view.’ You can easily change from one point of view to another by shifting the focus to another signature. It is clear here that Wisse has a concept of *point of view* even though he does not explicitly introduce it as another moment into his Enneadic model. We have explicitly introduced another moment related to the point of view, which is mediated by an image between its standpoint and surroundings. The key thing here is that the heart of the model is the isomorphism between the mediations. The object is represented in the model by a signature. The signature becomes the focus of the modeler from a particular point of view. From that point of view the modeler obtains a particular image of the object within the

model. So, implicitly woven into Wisse's presentation of his Metapattern method, is the idea that there is *a point of view that is actually a separate moment*.

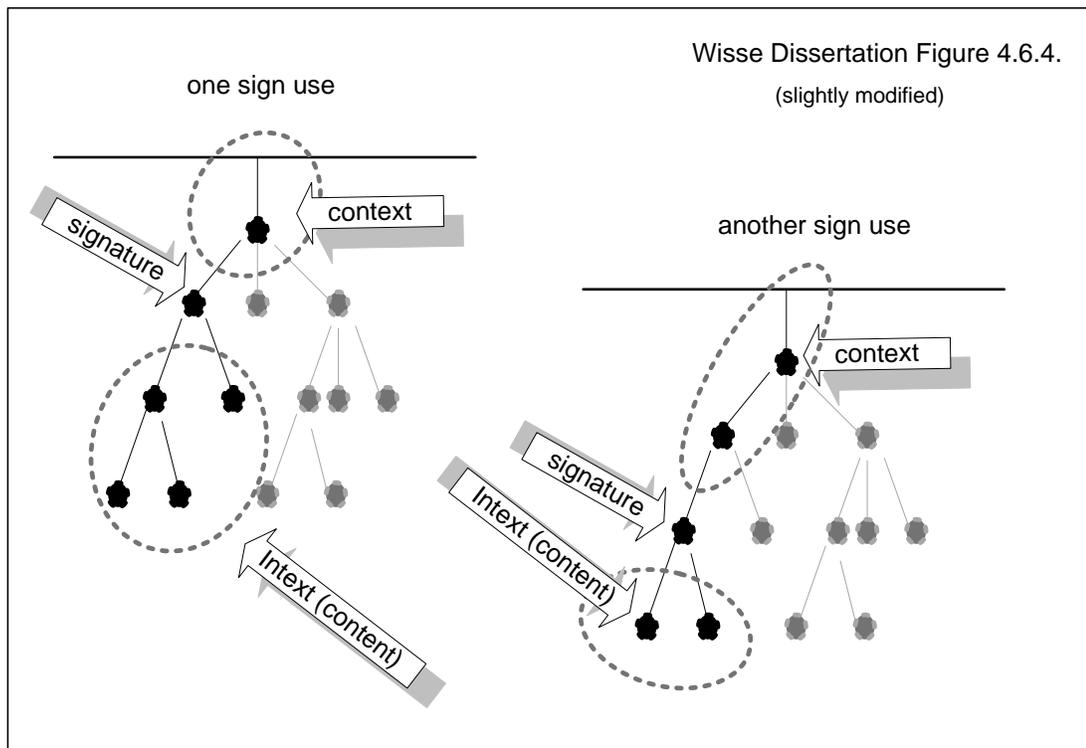


Wisse Dissertation Figure 4.6.3.⁷⁴⁸

A Metapattern-based model invites the sign user to choose focus.

The Metapattern method can be seen as a scaffolding or supporting framework for changing focuses on different signatures for different objects as seen from different perspectives in the modeling process.

⁷⁴⁸ Op. cit. Wisse, P. 2002 p. 152.



Wisse Dissertation Figure 4.6.4. Support of different interpretations (also read: sign uses).

Wisse's model incorporates the idea that different modelers may have different interpretations based on their points of view. Thus, different modelers use signs in very different ways and interpret them differently from each other. Each modeler has a different circumstance within which he represents his models. These representations are the foreground interpretants that relate to given background interpretants that the modeler brings with him to the work of his own modeling, or of his interpretation of someone else's model. We give more emphasis to the representations of the modelers (what is going on in their minds) which, for the most part, are self-talk and images that relate to the model that they are attempting to understand. So, we will name these *foreground and background interpretants* as *representations and circumstances*. Once we know they are representations, then it is clear that concepts *do* escape them. And we can see that each moment of the Ennead is 'escaped' in a different way. So, for instance, the perspective escapes the stance in the surroundings. The design escapes the content of the model within the context. The essence escapes the object in its situation. This escaping occurs at the limit of the infinite horizon of each of these moments of the Ennead. They are *lacks* that are balanced by *excesses*. Thus, just as the *vanishing point* escapes the surroundings of an image from a *standpoint*, so too the *goal* escapes the behavior of the object in the *situation*, and the *sense* escapes the *representation*, which is a focus in the *circumstance*. Similarly,

the *pragmata* escape the *content* marked by the *signature in the context*. In each case there is a balance between the *lack* and *excess* across the *second-order mediation* that Wisse takes to be the *core* of Sign Engineering.

Notice that the purpose of the second-order mediation is to produce an overlap or isomorphism between the various second-order mediations: Focus, Object, and Signature. The Signature allows us to Focus on the Object within the model. This overlap, or isomorphism, allows the model to map the territory more perfectly. But there are elements that the model and the territory cannot capture. They are ‘escaped’ in two directions: toward the *traces* as *lacks* and toward the *excesses* as *super-abundances*. Our characterizations of the moments of the Ennead, and the additional moment of perspective in the Quadralectic, allow us to address what escapes the isomorphism of the model to the territory, i.e., the real world system or meta-system being modeled, with regard to the representations of the modeler in the process of Sign Engineering.

Wissian Categories Expanded

What follows is Pieter Wisse’s justification for the mapping of his Ennead into the categories of Peirce. We will see that Pieter Wisse creates his own categories when he misunderstands those of Peirce. Yet, in spite of this, his misunderstanding is inconsequential for our own purposes because they are different from those of Peirce and they do afford us some insight that is useful for building a model of the moments of the Quadralectic.

Footnote 3: “See the essay *The Principles of Phenomenology* (1880-1910) as compiled, and included in, the collection *Philosophical Writings of Peirce* (1955, pp 74-97) by J. Buchler. I believe my ennead (see § 4.5) takes me in a different direction than Peirce. Or, rather, it lets me continue from a different perspective. The fundamental difference is that of Peirce’s realism whereas I favor transcendental idealism (see also Chapter 6).”

“Let me engage in some speculation, at least equaling the obscurity of Peirce’s notions which has been a source of bewilderment with many commentators (see for example Goudge, 1950). Given his numbered classification scheme, I naturally place first-order concepts inside the objectified reality as constructed, or whatever, by the individual’s intellect. Then my second-order classification can more closely resemble Peirce’s original interpretation. With my first- and second-order application, nine combinations result. I suppose that in such an extended and transposed Peircean universe, from realism to transcendental idealism, first-firstness is constituted by pure **focus [1.1]**. And **[1.2] first-secondness is the relationship, through that particular focus, of a foreground interpretant with its corresponding background interpretant**. It becomes even more complex with first-thirdness. It follows from my scheme that it is **[1.3] the set of interpretants mediated by all directly related foci**. Again, all this pertains to the objectified reality of an individual. As a model, it suggests a reality that is organized as **[2.1] second-firstness (pure object)**, **[2.2] second-secondness (specific behavior of situational object)**, and **[2.3] second-thirdness (an overall object’s integrated behavior in all relevant situations)**. The sign, mediating between firstness and secondness,

encompasses **[3.1] third-firstness (signature)**, **[3.2] third-secondness (signed intext in context)**, and **[3.1] third-thirdness (all configurations of intext-context that are derived from the same identifying signature)**.

“There certainly is some system in this mapping from Peirce’s metaphysical categories onto my semiotic ennead. I doubt its usefulness, however. And frankly speaking, I might be far off with my application of his numbers. In general, that metaphysical strain of Peirce does not contribute to my argument. Vitally important, though, is the triadic character of semiosis, and his embryonic suggestion of ground. Those concepts have inspired the development of the enneadic model of semiosis, outlined later in this chapter.”⁷⁴⁹ [outline numbers added]

If we follow Wisse’s appeal to the Peircian Categories, we see that he attempts to counterpoise them (as Peirce himself does) in order to derive the Ennead. Wisse’s application of Peirce’s System to the Ennead has some strengths and some weaknesses, but we will capitalize on the possibilities that his interpretations afford us and we will proceed to transform it to facilitate our purposes. We will then use the Ennead as the basis of the Quadralectic. This will entail some deconstruction and analysis of Wisse’s concepts while preserving his essential insights.

Even though Wisse’s use of the Peirce categories is flawed, we can still use his terms and structure to show how it is possible to derive the Quadralectic by the same method. We will begin with a broader range of the Trans-Peircean categories. Because of that resource we can produce the following derivation of the Quadralectic in a Wissian manner. Wisse interprets 1.1 (first-firstness) as FOCUS. Then he goes on to interpret 1.2 (first-secondness) as the relationship between the fore and background interpretants. At this point we will add to Wisse’s nomenclature and refer to the elements of this relationship as the *representation* and the *circumstance*. Thus, the relationship between a representation and its circumstance is first-secondness. Thus far, Wisse’s usage is obscure and is not true to Peirce, for whom the first is an *isolata*. Therefore, the first-first must be a solitary *isolata*, but Wisse is interpreting that as the ‘process of isolating.’ In the Wissian scheme, the mediator becomes the first and that is not true to Peirce. However, we will continue to define the Wissian categories, which are oriented toward consciousness and the operations of consciousness in the design process. In that sense Wisse is saying that what comes first is the ability to *focus*. Once we focus, then that sets up a relationship between what we are focusing on and its circumstances and everything else that relates to it. Wisse also makes a

⁷⁴⁹ Op. cit. Wisse, P. 2002 pp. 126-127. In the final paragraph of the quote Wisse refers to "ground" as being an idea that Peirce already had, which Wisse has elaborated on in the development of the Ennead. I. Mladenov has confirmed that Peirce had previously begun developing the idea of "ground", which is actually the same as Wisse's concept of adding context to the sign definition. The difference is that Wisse adds a different ground to each of the three elements of the sign. Peirce abandoned this idea of a "ground" for the sign in his later writings. See Mladenov, Ivan. Conceptualizing Metaphors: On Charles Peirce's Marginalia. Routledge Studies in Linguistics, 4. (London: Routledge, 2006).

mistake by positing that the third is all the instances of our focusing on representations within circumstances. The third actually means *continuity*, but Wisse interprets thirdness as totality. With respect to the totality of focus on representations in circumstances, we previously referred to this as the proto-gestalt. It is a perceptual way of looking at the Meta-system. It is the actual dynamic between the total circumstance and all of the focuses on the representations through which we understand a concept that makes sense. He is saying that the 1.3 (first third) is the proto-gestalt, which we will term as the *perceptual aspect of the meta-system* because it is different than the circumstances themselves.

Now let us use the Trans-Peircean categories discussed earlier to define the Concept and the Sense. The Concept is what escapes the representations, as well as the cognitive kernel that they indicate. On the other hand, Sense overflows from the representations as a projection. The concept is *less* than a representation, which is a system, i.e., a whole greater than the sum of its parts. Sense is *more* than the meta-system, i.e., a whole less than the sum of its parts. We assume, by following Special Systems Theory, that the focus is meant to indicate the ‘whole equal to the sum of its parts.’ Therefore, let us define the Concept as the Hyper Being Trace, which is 1.0 (first-zeroth). And let us define the Sense as the Projection that overflows beyond the meta-system as 1.4 (first-fourth).

- 1.0 first-zeroth: Concept trace**
- 1.1 first-first: FOCUS mediation**
- 1.2 first-second: representation = circumstance**
- 1.3. first-third: proto-gestalt of all representation as totality in their circumstance**
- 1.4 first-fourth: Sense projection as synergy of representations.**

Once we have worked out this scheme and made the modifications to the meaning of the Wissan categories as they are related to the Peircean philosophical categories, then we can proceed to define the other Quadralectic moments.

- 2.0 second-zeroth: Essence trace**
- 2.1 second -first: OBJECT mediation**
- 2.2 second-second: behavior = situation**
- 2.3. second-third: proto-flow of all behaviors as totality in their situation**
- 2.4 first-fourth: Goal projection as synergy of behavior.**

Notice that trace is the zeroth type related to the category. This explains why it is a trace and why there is really ‘nothing to it’ in each case. Because there is nothing to any of the zeroth types, they can, at the same time, impinge upon each other and offer insight without

interference. Wisse, following Peirce, goes from Subject to Object. Subject is seen as an agent with intention, awareness, and focus, that takes us to the dual in the subject/object duality, which is the object that is being represented in our interpretation. The object is known by its behavioral relationships in various situations. The totality of all the object's behaviors in all the situations is the proto-flow, the opposite of the proto-gestalt. This overflows into the behavioral target, which is a projection of goals. We must project goals in order to root out the essences of objects. The *essence* is the zeroth type *associated* with the Second and although Wisse says that this *is* a Second, it is contrary to the usage of Peirce. *Signs* are really the seconds. What Wisse means is that this is the second *moment* in his dialectic, which starts with the *inward* and the *subjective* because he is a transcendental subjectivist, who moves toward objectification. Berger and Luckmann⁷⁵⁰ proposed a similar scheme comprised of externalization, objectification, and internalization. We take our representations and we externalize them, they become objectified beyond us in the social sphere, and then we internalize these transformed representations, not the objectified representations. So we can see that the Wissian categories lean toward a similar type of Social Constructivist⁷⁵¹ dialectic as we move from the subjective to the objective via the sign, and then back toward an internalization with transformed meaning⁷⁵².

3.0 third-zeroth: Design trace

3.1 third -first: SIGNATURE mediation

3.2 third -second: Content (intext) = Context

3.3. third -third: proto-gestalt of all content as totality in their context

3.4 third-fourth: Pragmata projection at Pragmatic Target as synergy of content.

Wissian categories follow the idea of Berger and Luckmann in that the third step is an internalization of what was externalized and then objectified. We do this through signs, which are the signs to ourselves and others. There is no thirdness here in the Peircian sense. Thirdness is *continuity*. According to Wisse, this is the third *moment* of his dialectic, which will produce a mediation between the subject and object through signs. He says that the signature, i.e., the name, is the third-first. This would be completely wrong from a Peircian perspective. But if we accept it momentarily, then we can see that what he is actually saying is that the *identity of the object is the key*, and that it is held by the *signature*. The signature is a point of mediation that arises from the *dynamic* between

⁷⁵⁰ Berger, Peter & Luckmann, Thomas, The Social Construction of Reality (New York: Anchor Books, 1967).

⁷⁵¹ See Gergen, Kenneth J., and Mary M. Gergen. Social Construction: A Reader. (London: SAGE, 2003).

⁷⁵² This is ironic, because Wisse ostensibly follows Schopenhauer.

content and *context*. He calls content the *intext*. It is a text marked by the signature and delimited in relation to the context. Our point is, if we accept these Wissian categories, then we can see that there is a totality of all signatures related to an individual object that gives its identity across contexts and then defines its overlapping contents. And, given that there are different contexts, a Venn Diagram could be used to illustrate this point very well. The third, for Wisse, is the totality of all the signatures through which he tracks identity across contexts, but we can see that the *zeroth element is the design*. The *design* is the *third meta-level of the sign* that captures the signature within the meta-system of the design landscape. In other words, we want to create things that will be able to function in multiple contexts in the situation where there is always a structurally changing flow of content⁷⁵³. *The design is what will articulate the sameness across contexts while holding contents*. The third-fourth is the projection of the pragmata, or the pragmatic considerations (or pragmatic conditions) that will allow the design to have integrity, given the flux of content and context for the schematized object. The meta-signature of the craftsman, or artist, is his style, his subject matter, his technique, and/or his approach to his art. *Design is that meta-signature*. You cannot put your finger on what it is but it is very definite in its expression of the *coherence* of the art of the craftsman, or artist. Some craftsmen, or artists, of course, change their style, their technique, their subject matter, or their approach. But when they do that, they are trying to change their identity and assume a meta-identity⁷⁵⁴. Our point is that Sign Engineering uses signs to capture the necessary architecture that will produce a given set of emergent characteristics when they are embodied. Those signs are produced by the ensign, which is the ‘sign making’ process at the second meta-level. At the third meta-level, the sign enters the realm of possibilities, and as a design, *it signifies* a point in a multi-dimensional design landscape. The signature of the identity of the designed component of the system is a point in multi-dimensional space that has a specific name that marks its identity. The design is a third-zeroth, i.e., there is nothing to it but a trace. And that trace is balanced by the overflowing projection of pragmata, which are the pragmatic practices that create an environment that allows the design to be embodied in its specific architecture, which represents that point in the landscape of all possible designs.

If we are going to produce the design as an *externalization* that has been objectified for *re-internalization*, then the signs need to be materially represented. They must act as a prototype for the system to be designed. The challenge for design is to take that model, or

⁷⁵³ Monod, Jacques. Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology. (New York: Knopf, 1971).

⁷⁵⁴ Cf. Picasso, who changed his style frequently.

prototype, and move it into a realm where the pragmata can be developed so that the design will be visualized and eventually produced in an embodied form. Sign Engineering goes through this cycle of externalization, objectification, and internalization over and over until these conditions are met for actualized embodiment. The design continues to change as we attempt to find the *right balance* of the pragmata so that the artifact will work and perform with the envisioned emergent characteristics.

4.0 fourth-zeroth: Perspective trace

4.1 fourth-first: IMAGE mediation

4.2 fourth-second: stance= surrounding horizon

4.3. fourth-third: proto-flow of all stances as totality in their surroundings

4.4 fourth-fourth: Intentional Target (Vanishing Point) projection as synergy of stances

At this point we will use the Wissian categories to move beyond the Ennead. We posit a fourth category based on synergy that goes beyond the third moment in the dialectic. Yet, here we notice there is a ‘drawing back’ or contraction from the projection of the signs. In the midst of this contraction we find a framework of perspectives in which our ‘sign views’ of the design must be seen. This is the fourth-first category and will be referred to as the Image. It mediates between the ‘nowhere of the transcendental subject’ and the ‘nowhere of the transcendental object.’ Thus, we may establish a *stance* that allows us to have a perspective on the artifact under design within its surroundings, and from that stance, we can visualize an image of it. The collection of all the stances is the proto-flow of the images. The fourth-zeroth is the perspective and the projection is the vanishing point or the intentional target. Perspectives on things are not simply views from positions in space, because we know that there are *many* perspectives on things, which are based on facts, theories, paradigms, epistemes, ontos, existences, and absolutes that we designate as real, or true, or identical, or present. Thus, when we view an artifact, such as a painting, we view it from an actual stance (or place) in the landscape as we observe and experience the perspectives and vanishing points of the artifact. An example such as this serves as a framework through which we can understand other types of more esoteric technical perspectives that are necessary in building systems, particularly those which we refer to as the ‘specialties’ or by the term ‘aspect oriented design.’

It is significant to note that because the concept, essence, perspective, and design are Hyper Being entities that have a zeroth type, they can all be focused on the same thing without *interfering* with each other and this allows the design group to share their insight

into the design that is under construction. Although the Quadralectic is a cycle, we may observe that the experienced practitioner will visualize this design cycle in his mind, as if all the *moments* are focused on the same foci at the same time to produce the design insight. All the projections overlap and this produces sense targets, goal targets, intentional targets, and pragmatic targets that can be coordinated to produce an integrated projection, which we will define as *intentionality within the field of awareness*. In this structure both noesis and noema are interfolded to support the intentionality that gives our awareness a fusion of situations, circumstances, contexts, and surroundings. The perspectival moment of the Ennead gives us some distance from our design project and this is the hallmark of Sign Engineering.

This interpretation misconstrues the Peircian Categories, but once we tentatively accept the Wissian interpretation of Peirce and build upon it, then we can use our expanded set of trans-Peircean categories to precisely explain the structure of the moments of the Quadralectic. If we were to completely accept his interpretation we would have to explain why this development does not follow the lifecycle of the Quadralectic, but instead creates a contracted structure of three moments rather than four in order to be able to produce that lifecycle. In other words, the *fourth* Wissian category is the *third* moment in the Quadralectic and the *third* Wissian category is the *fourth* moment in the Quadralectic. This is the type of problem that arises with purely conceptual theories that do not take their guiding thread from the Nomos, which can sometimes force us to think in counter intuitive ways that pure ideas can never approximate. Yet, what is useful about this development is that it clearly defines a relationship between the elements in the moments of the Quadralectic in terms of the trans-Peircean categories as they are interpreted by Pieter Wisse. This allows us to have a level of precision that would be missing otherwise.

Wisse has used Peirce's philosophy in a pragmatic way to provide a philosophical ground for his method. In the process, he has defined Sign Engineering, which we seek to elaborate on by adding a further 'non-sign moment' to it. In the process, Wisse transformed the categories from Peirce's original concept, but on the other hand, we can see that this is an exercise in *Metis*. In other words, what Wisse does to Peirce's theory is to use it pragmatically to undergird his Metapattern method. He explicitly says he does not care if he is untrue to Peirce as long as he accomplishes his end. In the process he has some very interesting ideas about the foundations of the methods we are trying to build upon. So, although we do not agree with his distortion of Peirce's categories, we do salute him for his creativity, ingenuity, and cunning, which is, in fact, the essence of practical reason that

should always be exercised in design. Wisse is looking at the Philosophy of Peirce and his Semiotics with a designer's eye as he attempts to envision a pragmatic basis for his Metapattern method. What he produces has some very interesting features, which we will continue to discover as we look at his foundations for design with a designer's eye, and take liberties to transform and elaborate on them further. However, as much as we can, we will adhere to the original meaning of Peirce's categories and will avoid adopting the Wissan categories completely.

Quadralectic Moments Defined

We will transform the Wisse Ennead as follows:

TEMPLATE FOR MOMENTS:
 zeroth: System: FIRST Meta-system: **fourth**
The third is the full set of systems within the Meta-system seen as proto-gestalt or proto-flow.
 trace: System: MEDIATION: Meta-system: **projection**

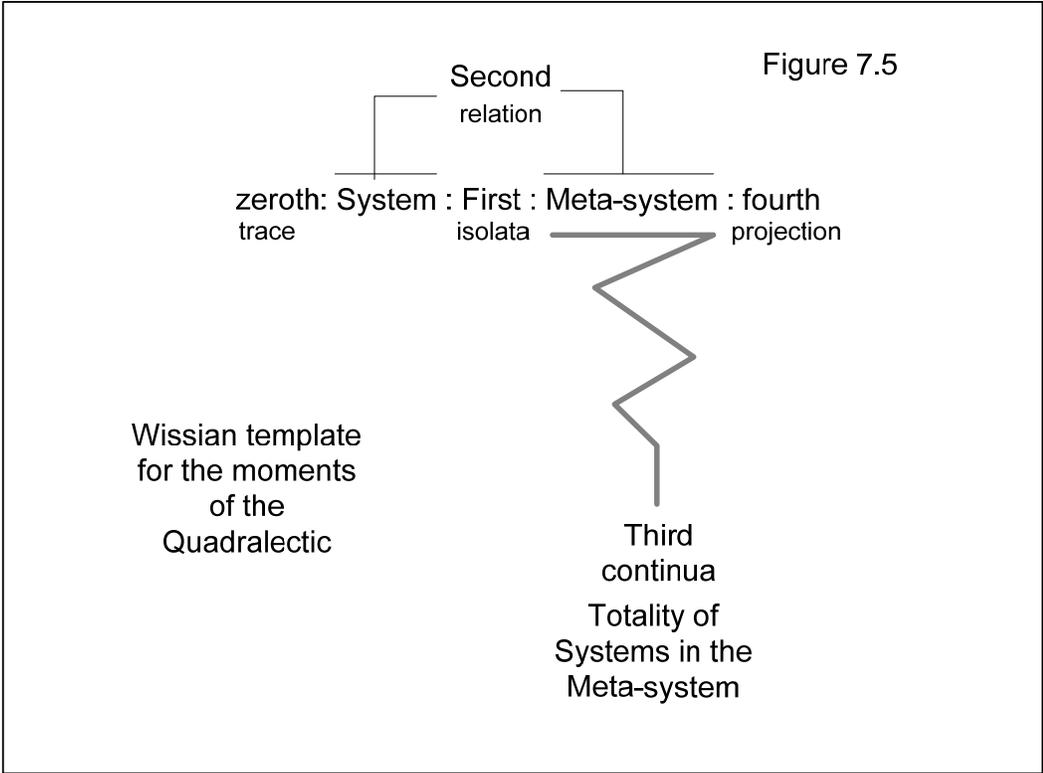


Figure 7.5. Wissan Template for the Quadralectical Moment.

QUADRLECTICAL MOMENTS:
 concept: Representation(FI): FOCUS circumstance(BI): **sense**
 essence: Behavior: OBJECT: situation: **goal**
*perspective: standpoint: IMAGE: surroundings: **vanishing point** [NEW MOMENT]*
 design: Intext: SIGNATURE (signifier): context: **pragmata**

We will preserve the *mediation* of the system and meta-system components of his Ennead but at the same time we will add the components of trace and projection.

For each moment the template is:

<i>trace</i> : System: MEDIATION: Meta-system: projection
--

We will also add the fourth moment of the Quadralectic, which is the *perspective*, and take that as the template for understanding all the other moments (or components). That is because perspective has been well understood since the Renaissance as the framework for the comprehension of forms.

Let us start with a general understanding of the perspectival moment in relation to the template. In perspective we have a *stance*, and from that stance the trace lines of the perspective appear. These trace lines go through an IMAGE and then fan out toward the surrounding horizon while other lines converge toward the vanishing point. So, the *vanishing point* is what is projected *beyond* the Meta-system by the system. The IMAGE mediates between the stance and the surroundings, but the trace consists of the perspective lines that converge at the vanishing point. Perspective exists between diverging panoramas that emanate from the point of view at the stance *and* the converging trace lines that converge at the vanishing point. Normally, the diverging and converging lines cross in the image giving the illusion of orthogonality. This allows the attention of the viewer to be drawn to the image via the trace lines⁷⁵⁵. The point of view is the illusory ‘no where point’ of the subject, and the vanishing point is the ‘illusory point’ of the object. These two (the ‘nowhere’ point and the ‘illusory point’) are duals of each other. As Nietzsche says, subject is object turned inside out and vice versa⁷⁵⁶. Perspective is the framework by which this transformation is enacted. This framework, based on our understanding of the structure of perspective, leads to the idea that there are four Quadralectic moments. We will treat each of these in turn:

⁷⁵⁵ Teaching Company Tape on the Renaissance. Fix, Andrew C. "Renaissance, the Reformation, and the Rise of Nations", Course No. 3940. See <http://www.teach12.com/tcx/CourseDescLong2.aspx?cid=3940> accessed 090322

⁷⁵⁶ This is a paraphrase.

<i>trace: perspective:</i>
System: standpoint:
MEDIATION: IMAGE:
Meta-system: surroundings:
Projection: vanishing point

Pieter Wisse's ideas are compelling because he makes a trialectical connection between the System and Meta-system through a mediation much the same way that Hegel defines Work. This aligns with our analysis of the duality of the System/Meta-system and it provides an element that mediates between these. But it is important to add the *trace* to this trialectical model. The trace is the Hyper Being element that is part of the Quadralectic, which is concept, essence, perspective, and design. We have noted that Hyper Being is situated between *Set* and *Mass* in the unfolding of the Foundational Mathematical Categories and *the difference between the System/Meta-system* is often embodied as a *difference between Set and Mass*. Thus, *trace* represents the Hyper Being interface between the System-Set and the Meta-system-Mass. The *perspective* is the point of origination of the View from Nowhere⁷⁵⁷, i.e. the subjectivity of the subject, which is the *who* that is taking a standpoint. Generalized 'perspective' means every type of interpretative perspective that can be taken on some matter, not just the geometrical perspective on objects. In addition, the perspective framework shows us that the system projects onto the environment from the position of the stance as well as overflowing into the environment as a projection. And so we need to add that projected element, which can be seen from the vanishing point with perspective. This overflow, or excess, is missing from the trialectical determination of the Ennead in the same way that the trace is missing.

So, now let us consider the other moments of the Quadralectic that Wisse includes in his Ennead given that we will add the *lack* as a 'trace' and the *excess* as a 'projection' to each moment of the second order mediation. The 'moment of perspective' highlights the necessity of the trace and projection elements that may still remain hidden or exist beyond the trialectic of work. These trace and projection elements can also be found in other

⁷⁵⁷ Nagel, Thomas. The View From Nowhere (New York: Oxford U.P. USA, 1989).

moments of the Ennead, and acknowledging their presence increases our ability to grasp the Emergent nature of Design.

<i>trace: essence</i>
System: Behavior
MEDIATION: OBJECT
Meta-system: situation
Projection: goal

Starting from the moment of the perspective, we understand that in the external world, organisms exhibit behavior. In fact, it is their behavior that controls their perception as well as their possibility of being perceived. Bodily behavior shapes perception and gives us insight into the essence of an object, and those objects are dealt with differently depending on their essence. We can proceed a step further and define ‘bodily behavior’ as an object in the world, and when we do, it is termed as Action by the Subject, but whether bodily behavior (as the object) is being perceived, or where bodily behavior as the embodied subject is being perceived – it is behavior that ultimately controls perception⁷⁵⁸. Here essence means the hyper-essence, which is the internal coherence of the thing that is captured by its ‘whatness.’ Objects are used differently depending on the situation. So, in this case, behavior can be seen as a ‘usage practice’ that brings out the meaning of the thing based on ‘how it is used.’⁷⁵⁹ However, we can also see that all practices use objects toward some end or goal. If we are oriented toward the goal, we are in the present-at-hand mode, but if we are oriented toward what we are *using*, i.e., a tool or instrument, then we are relating to that tool in the ready-to-hand mode. Dasein takes a stance in the world toward things with some goal in mind, and it is through the projection of that goal, via intentionality, that we experience the ecstasy of existence overflowing into our lifeworld. This is what we define as an *objective moment* in the Quadralectic.

Following the objective moment of the Quadralectic is a subjective moment.

⁷⁵⁸ Powers, William T. Behavior: the Control of Perception. (Chicago: Aldine Pub. Co, 1973).

⁷⁵⁹ Op. cit. Wittgenstein in Philosophical Investigations specifies the idea that ‘Meaning as Use’.

<u>trace: concept</u>
System: Representation(FI)
MEDIATION: FOCUS
Meta-system: circumstance(BI):
Projection: sense

We will rename the ‘foreground interpretant,’ (FI) the *representation*, and the ‘background interpretant,’ (BI) the *circumstance*. What mediates the two is the FOCUS. We *focus* on one representation or another within a given circumstance. Our *projection* is the *sense* we make out of the representation given the circumstance. The focusing can be done in terms of gestalt, flow, proto-gestalt, or proto-flow. Focusing means ‘what we pay attention to.’ We pay attention to one representation, rather than another, in different circumstances. Notice that in certain circumstances our representations determine our behavior within a context, which, in turn, determine our stance in a given surrounding. That stance determines what we *experience*.

<u>trace: design</u>
System: Intext (i.e. content)
MEDIATION: SIGNATURE
Meta-system: context
Projection: pragmata

The experience has its *intext* and *context* mediated by a *signature*. The signature is based on a particular design, which is projected as some ‘means to a practical end,’ referred to here as ‘pragmata.’ Experience is a semiotic activity that has a practical purpose. As we have said, structurally there are four pattern possibilities for pragmata: structure, flux, value, and sign. We are using *the sign structure* as the basis of this analysis. But *any* of the pragmata could have been chosen. In experience we are oriented toward some pragmatic end, and that pragmatic end might be different from our idealistic goal with respect to objects. The pragmata have to do with structuring, controlling flux, valuing, or signing. It is the pattern that underlies the form, which is the goal of behavior. But any pair of the schemas could be introduced here to differentiate the two. Experience has a particular intext within a context mediated by the *signature of the experience*. That signature has a

trace design that we are trying to understand and realize through the pragmata via the signing that balances intext with context. Signature means a sign of identity. It is a specific sign but it expresses the trace design in a way that can move the system designers toward an understanding and realization of the pragmata. Intext is balanced against context by the identifying signature that expresses a design in a way that reveals a pragmatic outcome. Intext is the interior content within the context. Intext informs by applying a specific signature that will bring out the design so that it can be expressed as a pragmatic outcome.

<u>Wissian: Zeroth Trace:: concept: essence: perspective: design</u>
<u>Wissian: Second System:: Representation(FI): Behavior: standpoint: Context (Intext)</u>
<u>Wissian: First MEDIATION:: FOCUS: OBJECT: IMAGE: SIGNATURE</u>
<u>Wissian: Second Meta-system:: circumstance(BI): situation: surroundings: context</u>
<u>Wissian: Fourth Projection of targets:: sense: goal: intention (vanishing point): pragmata</u>

Note: All Seconds relate System to Meta-system. Thirds are the totality of all existing Systems in the Meta-system.

<u>Lack: Zeroth Trace::</u> Concepts allow us to comprehend essences, and although these essences are separated and unique, acknowledging their differences will lead us to better understand perspective, and this will improve our ability to design.
<u>Wissian: Second System::</u> Representations control behavior, which give us our standpoint (or stance) in the world and that supplies the content of experience (or intext).
<u>Wissian: First MEDIATION::</u> Focusing attention on objects gives us images with a particular experiential signature.
<u>Wissian: Second Meta-system::</u> Meta-systems are comprised of circumstances, surrounding horizons, contexts, and situations, and each are related to their particular systems in the Quadralectic.
<u>Excess: Fourth Projection of targets::</u> Our sense of things allows us to attune ourselves to the goals that are organized as ultimate objects (such as the vanishing point), which we underwrite through pragmata, i.e., the pragmatic ends that subtend goals and make it possible for us to reach those goals.

There is a mediation between the System and Meta-system, and that supports a projection that is beyond the meta-system, which is made possible by opening up possibilities that create an *openness* within Hyper Being. If there was no opening, there would be nothing that the system could project onto. In that case, no projection would exist beyond the meta-system. We can use the definition of *openness* in Hilary Lawson's Closure⁷⁶⁰ as a way of understanding this concept, or we can use Heidegger's ideas, as expressed in Contributions to Philosophy.

We have further developed the Quadralectic with the addition of the 'moment of the perspective' and because we consider each moment (thus far defined) both in terms of their 'traces of lack' as well as their 'overflowing excess' we have a more nuanced definition of Hegel's concept of work. Hegel's concept of Work is enhanced by his dialectical realization of beginning, middle, and end, where the beginning is the *circumstance*, the middle is the *means* and the end is the *purpose*. Hegel is not specific about defining the *moments of work*. Here, we will define work in its preeminent status as the production of Emergence within humanly produced artifacts, the arising of which is part of the Emergent Event. This is an essential type of work that utterly transforms the world as part of the Emergent Event. All other transformations are degenerate modes of that most radical type of work. And here we are saying that Trialectical moments of work, which bring new things into existence through Emergent Engineering, have a certain coherence in the way the 'moments of this work' support one another within the Quadralectic. There is a *conceptual moment* that produces representations, there is a *moment of essence perception* based on behavior toward the object, there is a *moment in which new perspectives* have to be taken toward things in the world, and finally there is the *moment in which the content of the new thing must be filled in pragmatically*, and this is the *moment of design*. These are the moments of *radical work* that transform the world. In Emergent Design all these moments of work have to cohere in order to produce something utterly new. In all other forms of work, which are not as radical, it is possible that these moments may fall apart or that some could be missing all together. It is not only in consciousness, or self-consciousness, or reason, or spirit that have moments of this type that Hegel analyzes, but also *work itself* has moments that are clearly visible in its highest manifestation where it is producing something completely new. Marx interpreted all of Hegel's work as centered in thought, but we believe that Hegel meant *bodily* and *embodied work*, not just the work of thought. *And the Quadralectic shows how the work of thought is connected intrinsically to*

⁷⁶⁰ Lawson, Hilary. Closure: A Story of Everything (London; New York: Routledge, 2001).

bodily and embodied work. It is connected because we not only have concepts that are represented, but those concepts are about the essences of objects that are only clearly understood through our behavior toward those objects. And we must take an embodied stance toward objects in order to gain a proper perspective, although our ultimate search is for a new perspective, which is mediated by the *anamorphic quality* of the new object. The new emergent object opens up a new perspective on the world. Finally, we design the content of a new object based on *pragmatic* considerations so that it actually has the emergent properties that we desire. This means that the new object becomes embodied out of constraints and qualities that can be realized within the world as we conceive of it at a given point in its technological development. Work is not merely the production of pre-determined and already designed objects. Rather, there is *radical work* that produces new things, which, in turn can change the world either in part, or sometimes, as a whole. Understanding these moments of work that allow new things to come into existence is our purpose for defining the moments of the Quadralectic.

View from Beyng

In Heidegger's Contributions to Philosophy⁷⁶¹ there is resonance (echo), handoff (playing-forth), leap, and grounding. There is a resonance between the System and the Meta-system, which expresses itself in each moment of the Quadralectic. But there needs to be an *opening*⁷⁶² in which a *handoff* occurs between the System and the Meta-system, which allows a *playing-forth* between them. Ultimately there is a *leap* across the divide between them, but once that cleavage has been transitioned, then there is a *grounding* of the System in the Meta-system as an *abgrund*⁷⁶³. Where the System seeks *grounding*, the Meta-system retreats, is reticent, and refuses. This reticence and refusal causes the openness between the System and Meta-system, and creates a niche where the System can fit into the Meta-system. For the System to nestle into a niche in the Meta-system, there must be 'traces of possibility of encounter' *and* there must be a mediation between the two. The main characteristic of the schemas is that they nest into each other perfectly with no gaps. This nesting can only happen if there is an 'openness of possibility of mating,' or if one schema serves as a 'media for inscription' by the other. Being a *media* means that something is not only inscribed, but also projected beyond the media. Thus, the Quadralectic will operate

⁷⁶¹ Heidegger, Martin. Contributions to Philosophy: From Enowning (Bloomington, Ind.: Indiana University Press, 1999).

⁷⁶² Or 'an open'.

⁷⁶³ Absence of grounding that grounds: i.e., an Abyss

between any two adjacent schemas. We have observed that if the goal is at the Form level, then the pragmata is at the Pattern level. *Sense* and the *vanishing point* mediate between these moments of projection as *other* projections. Pragmata have to make sense in relation to the goal. But there also needs to be a pure projection in spacetime of the coordinate system in order for the goal to be reached via the pragmata. All the projections are transcendences. All the traces are immanence. Between the System and the Meta-system is the immanence and the media that make the ‘passing through’ possible, which, in turn, creates an environment for transcendence. The Quadralectical moments are immanent and together with media they make the ‘projections of transcendences’ possible. This all occurs while situated in the schematic hierarchy. In each case, what ‘a System is’ and what ‘a Meta-system is’ can be at any two adjacent schematic levels. We say that schemas are media, but we fail to mention that it is the lower, nested schemas that write (inscribe upon) the adjacent higher schemas. The lower schemas use the higher schemas as media, and by opening up the traces between them the projection can be carried across the higher schema toward what lies beyond it, i.e., an even higher schema.

Extension of the Ennead into the Quadralectic

This extension of Pieter Wisse’s work is significant and in order to give his Ennead more dynamism and flexibility we have added another moment related to perspective, as well as elements of moments that are related to trace and projection. For the most part, Wisse’s structural concept of his Ennead comes out of this extension unscathed. But our connection to the philosophical categories of Peirce is even more tenuous than his. We are assuming that the Quadralectic will produce the synergies of design. We have noted elsewhere that the Quadralectic is related to the Emergent Lifecycle, the Foundational Mathematical Categories, and the Emergent Meta-system⁷⁶⁴. These two fundamental cycles are lodged in the Emptiness and Void of Existence and are the basis of the Quadralectic. But the Quadralectic operates in Being, not in Existence! The moments of the Quadralectic are posed at the Hyper Being level because that is the level where possibilities open up! We could pose the moments at any level, but the crucial level for explaining the nature of systems and meta-systems design is that of Hyper Being. The fundamental insight of Pieter Wisse was that the context, situation, circumstance, and/or the surrounding horizon must be the basis for our design. In design we try to fit the systems we build into environments. The Quadralectic explores the various different kinds of niches and views of the

⁷⁶⁴ [Elements of the Metanomos: Beyond Metaphysics and Metalogos](http://holonomic.net) at <http://holonomic.net> by the author.

environment for the systems we design. The system element in each case is like a probe into the system that can produce a specific response to the environment. So, we create representations, and we set those in motion to produce simulated behaviors. We then view those simulated behaviors in different perspectives (such as those named for real-time systems). We then attempt to understand the content of those systems, given the behavior of the representations of the various perspectives. This is the basic operation of system design. But that basic probing is dependent on the mediation of the System and Meta-system via the *medium*. The *medium of mediation* is the focus, object, image, and signature. We focus our attention on one object at a time in lieu of the entire situation that the system must respond to. We visualize images of that object, which Husserl calls the noematic nucleus through which we attempt to approximate the essence of the system as an envelope of constraints on attributes. The essence provides a particular signature of the parameters of the system given particular scenarios. In this process we are conceptualizing and visualizing the emergent system as we attempt to approximate the internal coherence of its essence given its nihilistic fragmentation across perspectives. This leads to the positing of a design. *Our key point is that a design is a meta-level of the sign itself*. Thus, design is not a fragmented, but an interconnected field, however, it only exists as a trace until the system is realized. That realization has to do with projection. Projection has to do with setting goals and supplying the *pragmata* that can support those goals at the next lower schemata. In that process we use the vanishing point as a limit toward which we push our approximations. We then coordinate these approximations based on the sense of what the various diverse elements become when they are brought together. Projection beyond the meta-system (of the system) is what allows emergence to be realized. If there is no projection, which is the basic actualization of timespace in terms of the schemas, then there would be no creation of emergent effects. This model specifies how the bootstrapping occurs that allows the design to be realized with the actualization of emergent effects through projection. It shows how the traces of the openness, as well as the medium, must be there to allow the system to pass through the meta-system, in order that it may reach the projected *goal* based on the *pragmata* at the *vanishing point* (which is also the point of realization) of something that must make *sense*.

This is a precise model of how the Quadralectic works based on the Ennead of Sign Engineering. We have expanded it to make it dynamic, but also augmented it to illustrate the important role played by Hyper Being and the projection process. In order to achieve projection, the system must move through the meta-system as a medium attuned to the openness. This is the system turning ‘inside out’ within the meta-system environment and

it does this in a four-dimensional rotation. By turning inside out, the system becomes the meta-system, and then goes beyond it to be reassembled as something emergent, which is an artifact with characteristics that go beyond nature. Furthermore, what goes beyond nature emanates from within us (as our creation) based on the template of the schemas. This is crucially dependent upon the possibilities that are unleashed from Pandora's Box by Hyper Being. Without those possibilities, there would be no emergent creation beyond what is in nature. It is *our* nature to create artifacts based on the schemas, and what we create is artificial because it is based on the timespace schematization that is built into us naturally. We appear to naturally produce what is artificial based on projections that are genetically built into us with very little, if any, contribution from culture. And these projections hew to the schemas. It is at the level of Hyper Being that this capacity is unveiled. We can see this demonstrated by the Demiurge in the Timaeus who begets creatures at the Hyper Being level, whereas, before, there was only a 'distanced' or 'abstracted' kind of creation. Embodied creation must 'be prepared for' by a Third kind of Being⁷⁶⁵. Embodiment⁷⁶⁶ and immanence are important for achieving a transcendence of the projection. This is why we say that the Emergent Event is four-dimensional time embodied. And that is why we say that the Emergent Event is the phenomena that becomes the face of the world as it draws in all the transcendences. It is at the level of Hyper Being that the possibilities necessary for a new creation come into play. The projections are Pure Being. If we coalesce the excesses of sense, goal, vanishing point, and pragmata into a unity, we can then visualize an illusory continuity that exists in Pure Presence. The Quadralectic is part of Becoming or Process Being, through which the emergent thing comes into existence. And for this process to happen, there must be a gap between the *Set and Mass* or *System and Meta-system*, which will provide a niche for the elements of Hyper Being that we see in the traces. These traces must not be mistaken for the mediation between 'Set and Mass' or 'System and Meta-system.' The traces give us access to the openness, whereas the 'medium of mediation' would close off that bridge of access between the two schemas. As we go up the schematic levels, we increase our access to the *open* expanse and we can *project* by pulling the *system* through this opening, which will transform it into the *Meta-system* and then reconstitute it to become something new, something emergent. It is then that we will achieve a full realization of our idea via the

⁷⁶⁵ Mentioned by Plato in the Timaeus, which corresponds to Hyper Being. Op. cit.

⁷⁶⁶ An example of embodied creation appears in the Mahabharata where the poet, who engenders the characters within his own story, becomes the progenitor of the Brothers whose children ultimately go to war. There is an equivalent of this myth in the Odyssey, when Odysseus becomes his own Bard on the imaginary island of Scheria.

four projections of the Quadralectic at the *limit* of the projection (of our idea) that has become embodied as a new Emergent Entity. This is part of our phenomenology of the System. This is how it turns inside out and into the Meta-system before being reconstituted into a new Emergent System. This ‘turning inside out’ is a rotation that can only be engineered in hyperspace, i.e., the fourth dimension. This tells us that we must dip into the nondual reality of our four-dimensional world in order to achieve an emergent effect. That opens up the nature of time from linear (as a ‘time arrow,’ or dissipative ordering) to either planar (autopoietic symbiotic) or four-dimensional (reflexive) time.

All of this serves to show the usefulness of Plato’s third kind of Being, which was rediscovered by Heidegger as ~~Being~~ (crossed out) and then taken up and given notoriety by Derrida when he presented it as *Differance*. Plato was discussing how the Demiurge formed the world creatively, noting that the embodied world must be *generated* and cannot be merely ‘thought’ into Existence. Plato says that creative generation takes place when the elements are placed within the *chora* or the *receptacle*. That receptacle is the ‘timespace’ within which the designed elements of the minimal solids are introduced. There is an ‘intelligent’⁷⁶⁷ design in these minimal Platonic solids that is determined from outside the universe. The ‘possibilities for organization in spacetime’ play a significant role in determining what can be created and what cannot be created. We understand the minimal solids conceptually, but we understand their *essence* when we try to build something else, a regular solid that is different, unique, and beyond those allowed in our universe. With the minimal solids we are introduced to dimensionality, which then determines possible perspectival views of things in spacetime. Yet, there is a fundamental design behind the concept of ‘number’ that we need to understand because of the way that it points to the possibilities of synergy, especially in the fourth dimension. Without Hyper Being there could be no embodiment of these possibilities. We can talk about the propensities of Wild Being and the singularities of Ultra Being as going beyond this middle kind of Hyper Being. Without opening up the realm of possibilities in Hyper Being, the propensities and singularities would not matter, there would not be a creative production of the ***emergent novelty of the new***. So, this is the level that we must focus on in order to understand the nature of emergent systems and meta-systems, as well as Emergent Science and Emergent Engineering. It is at this level, the level of Hyper Being, that emergent systems come into being based on patterns that are laid down in Existence upon which the Quadralectic is based. The Quadralectic is based on the Lifecycle of the Emergent Event, as seen in the

⁷⁶⁷ Subtle and sophisticated.

Foundational Mathematical Categories and within the Cycle of the Emergent Meta-system that exists in Emptiness and Void. *The Quadralectic moves within Being, wresting emergent artifacts from out of Existence into Being*⁷⁶⁸. At this level, the phenomenology of the new emergent system, or meta-system, comes into Being from Existence and the process happens through the Quadralectic. Central to this process are the traces that exist between the System and Meta-system along with the mediation between these two duals. Things such as noumena may have propensities that hinder or help this process, or there may be singularities in Being that block or provide the axis for this transformation. But, if we did not acknowledge Hyper Being, then the essential transformation from the system into the meta-system through *de-emergence* could not take place nor evolve back again into an Emergent System. All this happens through the traces that give access to openness. Through this mediation, one schema becomes the active media for the other.

⁷⁶⁸ This is to say the Quadralectic is a dynamic *inside of* Being (more precisely in Hyper Being), which receives its motive force from *outside of* Being in Existence. The Quadralectic takes artifacts *out of* existence and pulls them *into* Being. (Editor's note).

Context of the Quadralectic

Exploring Wild Being on the Way to Ultra Being

The Quadralectic is made up of separate moments but only one is related to signs. Here we will explore how Wild Being, as the dual of Hyper Being, plays a role in the actualization of Designs as Implementations of Emergent Artifacts. These duals are related to Ultra Being, which is a Singularity in existence that differentiates Emptiness from Void. Understanding the relationship between Being and Existence is crucial for understanding how new emergent artifacts come into being. They start out as Singularities in Ultra-Being that are embedded in Existence and then unfold through the various meta-levels of Being into our world. A geometrical model of this process is given. This unfolding of the meta-levels of Being is then related to the unfolding of the schemas.

Quadralectic Context for the Creative Design Activity

Design and Design Creativity are generally treated as an isolated activity⁷⁶⁹. We will follow the advice of A. W. McHoul⁷⁷⁰ and examine semiotics in the context of other activities that confirm the role of the Quadralectic as an applicable philosophical model for design. The concept of the Quadralectic stems from the work of Pieter Wisse who based his Sign Engineering and Metapattern method on the semiotics of Peirce. By utilizing Wisse's Ennead model to produce the Quadralectic, and by using his own interpretation of the Peircian categories as a basis, we will be able to explain where the Hyper Being meta-level Quadralectic moments appear within his scheme at the zeroth level. We have enhanced the Ennead by adding *perspective* as a *moment* to the process of Semiotic Design Engineering and as a result of this addition, the Ennead becomes a more viable framework for refining our concept of its elements and how it functions. The layer that he lacks is the *projection* through which the system surpasses the meta-system elements via the *mediation* and the *trace* that come between them. By transforming the Ennead into the Quadralectic, we are rendering what was an essentially static dialectical, theoretical structure that

⁷⁶⁹ [Application of General Schemas Theory: Design Methods and Meta-methods](http://holonomic.net) at <http://holonomic.net> by the author. In the last chapter we developed a more precise model of the Quadralectic that clarified what the Quadralectic model has to offer.

⁷⁷⁰ McHoul, A. W. [Semiotic Investigations: Towards an Effective Semiotics](#) (Lincoln: University of Nebraska Press, 1996).

mediated between *inside and outside*, and *content and context* into something that is even more dynamic. We have turned it into *a model of a process that cycles and involutes at the same time*.

In this chapter the Quadralectic will be given an even broader context. That context relates to the Lifecycle of the Emergent Event, as seen in the series of the Foundational Mathematical Categories, and the Cycle of the Emergent Meta-system. In previous papers related to the question of the philosophical foundations of the Western tradition, it has been shown that these two cycles are related to each other and that their relationship subtends the cycle of the Quadralectic⁷⁷¹.

As we examine the foundations for Engineering, especially the Emergent Engineering of Systems, it is imperative that we establish how the artifacts that embody emergent properties undergo creative design. As we continue to examine the relationship between design and emergence, our intention is *to unify design by visualizing it as a meta-level where possibilities emerge*. Thus, it behooves us to explain the relationship of the Quadralectic to the Lifecycle of the Emergent Event. It is of great interest that the Lifecycle of the Emergent Event is related to the Emergent Meta-system Cycle, which is the basis for the dynamics of Existence beyond Being. *The Quadralectics of Design occurs in Being, and Emergence becomes a possibility at the point where possibilities become possible within Being*. The Foundational Mathematical Categories appear as *traces in the nomos of the Lifecycle of the Emergent Event* which synchronize with the *cycle* of the Emergent Meta-system. It is this synchronization that gives the Quadralectic its dynamic quality.

Why does this matter to us when considering a Systems Phenomenology? It matters because we are not only interested in the description, explanation, and formalization of systems, but also in the creative design of systems. Their ‘coming into being’ as emergent artifacts is a fundamental feature of the world that our phenomenology should describe, explain, and formalize as much as we can. Existence is the standing from which something that comes into Being emanates from. Without something outside Being, for example, a non-Being such as Existence, there is no possibility of something coming into Being. Parmenides denied that there was anything outside of Being, and this is the generally accepted position in our tradition. But if there is no Existence, then Emergence becomes

⁷⁷¹ Emergent Engineering and Foundations of Emergent Science and Engineering and Elements of the Metanomos: Beyond Metaphysics and Metalogos at <http://holonomic.net> by the author.

impossible because there would be no *beyond* from which the transformations of Being could occur. Change must be change in relation to some reference point. Existence (what is found) provides this reference for transformations in Being. When we say that 'change changes', we mean that by comparing the changes in Being to the changes in Existence (that are differential) we can then see the *difference that makes a difference*, which is the Emergent Event, (which is an example of third order change). We are especially interested in how we can create artifacts that are emergent, and how that emergence becomes manifest in existence, rather than in the projections of Being. *A model has been developed in a foregoing series of papers*⁷⁷² *that explains how this is possible by combining the cycle of the Quadralectic in Being both with the Lifecycle of the Emergent Event, and the Cycle of the Emergent Meta-system. Expressed in this way both cycles define the dynamic of Existence.* The manner in which these various pieces of the puzzle came together was quite unexpected. But we should make use of this gift to deepen our phenomenology.

Hyper Being and Wild Being as Duals

In essence, we have discovered that semiotics interacts with other fundamental ideas that develop through the meta-levels of Being. But the level of *Hyper Being*, i.e., the level of traces⁷⁷³, is the most important because that is *the level where possibilities become possible*. Possibility is the essential ingredient of Design. We live in a world in which possibilities are easy for us to imagine. David Lewis describes this in his book, On the Plurality of Possible Worlds⁷⁷⁴. Lewis calls them *possible worlds*. We will use the term *pluriverse* when describing these possible worlds, or we may call them the *many worlds* when we are speaking in the context of the Theory of Quantum Mechanics. He designates them as *real* because he does *not* acknowledge that *possibility* can appear at a specific meta-level of Being. David Chalmers⁷⁷⁵ asserts that we *can* imagine possible worlds very easily. For instance, we can invent a *possible language* more easily than we can learn an existing language and it is significant to note that this possible language is co-determinate with the possible world⁷⁷⁶. This ability to *project, or 'throw forth,'* a possible world and a possible language at will, is dependent on the realm of possibilities opened up within the meta-level of Hyper Being. And if we are *throwing forth* a whole world and the languages

⁷⁷² Elements of the Metanomos: Beyond Metaphysics and Metalogos at <http://holonomic.net> by the author.

⁷⁷³ Derrida, Jacques. Of Grammatology (Baltimore: Johns Hopkins University Press, 1976).

⁷⁷⁴ Lewis, David K. On the Plurality of Worlds. (Oxford, UK: B. Blackwell, 1986).

⁷⁷⁵ Chalmers, David J., The Conscious Mind: In Search of a Fundamental Theory (Oxford: Oxford University Press, 1997).

⁷⁷⁶ See Whorf, Benjamin Lee. Language, Thought, and Reality; Selected Writings. (Cambridge: Technology Press of Massachusetts Institute of Technology, 1956).

that support them, then *throwing forth* new things within those new worlds would seem a natural part of the process of actualizing possibilities. In effect, new worlds are possible horizons on which new things can be seen. *The production of new worlds as a context for new things is a definition of the Emergent Event*. What is difficult to conceive is: How do possible things within possible worlds enter our world as something that actually exists? It is not hard to explain the projection, the difficulty lies in explaining how the projection is realized within our common world as an *intersection of many possible worlds* created by lots of different people. Somehow this *wild* variety becomes normalized and this change becomes a new commonly agreed upon world with a new system with emergent properties. This process is hard to explain and that is why we evoke the Quadralectic and its relationship to the emergent event in tandem with the dynamic nature of existence. The Quadralectic can serve as a clear and viable model for this emergent manifestation. We will not explain in detail how these three cycles interlock and synchronize because that has been done elsewhere⁷⁷⁷. Rather, we will give an overview that shows why this interlocking is important for the purpose of understanding the phenomenology of the emergent system/process. In effect, we need to know more than simply how to envision a system. As we travel up the meta-levels of being we realize that what we are really seeking is a *phenomenology of the emergent system* particularly when we are the producers of that emergent system. We will call this the *modality of the in-hand*⁷⁷⁸ of being-in-the-world. It is the next modality up from the present-at-hand and ready-to-hand and it was first recognized by Merleau-Ponty in his Phenomenology of Perception⁷⁷⁹. Toward the end of his life, Merleau-Ponty realized that the possibility of an expansion of being-in-the-world must exist. To illustrate, he gives the example of a blind man with his walking stick that has become part of him, or we could think of a guitar player⁷⁸⁰ with his guitar, which has become an extension of himself. If being-in-the-world expands, it must expand into the realm of possibility. That is because the world contains everything that *is*, as well as the things that *are not*. The world expands by the introduction of something genuinely new and that is precisely what the meta-levels of Being give us, the necessary pre-requisites for the new thing coming into existence. We only recognize this when we ascend to the level

⁷⁷⁷ Op cit. See Meta-nomos series of working papers by the author. See also Chapter 13 of this dissertation.

⁷⁷⁸ “In-hand” is a term coined by the author for the third meta-level of being-in-the-world that corresponds to the present-at-hand (extant) and ready-to-hand (handy).

⁷⁷⁹ Merleau-Ponty, M., Phenomenology of Perception (New York, Humanities Press, 1962; Routledge, 2002) pp. 165, 176, 260-261, 299; See also Gordon, Hayim, and Shlomit Tamari. Maurice Merleau-Ponty's Phenomenology of Perception: A Basis for Sharing the Earth. Contributions in Philosophy, no. 89 (Westport, Conn: Praeger, 2004).

⁷⁸⁰ Op cit. Merleau-Ponty, M. pp. 168-169. Merleau-Ponty uses the organist as an example, but I think a guitar player is a better example.

of Hyper Being. Previously we asserted that we can easily imagine possible worlds, but within that realm of possibility, a more difficult question arises. Can a new thing exist as ‘more than just a possibility’? Can it be ‘brought into existence,’ or ‘actualized,’ within the world? Our first question concerning possibilities emanates from the realm of Hyper Being, and our second question concerning actualization, comes from Wild Being. Each new thing is mirrored in the meta-levels of Being and what *opens up* the world to the *existence* of the new thing is what makes it *possible* for the new thing to *connect back* to the world so that it may be *actualized*. The kinds of Being are a step by step guide for how this is done. What intrigues us here is how *possibility* occurs within the *design process of something new*. In other words, we are not only interested in how something new turns up in our world, but we want to understand how we can actually create something new and bring it into our world. Engineering is an excellent example of our society’s desire to produce new and emergent things continuously. This needs to be explained from a foundational perspective, and from this perspective we must move beyond the dualism of the foundations and anti-foundations to a position of *afoundationalism*, which has been developed in earlier papers⁷⁸¹. From the perspective of Being, we need to recognize that traditional mathematics has given us the Foundational Mathematical Categories that are written into the Nomos of Emptiness⁷⁸², which interact with the cycle of the Emergent Meta-system that appears from the Void⁷⁸³.

Emptiness, Void, and Ultra Being in the Standing of Existence

Emptiness and Void are the two basic interpretations of Existence. Foundations are very weak; they cannot be grasped and are only found in Existence and not in Being. This is what one should expect. Being is a projection. It is not possible to have a foundation in something that is *moving* and being *thrown* as an ‘ecstasy’⁷⁸⁴. Existence is *what is found* that *lies beyond* the *projection* but is *not affected* by the projection. Foundations belong to the realm of Existence and not within the realm of Being. Foundations are not graspable by Being. From this perspective, a weak, independent, non-graspable foundation can exist as a Foundational Mathematical Category written into the Nomos, and furthermore, it is the

⁷⁸¹ Foundations of Emergent Engineering and Emergent Science at <http://holonomic.net> by author.

⁷⁸² Nomos appears in Existence within Emptiness (even zero), which is where the Foundational Mathematical Categories appear.

⁷⁸³ Void (odd zero) is a more originary level of Existence than Emptiness, which only appears as opposite Being, where the Emergent Meta-system appears.

⁷⁸⁴ Henry, Michael. "The Power of revelation of affectivity according to Heidegger" pp. 354-369 in Macann, Christopher E. Critical Heidegger. (London: Routledge, 1996) p.360. See also Bintz, Neil Frederick. The Concepts of Existence and Ecstasy. (Thesis (M.A.)--Drew University, 1958).

dual of the Emergent Meta-system cycle that delineates the cycle of dynamic existence. The Quadralectic appears within the synchronization between these two cycles, but in the context of Being. Therefore, it must come from *Ultra Being*, because that is *the difference that makes a difference* between *Emptiness* and *Void*. The Quadralectic appears from Ultra Being in two steps, first from Wild Being, and then from Hyper Being. Then it devolves into Process and Pure Being. That means that the Quadralectic unfolds from a Singularity (within the existence of Being) as the *difference* between Emptiness and Void. The Foundational Mathematical Categories exist within Emptiness and are the fundamental source of all mathematical categories and the source of all thought concerning the schematization of designs. The Foundational Mathematical Categories provide the Quadralectic with the ability to make a design, to conceptualize it, to define its essence, and to form a perspective. The Quadralectic also uses the Foundational Mathematical Categories to impose designs as constraints. The Foundational Mathematical Categories give us a picture of how the Emergent Event comes into being, and when they function as a set, these categories help us to create and provide insight into the emergent nature of the designed artifact. This is the key point. Emergence must occur in the context of the Void but on the basis of the schematization of Emptiness. The fact that a universe exists first, mostly as empty space, is a given. But within that there is *projection*, and counter to the projection is the *emptiness of the projection*, which makes it both illusion and the stuff of imagination. We use the unfolding of the Emergent Event in Nomos as the measure by which we constrain the emergent thing we wish to bring into existence. If it were not for the relationship of the Emergent Event to the Emergent Meta-system, we could not bring something into existence. If it were not for the connection of the Foundational Mathematical Categories to emergence, we could not introduce something radically new. There are actually four things interacting: the Quadralectic unfolding from Ultra Being, the Emptiness of the Foundational Mathematical Categories unfolding in the Lifecycle of the Emergent Event, the Void unfolding as the dynamic of the Emergent Meta-system, and finally, Manifestation. Manifestation is the nondual between Emptiness and Void. Manifestation is what allows the transition from imagination to existence because, at their root, Emptiness and Void are the same thing beyond the appearance of the singularity of Ultra Being. Thus, it is not a problem for something new to come into existence as an Emergent Event because there is ultimately no difference between the Emptiness and Void sides of Existence. Projection also unfolds from out of existence, which brings us to the conclusion that since these attributes unfold from out of existence, *there is no need to cross any barrier*. Yet, when we recognize Emptiness and Void as different, we believe that

there *is* a barrier to cross and we devise a way to cross it by applying the Quadralectic in Being. Yet, because this is synchronized with the lifecycle of Emergence in the Foundational Mathematical Categories, as well as with the cycle of the Emergent Meta-system (which is the basis of our understanding the Void), then the Quadralectic is nothing more than the *synchronization* between these two cycles that are reflected in Being after their unfolding.

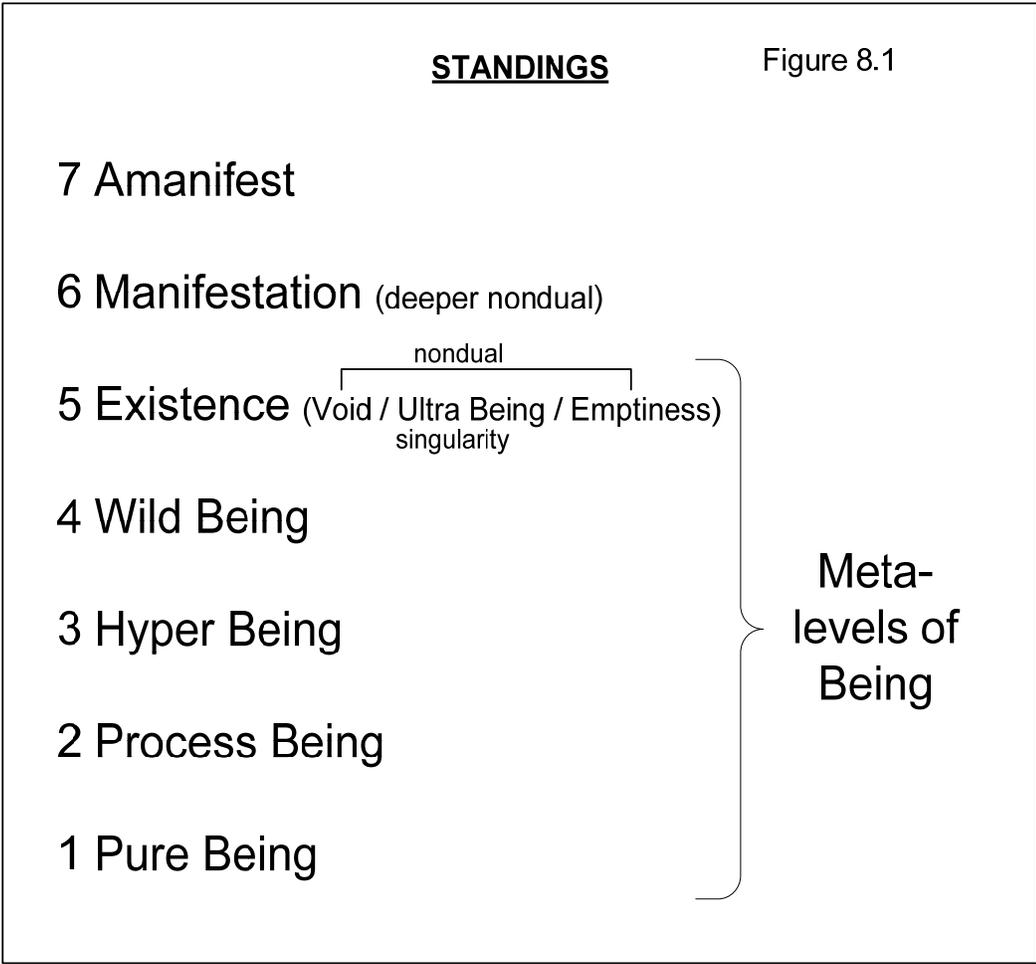


Figure 8.1. Standings.

We have to keep in mind that the Quadralectic unfolds out of the singularity of Ultra Being, which is the *difference that makes a difference* between Emptiness and Void. The chasm between Emptiness and Void is made bridgeable by Manifestation, which is the deeper nondual beyond and before the arising of that apparent split in Existence. The lifecycle of Emergence appears in Emptiness and is inscribed in the Nomos, i.e., the nondual that relates to the duality in Being. But Emptiness and Being are founded on Void, which is represented as the cycle of the Emergent Meta-system. Within the context of

Being the Quadralectic merely reflects the synchronization of the cycle in Emptiness⁷⁸⁵ and the cycle in the Void⁷⁸⁶. Both of these cycles that articulate this apparent duality of nondual existence are manifestations of the deeper nonduality of the Manifest. In this case we are using the term, Manifestation, as it is defined by M. Henry in The Essence of Manifestation⁷⁸⁷, which is a term that he actually derived from Meister Eckhart⁷⁸⁸. Henry does not appear to realize the full depth of Eckhart's term, although he uses it as his basis for his critique of Heidegger that places it on the level of Hyper Being. Henry refers to "that which never appears" as the "Essence of Manifestation" and uses it to critique Heidegger's Ontological Monism. But we can see there is a deeper interpretation of the term Manifestation that is closer to Eckhart's original meaning and goes beyond Henry's application to Fundamental Ontology. For Eckhart, the Essence of Manifestation is the Godhead, i.e., the part of God that can never be known by humans. Eckhart clearly identifies Emptiness with that. But we know from the evolution of Buddhism in China that there is a difference between Emptiness and Void. Emptiness⁷⁸⁹ is represented in Buddhism⁷⁹⁰ as the ultimate basis of consciousness, and the Void⁷⁹¹ is represented in Taoism⁷⁹² as the underlying reality of nature. Thus, there are two different interpretations of the nonduality of existence. Emptiness is associated with Time and Void is associated with Space. In relation to Being, Emptiness sees the nondual as projection, and Void sees the nondual as it was before the split between Emptiness and Being arose. We will identify the deeper nonduality between the nonduals as Manifestation and distinguish that from an even deeper nondual called the Amanifest. It is clear that, as a Singularity, Ultra Being marks the difference between Emptiness and Void and is the opposite of the deeper nondual of Manifestation. Ultra Being is what remains of Being when we are outside of its projective enchantment. Ultra Being is merely an externality of a projection of Being that is found in Existence. But because the ecstasy of exi-stance (standing outside ourselves in the world we project, i.e., the ecstasy of existence), springs from us spontaneously (before

⁷⁸⁵ Which is expressed as the Lifecycle of the Emergent Event.

⁷⁸⁶ Which is expressed as the Cycle of the Emergent Meta-system.

⁷⁸⁷ Henry, M. and Etzkorn, G.J., The Essence of Manifestation (The Hague, Nijhoff, 1973).

⁷⁸⁸ Tobin, Frank J. Meister Eckhart, Thought and Language. The Middle Ages (Philadelphia: University of Pennsylvania Press, 1986). See also Caputo, John D. The Mystical Element in Heidegger's Thought (Athens: Ohio University Press, 1978).

⁷⁸⁹ Huntington, C. W., Namgyal Wangchen, and Candrakirti. The Emptiness of Emptiness: An Introduction to Early Indian Madhyamika. (Delhi: Motilal Banarsidass Publishers, 1992).

⁷⁹⁰ Conze, Edward. Buddhism: Its Essence and Development. (Birmingham: Windhorse, 2001).

⁷⁹¹ Zhang, Dainian, and Edmund Ryden. Key concepts in Chinese philosophy. Culture & civilization of China. (New Haven, Conn: Yale University Press, 2002).

⁷⁹² Laozi, and D. C. Lau. Tao Te Ching. (Baltimore: Penguin Books, 1963). See also Kirkland, Russell. Taoism: The Enduring Tradition. (New York: Routledge, 2004).

we get a chance to call it back or pre-empt it) we are, as Heidegger says, *thrown into the world as if we were always already there with our existentiell*⁷⁹³ *of Discoveredness, Understanding, and Talk, and that this is the way we are able to express our Care for things in the World.* Thus, we experience the paradox of being an *ontic thing* that projects the world, while at the same time, we are existing in the world that we have projected. In the Gospel of John this is hypostatized as the relationship of Christ to God the Father, in which Jesus is, on the one hand, the God who creates the world, but also a specific creature existing at a specific time *in* the world. This paradoxical relationship of being a specific *ontic being* that projects the world that we are inhabiting as a space that we are already embodied within, is the core of Heidegger's analysis of Dasein in Being and Time⁷⁹⁴.

Dasein is what Heidegger defines as the ontic being that projects the world that he is part of prior to the arising of the difference between the subject and object, which later becomes a dualistic reification. By *not* reifying we can be in the paradox without tearing ourselves apart by becoming both subject and object. We become an anagogic thing (the word "Thing" in Old English originally meant a social gathering, and thus can be related to *mitsein*, i.e., being with others), which allows us to resolve the paradox. Heidegger intended to find a way of expressing the paradoxical situation of Dasein as *what we were prior to the differentiation of subjects and objects*, which was the fundamental bind that Husserl, Heidegger's mentor, found himself in as the elaborator of Kant's Transcendental Metaphysics. Husserl made the essential discovery that the *world* can be the *horizon* upon which everything can be seen, which deems bracketing unnecessary for Phenomenology, thus solving the problem of intersubjectivity. This brings Phenomenology into the world as a means of access to the phenomena of the world. Heidegger *identifies* us, i.e., humanity, with the horizon of the world and places us in this horizon as *part of it*. In this horizon we are being-in-the-world, i.e., we are "There-Being". "There-Being" puts emphasis on "Being as Intelligibility", i.e., the meaning of Being, which is understood as an 'opening of the openness.' Heidegger identifies two modalities of being-in-the-world: *present-at-hand* and *ready-to-hand*. They are essential for our human projects to be visualized in terms of goals and products, particularly when they are produced through technological means⁷⁹⁵. Heidegger considers these two modalities of the 'Being of Dasein within the World' as equiprimordial. One modality corresponds to the view of Parmenides (all is stasis that perdures) and the other modality supports the view of Heraclitus (all is flux and

⁷⁹³ The German terms used by Heidegger are *Befindlichkeit*, *Verstehen*, *Rede*.

⁷⁹⁴ Op Cit. Heidegger, M. p. 33ff.

⁷⁹⁵ Winograd, Terry. Bringing Design to Software. (ACM press books. New York, N.Y.: ACM Press, 1996).

becoming). Plato's Sophist refers to these two views as the initiation into the Greater and Lesser Mysteries. But then there is also the position of the Hierophant⁷⁹⁶. Plato distinguishes the Men of Earth, who only know what they hold in their hands, from those initiated into the Lesser Mysteries who understand that the invisible realm is flux, from those initiated into the Greater Mysteries who know that the invisible is unchanging Being. But, the *one who initiates them* knows of a higher kind of Being beyond Flux and Stasis. In Plato's Sophist, Hierophant, says that what we want is, "change and changelessness at the same time". This view is both Process Being and Pure Being at the same time, which is actually the definition of Hyper Being. Hyper Being is the *Being of discontinuities within a genetic unfolding*. Hyper Being is *change* because it is a discontinuous jump in the unfolding of physis, or logos, but at the same time, it is also *no change* because the discontinuity (itself) does not move or transform, but is a hiatus through which the genetic unfolding occurs. This view of Hyper Being is what Merleau-Ponty⁷⁹⁷ calls the "hyper-dialectic" between Sartre's Nothingness⁷⁹⁸ and Heidegger's Process Being. Merleau-Ponty's hyper-dialectic describes the expansion of being-in-the-world. We will identify this concept with the third modality, which we will call the 'in-hand,' which describes how the tools that we use actually transform within our hands. A rock becomes a hammer, a paper-weight becomes a door-stop, or possibly something else, depending on what we need. This ability to expand processes and products into the realm of possibility is at the level of Hyper Being. It is this key meta-level of Being that we will focus on in our modeling of the Quadralectic. It creates the possibility for the design of emergent artifacts and allows them to become embodied in our world.

Unfolding of the Quadralectic from the Singularity of Ultra Being

In order to explain how the emergent artifacts are brought into the world, we need to go beyond Hyper Being to understand Wild Being and Ultra Being, and it is clear that we need to change our perspective so that we may explain how the Quadralectic unfolds from the *singularity* of Ultra Being to the *stage* of Wild Being. This is very different from a perspective that builds a schematic process from the 'Pure Being of *products*' to the

⁷⁹⁶ His claims about "needing change and changelessness at the same time" are similar to those of Plato in the Timaeus concerning the *third* kind of Being.

⁷⁹⁷ Merleau-Ponty, Maurice, and Claude Lefort. The Visible and the Invisible: Followed by Working Notes. Northwestern University Studies in Phenomenology & Existential Philosophy (Evanston Ill.: Northwestern University Press, 1968) pp. xivi-xivii. See also Beck, Douglas. Merleau-Ponty's Last Vision A Proposal for the Completion of The Visible and the Invisible (Evanston, Ill: Northwestern University Press, 2000).

⁷⁹⁸ Sartre, Jean-Paul. Being and Nothingness: An Essay on Phenomenological Ontology (New York: Philosophical Library, 1956).

‘Process Being of *the becoming of work processes*’. Rather, we are examining how concepts and designs are imagined, come into Being, and finally exist as actualities that are *realized in our worlds as embodied things*, and that they are essentially different from all things that have ever existed before. This is a perspective that defines the transformation of the world and how something appears as an Emergent Event. The *appearance* of the new thing that we have designed and made becomes the source of a cascade of unexpected changes within the world in which we live. And this phenomenon is not only confined to engineering, which is embedded as a reflexive *techne*, i.e., the ‘technology of creating technology’ for our sustainment within our environment, but is reflected in all aspects of the world in which we live. We often initiate these cascades of emergent events far beyond our ability to control them which results in our technologies becoming interlocked and synergize in ways that we do not expect. Consequently, the world changes with the introduction of a new technology. So, let us pose this question: As a being-in-the-world, how do we transform the whole world? We need to participate in this new modality that is opened up by the Hyper Being of the “in-hand”, where things can function simultaneously in multiple possible worlds. This new modality is what we will use as a means of designing things by imagining the *connections between things that already exist*, although there are times that we may imagine *new things that never existed*. This ability to explore, which is what Kauffman calls the “adjacent possible”⁷⁹⁹, is key to bringing new things into existence within the world. If an emergent entity is too far from the edge of what exists, then it is impossible to bring it into existence. We must focus on discovering things that are not only on the verge of existence, but also just beyond what now exists. Hyper Being opens up all of the realms of possibility that David Lewis alludes to as *real-possibilities*, even to the extent that these possibilities are projections of whole possible worlds. Yet, another question beckons: How does something that is on the verge of actualization *become actualized* within our world? Our answer lies in trying to understand Wild Being and its emanation from Ultra Being, as well as the relationship between Ultra Being and the two nonduals of Emptiness and Void, *and* the deeper nondual beyond these, which is Manifestation.

⁷⁹⁹ Kauffman, Stuart A. *Investigations* (Oxford: Oxford University Press, 2000) p.148.

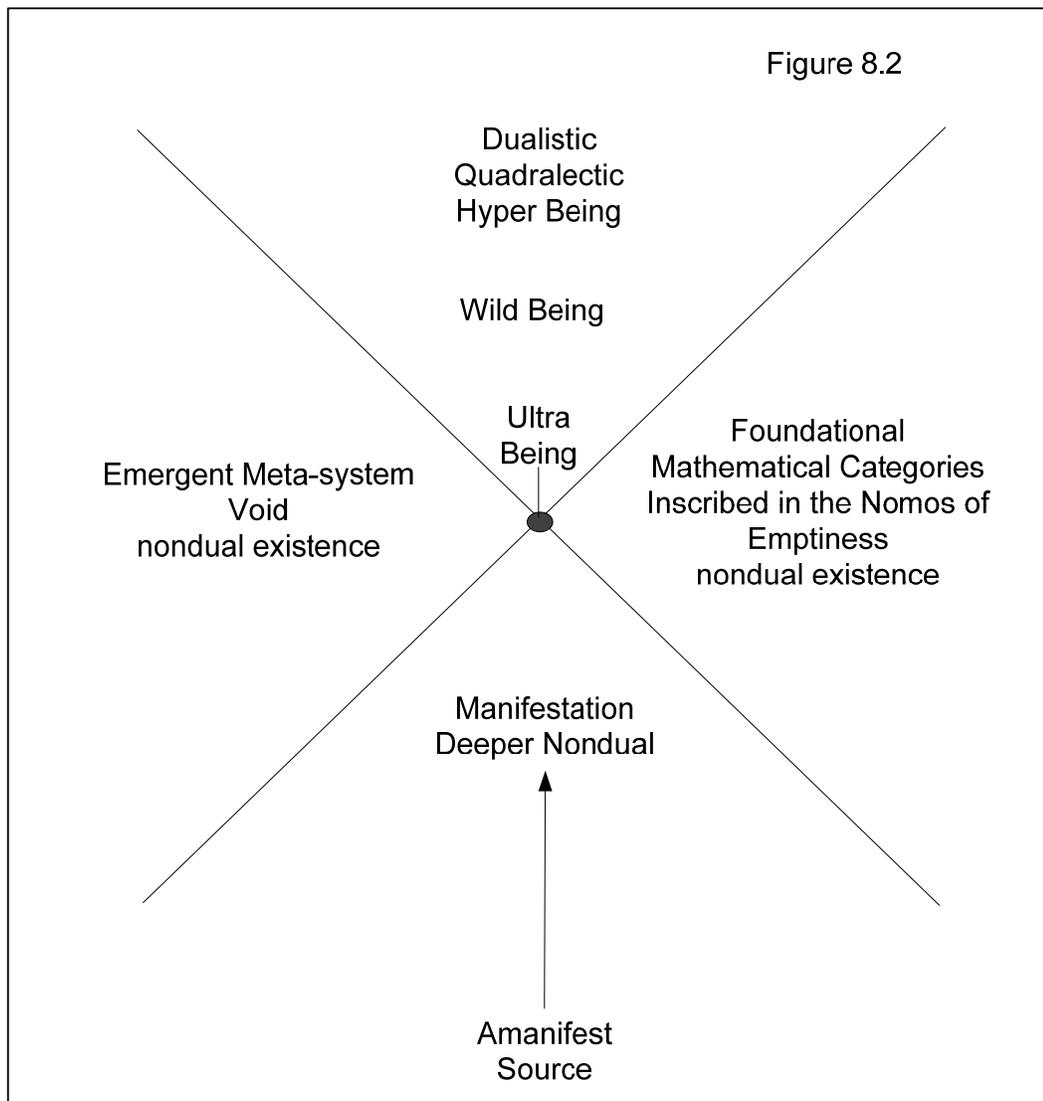


Figure 8.2. Relations between Manifestation, Emptiness, Void, and Dualistic Being.

We will use an analogy here. Singularities are *points* through which there are multiple folds of spacetime that exist beyond our representations. For example, the *Singularity* at the center of a blackhole takes us beyond the laws of physics. Thus, Ultra Being, as a Singularity has no representation, so points are the first representation that we can have. We can understand Wild Being as the representation of *dispersed* points in spacetime around the Singularity, and it is through their expression of propensities that we can understand how a Singularity exists beyond spacetime and affects the realm of spacetime. Hyper Being, on the other hand, is like a line. It expresses the difference between Pure Being and Process Being, and appears as a line that can never be crossed. Wild Being is expressed as *points that can never be connected* due to the presence of the Singularity, while Hyper Being is a *line that can never be crossed*. Heidegger defines Hyper Being in this way in his essay, “The Question of Being”. His essay was actually written as a letter

commenting on an essay written in 1955 by E. Junger titled “Across the Line”⁸⁰⁰. In his letter Heidegger dealt with Junger’s concept of the “Worker” and introduced his notation for Hyper Being as ~~Being~~ (crossed out). The line that can never be crossed crosses right through the Monolith of Being⁸⁰¹ and distinguishes between Pure Being from and Process Being. It is this monolith that M. Henry objects to and refers to it as the *assumption* of Ontological Monism⁸⁰². Process Being should *not* be seen as a line, but as a plane that can never be crossed. Pure Being must be seen as a three-dimensional block that can never be crossed, and because the three-dimensional block can never be crossed, it is entirely static. These are the issues that Zeno⁸⁰³ engaged in when he argued in support of Parmenides on the origin of the nature of Being. *Crossing* means motion, and motion is a contradiction⁸⁰⁴. Hegel embraces this contradiction, but for most philosophers it is anathema, and that is what causes the split between Pure Being and Process Being. Process Philosophers such as Heraclitus⁸⁰⁵, A.N. Whitehead⁸⁰⁶, and N. Rescher⁸⁰⁷ accept these contradictions of motion as endemic to the process view. They say that contradiction and motion are endemic to Being itself, and that Being is always Becoming, and that the stasis of Being is an illusion. Thus, the *moment of the present* becomes all that actually exists and Being is only understood within Time as the ‘plane of the present’ between past and future. Some philosophers say that this plane is not infinitesimal in depth, but, in fact, has duration and a specific size. William James calls this the “specious⁸⁰⁸ present”. G. H. Mead notes that it takes time for something to be what it is, so, for different things, the *time span* within the

⁸⁰⁰ “The Question of Being: A Letter to Ernst Junger concerning ‘The Line’” in Stassen, Manfred. Martin Heidegger: Philosophical and Political Writings. The German Library, v. 76 (New York: Continuum, 2003). p. 120, see p. 141 for ~~Being~~. See also Zimmerman, Michael E. Heidegger's Confrontation with Modernity: Technology, Politics, and Art. The Indiana Series in The Philosophy of Technology (Bloomington: Indiana University Press, 1990). p. 35.

⁸⁰¹ The Monolith of Being is the fusion of Pure and Process Being in Heidegger, which are distinguished by modes of Being.

⁸⁰² Henry, Michel. The Essence of Manifestation (The Hague: Nijhoff, 1973).

⁸⁰³ Zeno famously argued for the impossibility of motion in support of Parmenides, which was that Being is a static block in which there is no movement or change. Parmenides famously said there were three paths: Being, Non-Being, and Appearance, but claimed that the last two of these paths were impossible.

⁸⁰⁴ One of the implications of Zeno’s arguments is that motion is always a contradiction.

⁸⁰⁵ Heraclitus, and Brooks Haxton. Fragments: The Collected Wisdom of Heraclitus (New York: Viking, 2001).

⁸⁰⁶ Whitehead, Alfred North, David Ray Griffin, and Donald W. Sherburne. Process and Reality: An Essay in Cosmology. Gifford lectures, 1927-28 (New York: Free Press, 1978).

⁸⁰⁷ Rescher, Nicholas. Process Metaphysics: An Introduction to Process Philosophy. SUNY series in philosophy (Albany: State University of New York Press, 1996). See also Rescher, Nicholas. Process Philosophy: A Survey of Basic Issues. (Pittsburgh, PA: University of Pittsburgh Press, 2000). See also the work of his student Seibt, Johanna. "Free Process Theory: Towards a Typology of Occurrences." Axiomathes. 14. 1 (2003): pp. 23-55.

⁸⁰⁸ James, William. The Principles of Psychology (New York: Dover Publications, 1950) p. 609, 3 volumes.

‘plane of the present’ would be different⁸⁰⁹. In light of the philosophical legacy of Heidegger, we note that Pure Being and Process Being serve to define the ‘plane of the present,’ and that the basic thrust of Metaphysics in the Western Tradition is related to Presence. Pure Being indicates that everything Present is a completely accessible pure plenum. Process Being indicates that there is a ‘plane of presence’ between the past and future, which is actually Becoming, and that Pure Being, itself, is an illusion that we create by projecting beyond this plane to the whole of three-dimensional space. In Process Being there are inaccessible regions *beyond presence* that must *be made present* by a ‘showing and hiding’ dynamic. This dynamic is missing from Pure Being. The two views together define the asymmetry between space and time, which is central to our pre-Twentieth Century view of physics. In the Twentieth Century we learned through Relativity Theory and Quantum Mechanics that there was a four-dimensional world beyond the ‘symmetry-broken world’ we experience. Heidegger tried to create a generalized way of relating the two views together by saying that Pure Being is how we see the world as present-at-hand, and that Process Being is the supporting infrastructure of technology that has a special wholeness hidden from us, although we must relate to it as an *absence* in order to deal with *presence*. Thus, Heidegger created a model of our existence, which took account of the fact that we seem to live in a lifeworld that has a *symmetry break between time and space*, but actually, we live in a world whose infrastructure is *not* symmetry broken, and we draw upon that to negotiate our way through the world that we are experiencing⁸¹⁰.

We can use our analogy to further understand the relationship of Hyper Being to Wild Being and to approach the nonrepresentability of Ultra Being. The ‘difference that makes a difference’ (Bateson⁸¹¹) between Process Being and Pure Being is embodied in an uncrossable line whose nature is Hyper Being. There is a hidden discontinuity between Pure Being and Process Being, and this discontinuity has a different nature than either of them. Hyper Being embodies the nature of the discontinuities that appear in both products and processes. But, *if Hyper Being is a line, then by this analogy Wild Being is merely a handful of points that cannot be connected*. Notice, that at each stage, each kind of Being becomes more difficult to envision as we consider the *impossibility* that is connected to it. The three-dimensional space of Pure Being is impossible to cross or move about in, thus it

⁸⁰⁹ Mead, George Herbert, and Arthur Edward Murphy. The Philosophy of the Present (Chicago: Open Court Pub. Co, 1932).

⁸¹⁰ Heidegger, Martin. On Time and Being (New York: Harper & Row, 1972). See also Schatzki, Theodore R. Martin Heidegger: Theorist of Space. Sozialgeographische Bibliothek, Bd. 6. (Stuttgart: Steiner, 2007).

⁸¹¹ Bateson, Gregory. Steps to an Ecology of Mind (New York: Ballantine Books, 1972).

has no contradictions within it. The two-dimensional space of Process Being is impossible to go beyond, so we are trapped in the Now between Past and Future. Here, Time is seen as a ‘plane of presence’ sweeping through the *block* of Pure Being that is distinguished by phases of time. Contradiction is acceptable in Process Being, but one can be suddenly trapped in a much narrower plane, such as Flatland⁸¹². Within Hyper Being we are distinguishing between Pure Being and Process Being and that becomes a line that is impossible to cross and thus a line that represents all discontinuities and finally, within Wild Being, we are trapped in single points that are impossible to connect. All we can do is to look at the propensities of those points and try to see a pattern such as we do when we look at the Mandelbrot Set⁸¹³. The *propensities of the points* are the direction and velocity they would travel if they were free to escape to infinity. And by looking at those propensities,⁸¹⁴ we can see a pattern that reveals the sub-surface presence of singularities that are affecting those points. The Singularity is virtual and does not exist in spacetime. Within Wild Being there is no room to think, there is only room for concepts, or perspectives, or designs, or essences (as isolated contents that *cannot be connected*). The *possibility of connection* appears in Hyper Being. Within Hyper Being, a whole universe of possible connections unfolds. But, in Wild Being, there are only fixed points with no possibility of connection, each with its propensity to move *if* it were allowed to move. This is the *constriction* of being-in-the-world, which is the opposite of the *expansion* of being-in-the-world. Hyper Being and Wild Being are duals. They are very strange, which makes it difficult to describe them. But their relationship is essential to understanding how emergent events and their associated anamorphic objects, i.e., objects that change the world, come into existence. The modality of Wild Being can be characterized as “Out of Hand”⁸¹⁵ in a close comparison with Kevin Kelly’s Out of Control⁸¹⁶. In other words, within Wild Being there is no room to maneuver in our understanding of things. Each stage of Being is a restriction in our ability to make things intelligible, *until we move into the realm of Ultra Being where we encounter a non-representable singularity*. These two

⁸¹² Abbott, Edwin Abbott. Flatland: A Romance of Many Dimensions (New York: Barnes & Noble, 1963). See also Stewart, Ian. Flutterland: Like Flatland Only More So (Cambridge, Mass: Perseus Pub, 2001). See also Abbott, Edwin Abbott, and Ian Stewart. The Annotated Flatland: A Romance of Many Dimensions (Cambridge, Mass: Perseus Pub, 2002).

⁸¹³ Mandelbrot, Benoit B. The Fractal Geometry of Nature. (San Francisco: W.H. Freeman, 1982).

⁸¹⁴ Thompson, Ian J. Philosophy of Nature and Quantum Reality (Department of Physics, University of Surrey, 1993). See <http://www.ianthompson.org/propensities.htm> accessed 080905.

⁸¹⁵ This is the author’s terminology which elaborates on the modalities of being-in-the-world at the level of Wild Being, that have no definitive terms such as present-at-hand, ready-to-hand. It complements the ‘in-hand’ for Hyper Being also coined by the author.

⁸¹⁶ Kelly, K., Out of Control: The New Biology of Machines, Social Systems, & the Economic World (Perseus Books Group, 1995).

extremes of constriction and being out-of-control are reminiscent of the freeze response in trauma. There is the fight/flight response, which is binary (you either fight or flee). But, if you cannot fight or flee, then you are frozen, which is *also* a way of countering a threat. For example, some predators will not eat prey that is already dead, so prey will freeze and ‘play dead’ in order to attempt to avoid being eaten when ‘fight or flight’ does not work. Thus, the representation of these states of Being appear psychologically in response to Trauma. This means that the states of Being are extremes in our human experience and that is why we are not familiar with them. Yet, they play important roles as survival mechanisms in extreme situations. We see pictures of those extreme situations that define the limits of human experience in Myth. *There are many archetypal representations of these types of states that fill the panoply of possible states of being-in-the-world.*

Geometrical Model of the Unfolding of the Kinds of Being from the Singularity of Ultra Being

Once we understand that Hyper Being and Wild Being are duals of each other just as Process Being and Pure Being are, and once we understand that these duals are *also duals*, then we can begin to better understand that we are dealing with a complete set of ‘possible states of being’ as we move from complete unrepresentability to complete representability. Complete representability is connected with having the highest degree of freedom and complete non-representability is connected with a complete lack of points needed to represent something. The stages of movement toward representability involve *first* having the zeroth dimensional points in Wild Being, but not being able to connect them, and *then* having the first degree of freedom as a one-dimensional line in Hyper Being for making a choice, but in the untenable position of not being able to cross the line between those alternatives. When we introduce a second dimension with Process Being, then it is possible to move about, but you still cannot leave the plane, like the flatlanders. That plane is the moment of the Now within space. When we introduce the third dimension, we then have a full panoply of space that is present and this is Pure Being. When we combine Pure Being and Process Being, we have moved into the monolith, and through their equiprimordiality we can create a model of the asymmetry of spacetime. The plane of the present sweeps through, from past to future, but we are always trapped in ‘the plane of the present.’ Yet, from the point of view of space, there is an assumption that this plane is the ‘symmetry breaking point’ between space and time. Time is seen as four-dimensional. Four dimensions contain four three-dimensional spaces. At every point in three-dimensional

space there is another direction that Rudy Rucker⁸¹⁷ (following Hinton⁸¹⁸) calls the *ana* and *kata*, which is orthogonal to the three dimensions of space that we experience. This means that at every point there is a plane, which is the interface to another three-dimensional space that is different from the one we are in. In our model of the worldview we have called those three other spaces, the *regions*⁸¹⁹. In stories, fairytales, and myth this surface is represented as a mirror. This is because, if we pass something through the fourth dimension, we can turn it inside out. That is the basis of our model in the Quadralectic: turning the System inside out through the Meta-system so that the System becomes the projection. Since time is a fourth dimension, then time is seen as that plane that allows things to turn inside out, or as a plane that can create enantiomorphic⁸²⁰ forms within our world (such as our own right and left symmetry). The Chiasm of the Brain⁸²¹ in relation to the Body is an excellent model of this. The right brain controls and perceives what is happening on the left side of the body and vice versa. The two sides of the brain communicate through a chiasm, a set of connecting nerves between the right and left sides of the brain. This chiasmic aspect is what Merleau-Ponty associates with Wild Being⁸²². From the point of view of Wild Being we are constituted as Flesh⁸²³, and the nature of that Flesh is what Merleau-Ponty calls “touch-touching”. That is what Merleau-Ponty is referring to when a single person has one hand touching the other. He contends that you cannot feel the both hands touching each other at the same time. In other words, there is a de-cision (decision) as to whether we will feel one hand touching the other hand, *or* feeling

⁸¹⁷ Rucker, Rudy v. B. [The Fourth Dimension: Toward a Geometry of Higher Reality](#) (Boston: Houghton Mifflin, 1984) p. 139. See also Pickover, Clifford A. [Surfing Through Hyperspace: Understanding Higher Universes in Six Easy Lessons](#) (New York: Oxford University Press, 1999) p. 99. See also Kaku, Michio. [Hyperspace: A Scientific Odyssey Through Parallel Universes, Time Warps, and the Tenth Dimension](#) (New York: Oxford University Press, 1994).

⁸¹⁸ Hinton, Charles Howard. [The Fourth Dimension \(1904\)](#) (Kila, MT: Kessinger Pub, 1996). See also Hinton, Charles Howard. [Scientific Romances: First and Second Series](#) (New York: Arno Press, 1976). See also Throesch, Elizabeth Lea. [The Scientific Romances of Charles Howard Hinton: The Fourth Dimension As Hyperspace, Hyperrealism and Protomodernism](#) (U. Leads, Ph.D. 2007). See also Hinton, Charles Howard, and Rudy v. B. Rucker. [Speculations on the Fourth Dimension: Selected Writings of Charles H. Hinton](#) (New York: Dover Publications, 1980).

⁸¹⁹ “Regions” is the author’s terminology for the other three three-dimensional spaces beyond ours that belong to the fourth dimension.

⁸²⁰ Gardner, Martin. [The Ambidextrous Universe: Left, Right, and the Fall of Parity](#) (New York: New American Library, 1969).

⁸²¹ Bear, Mark F., Barry W. Connors, and Michael A. Paradiso. [Neuroscience: Exploring the Brain](#) (Baltimore, Md: Lippincott Williams & Wilkins, 2001). p. 312 for Optic Chiasm; Springer, Sally P., and Georg Deutsch. [Left Brain, Right Brain: Perspectives from Cognitive Neuroscience](#). A Series of Books in Psychology (New York: Freeman, 1997).

⁸²² Op. cit. Merleau-Ponty. [The Visible and Invisible](#) p. 102 throughout the book starting with the preface. He also calls Wild Being “*brute* Being” patterned after Lévi-Strauss, Claude. [The Savage Mind](#) (Chicago: University of Chicago Press, 1966).

⁸²³ Gillan, Garth. [The Horizons of the Flesh; Critical Perspectives on the Thought of Merleau-Ponty](#) (Carbondale: Southern Illinois University Press, 1973).

the other hand touch the one hand. There is a certain opacity to that de-cision or di-remption⁸²⁴. There are phenomena such as tickling that we cannot do to ourselves. We can only be tickled by another. The radical discontinuity in the flesh between touch or touching⁸²⁵ as an *either/or* sensation represents Hyper Being, but the fact that we can only be tickled by another, and not ourselves, represents the chiasm between the two alternatives despite their radical separation. That is why the pattern of propensities, when viewed globally, makes up something that is recognizable.

The Mandelbrot Set⁸²⁶ is such an example of how ‘lines of flight’⁸²⁷ form patterns in spite of the isolation of the points in the Complex Plane. It is made up of isolated points in the imaginary plane represented by their lines of flight⁸²⁸, which are colored by their escape velocity differences. The tickle response is a global pattern between bodies that we cannot imitate using our own body⁸²⁹. Those bodies each have a “touch-touching” discontinuity in the reflexive perception of their own bodies as flesh. But there is still a global pattern between bodies that bridges those discontinuities – both *within* the bodies and *between* bodies. Wild Being can be interpreted as the internal and inherent proclivities, tendencies, propensities, etc. of content that bridges their separation in space to form whole patterns in spite of the fact that they cannot be connected. Wild Being is as close as we can get to understanding the noumena of the non-representable aspects of objects and ourselves as *Wille*. Peirce refers to the points of Wild Being as Firsts⁸³⁰. When we *relate* the points of ‘Firsts’ to each other we get ‘Seconds’, i.e., relationships between things such as we see in Hyper Being. When we relate these relationships to each other, we get ‘Thirds’, which are continua such as those that appear as surfaces in Process Being. Going beyond Peirce we can say that Pure Being is a realm of synergies such as we see in the Platonic solids at the third and higher dimensions. Those synergies are relationships that exist between continua,

⁸²⁴ Di-remption is an archaic word meaning separation, used for translating Hegel where he indicating ‘splitting in two’.

⁸²⁵ Lawlor, Leonard. The Implications of Immanence: Toward a New Concept of Life (New York: Fordham University Press, 2006).

⁸²⁶ Mandelbrot, Benoit B. Fractals and Chaos: The Mandelbrot Set and Beyond: Selecta Volume C (New York: Springer, 2004).

⁸²⁷ Cf. Deleuze, Anti-Oedipus Op. cit.

⁸²⁸ Hughes, John. Lines of Flight: Reading Deleuze with Hardy, Gissing, Conrad, Woolf (Sheffield, England: Sheffield Academic Press, 1997). pp. 45-6.

⁸²⁹ Crossley, Nick. The Social Body: Habit, Identity and Desire (London: SAGE, 2001). p. 69.

⁸³⁰ This is a radical reinterpretation compared to what we gave when discussing Peirce’s own approach to defining Firsts. Firsts for Peirce were geometrical and had a quality of homogeneity. Here, by a reinterpretation, they are transformed into exemplifications of propensities, tendencies, and dispositions that are the source of lines of flight.

yet, at the same time, they are also constraints built into the nature of what can exist by the nondual Nomos that appears in Mathesis.

Order is the most basic nondual between the dualities of Physis and Logos. It is in this nondual Nomos that the Foundational Mathematical Categories are inscribed as traces of Emptiness. Void is related to the existence of empty space as the ultimate container. Emptiness and Void can be thought of as the nondual nature of an idealized geometrical space and its synergies and constraints in relation to real spacetime. In order to create anything we need to draw upon the resources of mathematical possibility. On one hand that can be traced in Emptiness while, on the other hand, the *actuality* of empty space is a place where something can be created. But how does something draw on *both* the mathematical possibilities and the physical spacetime possibilities in order to attain something that synergistically represents the emergent characteristics that are embodied in spacetime? This can only happen by creating a bridge between those two realms, but in doing so, we need something that will not only embody the quality of bridging (or connecting) but something that will *allow* the connection as well. It is *Manifestation*, i.e., the deeper nondual that makes Emptiness and Void the same thing prior to their arising as different interpretations of Existence. *This* is what *allows* the ‘bridging’ (or connection) to happen. For the actual embodiment to exist, there must be a departure from a non-representable singularity beyond spacetime. Embodiment must exist in virtuality. According to Deleuze⁸³¹, actualization only occurs as appearing out of virtuality. The Singularity of Ultra Being, which distinguishes Emptiness from Void, must give rise to this embodiment in spacetime. Embodiment first appears as points with propensities that can be characterized as content. If we were able to actually *connect the unconnectable* we could distinguish the first type of order as a set of distinctions. Those distinctions would be represented by using a boundary logic⁸³² or laws of form⁸³³. At this point, once we have distinctions, then we can relate them to each other and produce *continua* out of the *discontinua*, which is actually a Peircian Third. Finally, when one relates the continua *synergistically to each other*, then we have a *plenum* such as appears in Pure Being. Notice that the kinds of Being are stages of both embodiment and representation. That is why Deleuze describes them in terms of both “Representation” and “Repetition”. Repetition is a behavioral component that relates to embodiment. Representation and Repetition are basic

⁸³¹ De Landa, Manuel. *Intensive Science and Virtual Philosophy*. Transversals (London: Continuum, 2002).

⁸³² Op cit. Kunze, D.; See also Bricken, W.M. “An Introduction to boundary logic with the losp deductive engine” Research report (Seattle: University of Washington 1988).

⁸³³ Op cit. Spence-Brown, G. *Laws of Form*.

distinctions with dimensional differences that produce sub-schemas. Embodiment and Representation go together. That is why Schopenhauer presented the World as Will and Representation⁸³⁴. Will (*wille*) is the embodiment of our propensities. Representation becomes possible as soon as we can make a distinction, prior to that there is no representation. Representation becomes possible at the level of Hyper Being because possibilities become possible at that level. At the level of Wild Being, when we are but Flesh *without possibilities*, all we can relate to are our own propensities, dispositions⁸³⁵, tendencies, and proclivities. Derrida built his philosophy on the “Differance” of Hyper Being, while Deleuze and Guattari based their philosophy on Wild Being. Deleuze and Guattari characterize us as *desiring machines*, pure purveyors of our desires that are utterly embodied and completely immanent. The individual is seen as a physical and organic nexus for these desiring machines⁸³⁶, which form a rhizome⁸³⁷ of difference within the *socius*⁸³⁸, i.e., the social field, i.e. *mitsein*⁸³⁹. James S. Hans in the Play of the World⁸⁴⁰ also built a philosophy at the level of Wild Being as did Cornelius Castoriadis who uses the term *Magma*⁸⁴¹ to define his philosophical concept of Wild Being. There have been multiple attempts to explore this wild and untamed region of the embodied *Wille*, or the *human as a thing-in-itself*, or the *human as noumena*. Yet, the whole key to these various philosophies is *embodiment*. Wild Being is the level where the entity that is *coming into being* is *embodied* and given the nature of being *existent* as well. Wild Being is the point where things cross over from a *virtual singularity* and become embodied within spacetime for the *first* time, which happens prior to having access to the realm of their possibilities. Once they are opened up to the realm of their possibilities, then it is possible for the embodiment of those possibilities to occur in spacetime. This is prior to any process, and prior to any product. Processes are precisely the exploration of the realm of possibilities based on given propensities. Processes are probabilistic. Probabilities are generated from

⁸³⁴ Op. cit. See http://en.wikipedia.org/wiki/The_World_as_Will_and_Representation, accessed 080824.

⁸³⁵ Mumford, Stephen. Dispositions (Oxford: Oxford University Press, 1998). p. 84.

⁸³⁶ Shapiro, Gary. After the Future: Postmodern Times and Places. Contemporary Studies in Philosophy and Literature, 2 (Albany: State University of New York Press, 1990).

⁸³⁷ Deleuze, Gilles, and Félix Guattari. A Thousand Plateaus: Capitalism and Schizophrenia (Minneapolis: University of Minnesota Press, 1987) P. 14ff.

⁸³⁸ Østerberg, Dag. Metasociology: An Inquiry into the Origins and Validity of Social Thought. (Oslo: Norwegian University Press, 1988) pp. 226-229. See also Graafland, Ad. The Socius of Architecture: Amsterdam, Tokyo, New York. Stylos Series. (Rotterdam: 010 Publishers, 2000).

⁸³⁹ Op Cit Heidegger, M. Being and Time Trans. Macquarrie, John & Robinson, Edward. p. 263; See also Olafson, Frederick A. Heidegger and the Ground of Ethics: A Study of Mitsein. Modern European Philosophy (Cambridge, UK: Cambridge University Press, 1998).

⁸⁴⁰ Hans, James S., The Play of the World (Amherst: University of Massachusetts Press, 1981).

⁸⁴¹ Castoriadis, Cornelius, The Imaginary Institution of Society (Cambridge, Mass.: The MIT Press, 1998).

fuzzy, rough possibilities and propensities⁸⁴². Think of risk⁸⁴³ calculations, which are Bayesian⁸⁴⁴, i.e., subjective probabilities. You must have the possibility of risk and the propensity for its occurrence. We will represent them *both* as subjective probabilities, but, in fact, subjective probabilities are merely ‘bound’ by what is ‘not boundable.’ Fuzzy numbers give up the ‘bound of *one*’ that probabilities try to maintain.

Risk is a fuzzy, rough representation measured against a propensity for occurrence. The propensity for occurrence is the likelihood that a condition will be actualized, i.e., actually arise in an embodied form. We will take that propensity of actual embodiment and contrast it to the possibilities of the effects that may occur. The possibilities of that embodiment form an endless horizon. But it is important to note that the endless horizon by itself, without the embodiment, is useless. Embodiment allows for the exploration of the horizon’s ownmost possibilities. This, in turn, creates a process, which will result in a product that is the ‘Pure Being’ goal of the process. It is necessary for each of these kinds of Being to appear as something emergent in the design process. It is imperative that all the levels and kinds of Being are applied to the Design Process. Without this careful identification and analysis of these subtle, but intrinsic aspects of the Design Process, we operate with the blind assumption that the final product is all that matters. We do not give these careful steps of the design process their due, instead, we focus on Pure Being. The Hyper Being and Wild Being phases of the process are ignored and this is how our Design Processes go awry. If the product is to have integrity and perform to the best of its capacity, then the Design Process must be able to identify, analyze, and predict its performance and the potential gains and consequences of that performance. *Furthermore, when we stifle an investigative philosophical approach to the Design Process, then we are also hindering the creative force that nurtures this process as well as the actual emergence of the emergent artifact.* The Design Process is not the same as the manufacturing process, which is focused on producing a finished quantity of the same thing. In the case of manufacturing, a focus on Pure Being makes sense. But, if we *stagnate* in the realm of Pure Being in the Engineering Design Process, we actually *suppress* these other levels of Being into the backwater of our social unconscious, *and this actually makes our job more*

⁸⁴² Hacking, Ian. [The Emergence of Probability: A Philosophical Study of Early Ideas About Probability, Induction and Statistical Inference](#) (London: Cambridge University Press, 1975) P. 137. See also Mellor, D. H. [Probability: A Philosophical Introduction](#) (London: Routledge, 2005) pp. 61-62.

⁸⁴³ Rescher, Nicholas. [Risk: A Philosophical Introduction to the Theory of Risk Evaluation and Management](#) (Washington, D.C.: University Press of America, 1983).

⁸⁴⁴ Bernardo, J. M., and Adrian F. M. Smith. [Bayesian Theory](#). Wiley Series in Probability And Mathematical Statistics (Chichester, Eng: Wiley, 1994).

difficult. It is no wonder that so many projects either fail or are seriously over-running their budgets and schedules! *Systems Phenomenology is the cure to this malaise*. Systems Phenomenology calls for recognizing all the kinds of Being and their effects on the System and we can do this by acknowledging their existence and behavior within the Meta-system. This means that we must recognize all the modalities of our being-in-the-world.

The impossibility of connecting the *points* at the level of Wild Being indicates that the nature of the Singularity is non-representable and naturally obscure since it is not directly manifest. It is an example of an “essence of manifestation” in the sense that M. Henry uses the term. The Singularity⁸⁴⁵ is something that never manifests, it remains virtual. The points with propensity that cannot be connected are all of the same points in the Singularity, and the differences in propensity are the traumatic separations that occur when they are ripped apart. When visualized as a whole, the wild points in their “lines of flight”⁸⁴⁶ all point to each other through their propensities and the global pattern that they produce, and this holistic perception of Manifestation compares closely to the way that we view the Mandelbrot Set. When we break that barrier of non-connection and allow two points to be connected and establish a Second from their Firstness, then we violate the integrity of the pattern and foist our projection on top of that pattern of disconnected points. That pattern of disconnected points will appear as a projection of the first distinction, which is then caught up in a whole net of such distinctions. As we project that net, we tend to be distracted by the difference between the map and the terrain that appears. We forget the propensities and instead look only at the distinctions that we make based on the content we are given and the *bridges* we are building. When we view these bridges *from the side*, they are *distinctions*, when we look at them *head on*, they are again bridges *from ‘content point’ to ‘content point.’* The net of relationships do not assume any continuity. Next is the projection of continuity (Thirdness) between the relationships. The projection of continuity allows for the *net* of relationships, as well as the meta-relationships, *between* the relationships, etc. to be understood as a single network that is completely interconnected. This provides a basis for traversing the net and thus creates processes that manipulate and use the net. When we arrive at three-dimensional space, then synergies begin to appear as constraints on the Nomos in either the Physis or the Logos. In that case, we call the attendant synergies, the Fourth, which go beyond Peirce’s categories.

⁸⁴⁵ Lu, Yung-Chen. Singularity Theory and an Introduction to Catastrophe Theory (New York: Springer-Verlag, 1976). See also Bruce, J. W., and P. J. Giblin. Curves and Singularities: A Geometrical Introduction to Singularity Theory (Cambridge, UK: Cambridge University Press, 1984).

⁸⁴⁶ *Ibid.* (Deleuze)

A famous example is the Platonic Solids that appear in Euclid's Elements. Similar, but different solids appear in the Fourth and higher dimensions.

Our geometrically inspired model allows us to crisply define the emergent transitions between the various meta-levels of Being and appreciate the significance of the relationship between Hyper Being and Wild Being and, in turn, their relationship to Ultra Being. Ultimately, the noumena is non-representable, but at each stage as we descend the stairs of the meta-levels of Being, we see more representability within each of the meta-levels. And representability is central to the possibility of design. We create designs to represent the emergent artifacts we wish to develop and implement, and our intention is that the products of our designs will become appropriate, proactive entities that will be become embodied within the world. Wild Being allows us to accomplish embodiment, while Hyper Being opens up the realms of possibilities beyond what already exists. We tend to only concentrate on Pure Being, which is the finished product, while we tend to suppress the process by which the products are developed. *But even more, we suppress the higher meta-levels of Being and their effects on the development process.* But, of course, that suppression does not ultimately work causing our design and development efforts to go astray. The Quadralectic is an attempt to show how these higher kinds of Being play a *decisive role* in Emergent Engineering by modeling the Design Process more accurately. If we recognize that the dynamic of the Quadralectic at the Hyper Being level is dependent upon the emergence of Wild Being from Ultra Being, then we will have a fundamental insight into the nature of the Quadralectic. The Quadralectic provides a basis for embodiment and then opens up the possibilities for the processes and products to follow these initial states of Being that are difficult to envision because they condition our creative processes so deeply. It is in the realm of Wild Being that we are most attuned to our materials and their own proclivities and propensities. This becomes *covered over* when we generate relationships, inter-connected *meta*-relationships and the net of distinctions that these relationships entail. Those networks of relationships are then covered over by 'assumptions of continuities.' Then, the 'assumptions of continuities' are covered over by the 'continuities of continuities,' which manifest synergies from the Nomos. Notice that the Nomos, which is nondual, begins to show up in Pure Being, which is related here to Fourthness. Everything ontic, which are the specific designs of specific things, take place on the other side of Ontological Difference against this background of Being with the different layers of projection that it represents. This is the background for every design, but we normally only pay attention to the *first* background, the Pure Being, and ignore or suppress the other kinds of Being and their importance to the process of the Emergence of

the New⁸⁴⁷. We ignore the background practices that are needed to constitute the deeper backgrounds. Creativity involves being open to *all* the backgrounds of our projections onto existence. The deeper the creativity and the more genuine the Emergent Event, then the more layers of projection are involved.

Meta-levels of Being and the Unfolding of the Schemas

We have noted that the Quadralectic is composed of four moments and that each moment demonstrates a relationship between the System and Meta-system, and the foreground and background, which is mediated by a *trace* and a *medium*. In addition, it is significant to note that this configuration of the *moment* is related to a projection of the System beyond the Meta-system as an involution of itself. We will arrange the portions of the moments in the following manner: We will place the Hyper Being *trace* between the System and the Meta-system. We will place the Wild Being *propensity* between the Meta-system and the projection. Beyond the projection we will place the Ultra Being *singularity*. The organization of the Quadralectic moment and their attributes should look like this:

⁸⁴⁷ Bunge, Mario Augusto. Emergence and Convergence: Qualitative Novelty and the Unity of Knowledge. Toronto Studies in Philosophy (Toronto: University of Toronto Press, 2003). See also Morgan, C. Lloyd. The Emergence of Novelty (London: Williams & Norgate, 1933). A classic.

• Facet	Schema
<i>Emptiness</i>	<i>standing</i>
MEDIATION	
• Monad	Schema
<i>singular content – Ultra Being – four-dimensional.</i>	<i>standing</i>
MEDIATION	
• Pattern	Schema
<i>product – Pure Being – unmovable space</i>	<i>standing</i>
MEDIATION	
• Form	Schema
<i>process – Process Being – unbreachable plane</i>	<i>standing</i>
MEDIATION	
• System	Schema
<i>trace – Hyper Being - uncrossable line</i>	<i>standing</i>
MEDIATION [<i>essence, concept, perspective, design</i>]	
• Meta-system	Schema
<i>propensity – Wild Being - unconnectable points</i>	<i>standing</i>
MEDIATION [<i>focus, object, image, signature</i>]	
• Domain Projection	Schema
<i>singularity – Ultra Being virtuality</i>	<i>standing</i>
MEDIATION	
• World	Schema
<i>Void</i>	<i>standing</i>
MEDIATION	
• Kosmos	Schema
<i>manifestation</i>	<i>standing</i>
MEDIATION	
• Pluriverse	Schema

Table 8.1. Mediation between Schematic Levels

Note: The terms in bold print are the areas where we are concentrating our efforts, and the terms in lighter print indicate a wider context for our focus. We are concerned with the image of the series and its relationship to the object of our investigation, which interfaces with Hyper Being. When we bring the two series together, i.e., the series of the schemas and their relationship to the structure of the moments of the Quadralectic, then we can see that it has a unique signature that motivates the argument in this dissertation.

Notice that when we combine the model of the dimensions of solitariness or isolatedness that describe the kinds of Being to this present model of mediations between schemas that are separated by standings, we see that the Quadralectic behaves in a reflexive manner. As

the schemas ascend to higher levels, the dimensions grow smaller. This reflux is different from the usual way of thinking about how the kinds of Being relate to the schemas. Normally we think of the kinds of Being as having meta-levels from *each* of the categories, but here the kinds of Being extend back toward the monads. This results from our conclusion that Hyper Being appears between the System and the Meta-system, which is the area that we are concerned with in respect to the *appearance* of the Quadralectic. This spills over into the relationships of the kinds of Being to the other schemas in an unexpected way, and when they are related to our ‘Dimensional Model of the Kinds of Being,’ we can see that the kinds of Being move in a direction that is *opposite* the hierarchy of the schemas. It is necessary to follow out these unexpected results of our models in case they show us something that we might not have seen otherwise. In this case it shows us that there is an *implicit reflux* from the upward unfolding of the schemas that relates to the dimensional expansion of the kinds of Being. Now, our explanatory model of the ‘Dimensional Expansion of the Kinds of Being,’ is predicated on the *solitariness* and *isolated disconnectedness* and the *lack of movement* that they each embody. This is counter intuitive, but it is one of the implicit and underlying implications of the Ontotheology or Logocentrism of the Metaphysics of ‘Presence without Absence’, ‘Identity without Difference’, ‘Truth without Fiction’, or ‘Reality without Illusion’. As we are moving toward greater and greater schematic articulation, we are, in fact, *contracting* as a result of the constraints of the Logocentrism of the Metaphysics of Presence and Ontotheology. The schemas are limited to a finite number, and, according to our calculations, S-Prime Theory⁸⁴⁸ suggests *ten*. The expansion of the Schemas is related to the expansion of *geometrical dimension*, but, the expansion of schemas is also *inversely* related to the dimensional character of the kinds of Being. As the schemas expand, the dimensional character of the kinds of Being eventually becomes more constricted and this has the effect of making the higher levels of the schemas more difficult to comprehend. They reach a level of profundity that causes them to become ‘unthinkable’ and that ‘unthinkability’ occurs between the Domain and World. We already noted that the greatest openness with respect to the area and volume of the hyperspheres of the higher geometrical dimensions (that are associated with the higher schemas) occurs between the Meta-system and Domain (volume), as well as between the World and Kosmos (area). So, it is of interest that this ‘singularity of unthinkability’ occurs between the two points of the greatest expansion of dimensional openness embodied in the hyperspheres. This means that there should be some

⁸⁴⁸ Nb. Developed by the author in previous essays on General Schemas Theory. Ten schemas: -1 to 9 dimensions. Two schemas per dimension and two dimensions per schema.

caution in discounting that this ‘reflux’ or ‘counter-contraction’ has meaning, although, it is difficult to comprehend what that meaning might be.

Dimension, Schema, <dimension, standing> Schema, FMC
12 {F theory ⁸⁴⁹ }
11 {M theory ⁸⁵⁰ }
10 {string theory ⁸⁵¹ }
09 pluriverse <-4d amanifest> unknown
08 kosmos <-3d manifestation> pluriverse (singularity)
07 world <-2d void> kosmos maximum area ⁸⁵² (holoid)
06 domain <-1d Ultra > world singularity (holon/integra)
05 meta-system <0d Wild> domain maximum volume ⁸⁵³ (whole)
04 system <1d Hyper> meta-system (mass)
03 form <2d Process> system (set)
02 pattern <3d Pure> form (multiple)
01 monad <4d Ultra> pattern (site/event)
00 facet <5d emptiness> monad (singularity)
-1 facet <6d manifestation> unknown

Table 8.2. Dimensions in relation to Schemas and Standings.

An additional question arises as to why it is that there is a Singularity⁸⁵⁴ between the *World* and *Domain* when the maximal openness, in terms of the area and volume of hyperspheres, occurs on either side of that Singularity in the unfolding of the schemas. This is a deep mystery. There is a difference between the Domain and the World. The Domain is a set of *rigorously controlled* perspectives, while the World is *all the possible* perspectives. It is similar to the difference between the System and Meta-system with respect to control over perspectives, although we don’t have access to all the possible perspectives in a World and that is what makes these Worlds so baffling. Perhaps that Singularity has to do with that

⁸⁴⁹ <http://en.wikipedia.org/wiki/F-theory> accessed 080905.

⁸⁵⁰ <http://en.wikipedia.org/wiki/M-theory> accessed 080905.

⁸⁵¹ http://en.wikipedia.org/wiki/String_theory accessed 080905.

⁸⁵² Hypersphere 33.07 unit sphere areas.

⁸⁵³ Hypersphere 5.26 unit sphere volumes.

⁸⁵⁴ The Singularity may explain the difference between the limits of the experience-able and the non-experience-able schemas (Kosmos and Pluriverse), which has always been a mystery.

lack of access. We could offer another interpretation. We have said that Dasein is being-in-the-world, and that Dasein is fused with the World Horizon. Perhaps the Singularity prevents us from having complete access to the paradoxicality or absurdity of Dasein, which projects the world but is also inside it. Dasein is immersed in Mitsein, which together intersubjectively projects the World⁸⁵⁵. Dasein cannot completely separate its own projection from the intersubjective projection of the World by Mitsein. Mitsein encompassing Dasein produces an openness and this openness is what appears as the surface and volume maximums of the hyperspheres. So, although Dasein produces an open clearing, which is himself, at the same time Dasein does not have access to himself. Dasein is wandering and falling, lost in his/her absurdity and in the ecstasy of the projection of Being, which is utterly involuntary⁸⁵⁶. It is possible that we can understand this inscrutable reflux within the structure and unfolding of the schemas in Wild Being with respect to the ‘contraction of being-in-the-world.’ This would give us another model that shows how the schemas *produce their own finitude* rather than producing infinite perspectives like the dimensions onto which they are projected.

This implies that the structure we are discussing would be arranged as follows:

Lower Schema - higher dimension
<i>modality – Kind of Being trace</i>
MEDIATION
Higher Schema - lower dimension

We compose the Quadralectic by stacking these schema levels from the Monad schema level to the World schema level. *Between any two schemas there is a kind of Being and a MEDIATION, which is the bridge between them.*

⁸⁵⁵ This is essentially the relation between Consciousness and Spirit described by Hegel.

⁸⁵⁶ This state of Dasein is described as that of the Zoas in Blake's epic.

The core of the Quadralectic is composed as follows:

System (second)
trace – Hyper Being (zeroth)
MEDIATION (first)
Meta-system (second)
propensity – Wild Being (zeroth at next level)
MEDIATION (first at next level)
Domain Projection (fourth and next second)

If we apply the Wissian categories to this template we see that there is an overlapping between the various schemas. This demonstrates that the categories can show how the schemas are fitted together to become “meet”.

Wild Being appears as propensities between the Meta-system and the Domain where the projection is realized. In each layer of the series between the schemas there must always be a form of mediation for each moment of the Quadralectic. By extending the Quadralectic beyond the core in this way, we can start at the beginning. There is a monad and the monad is articulated as singular content. It is mediated to the pattern level as the ‘patterning of that content’ in specific ways by specific modalities. We have discussed the various dissipative practices, which are desire, avoidance, dissemination, and absorption. These are all ways that the Pattern becomes mediated within the Form. Forms are engaged in processes that are mediated by the system and this produces behaviors of various types. For instance, in Object Oriented programs there are data and methods that encapsulate the data. Data is a pattern and the encapsulation gives the form, but the *methods* provide the behavior that manipulates the data to produce outputs that become inputs for other programming objects. The *system* is the collection of all the objects and all their instances and all their collective behaviors acting in concert. When we are debugging systems, we are looking at traces. The traces record tracks among the combinatorial explosion of tracks that the software will execute as a running system. This ‘combinatoric’ is what makes the testing of a system so difficult. In the Quadralectic there are specific mediations at the trace level for each moment of the Quadralectic: FOCUS, OBJECT, IMAGE, and SIGNATURE. The Meta-systems are the contexts for each of the System embodiments: context (intext), representation, behavior, and stance. The Meta-systems are called circumstance (representation), situation (behavior), surrounding horizon (stance), and context (intext).

We can see that *propensity* mediates between the Meta-system and Domain schemas. Those mediations can take on different characteristics that are related to Wild Being. The singularities of Ultra Being mediate between the Domain and World schemas. Void

mediates between the World and Kosmos, and Manifestation mediates between Kosmos and Pluriverse. On the other side, Emptiness mediates between Facet and Monad. These lay outside of the limits of experience and are mere transcendental idealizations. We can see that the Quadralectic appears in a larger pattern of mediation between the schematic levels via the kinds of Being. The mediation is at the trace level and we have focused our attention there because of the advent of possibilities that exist at that point.

In essence, our Systems Phenomenology takes account of the transition from the System level to the Meta-system level via the mediations that are modulated by Hyper Being, i.e., the realm of possibilities. This must occur in the context of the mediation of the Meta-system and the Domain in respect to propensities, as well as in the higher context of the mediation of the Domain and the World in terms of the Singularity of Ultra Being. As we build artifacts it is significant that we see our work in terms of the nesting of the schemas and as an expansion of the possibilities that take place between the System and Meta-system. With this understanding we will then see how necessary it is for the cyclical moments of the Quadralectic to work together. Who can claim that we do not need concepts, essences, perspectives, and designs to bring something new into the world and give it Being as well as Existence? Pieter Wisse discovered a large part of this structure in his creative use of Peirce to under-gird his Metapattern method. We have elaborated on his work and offered a cyclical dynamic that includes and expands it as a basis for Engineering. Engineering is more than just deSign Engineering. DeSign Engineering must interact creatively within a Quadralectic of Conceptual Engineering, Essence Engineering, and Perspective Engineering. Perspective Engineering is sometimes called the Integrated Process and Product Development Team. In a complex engineering environment, we need to involve many different disciplines and synergize their perspectives. We need these many perspectives in order to produce the emergent essence of the new artifact that will emanate from the concepts of possible Systems. Furthermore, we then need to represent the new System on paper before it is built. Sub-schemas such as plans, pictures, and models are needed to under-gird the construction of the emergent form of the new artifact, which will take its place within a new System that will transform the environment by its very presence in the new Meta-system. By showing the broader context of the Quadralectic, we hope to clarify how this process has the form that it does and what role it plays in our creative work as engineers and scientists. We need to understand General Schemas Theory, but the Quadralectic allows us to understand the broader process of the creative deSign of Emergent Systems. Context of the Quadralectic.

The Trajectory of Emergent Design through the Quadralectic

The Relationship between the Foundational Mathematical Categories and the Schemas as a Context for the Quadralectic

The Design process is related to the Emergent Event. This chapter will focus on the relationships of the mediations within the Quadralectic, which gives us the ability to see the trajectory of the unfolding of the Emergent Event based on the Schemas, the Philosophical Categories, the Foundational Mathematical Categories, and the Meta-levels of Being. We then show how this structure can be related to the minimal methods and viewpoints on realtime systems. Finally, we explore the various representations of the System in terms of minimal geometrical forms. Here, the moments of the Quadralectic are seen as aligned with the minimal system representations.

Mediations within the Quadralectic

Now, a more precise model of the Quadralectic has been created and we have demonstrated its unfolding from Ultra Being into Wild Being and then into Hyper Being⁸⁵⁷. Ultra Being is a non-representable singularity that marks the difference between Emptiness and Void as interpretations of Existence. We can also call this Singularity, 'the Neganary', that serves as a doorway into the Imaginary, if we consider it to be 'the step beyond the zeroth operator, which has no operands⁸⁵⁸'. We can see this singularity as the image of the noumena that lies beyond our projections. Prior to our schematic projection (intentional morphe) hitting the noumena, there are the propensities within the content (hyle), which are the expression of the separation of the content as it appears in spacetime from the non-representable singularity in the virtual realm. But when the projection interacts with the noumena and produces the sensible propensities of content, it opens out into the realm of possibility, which is an open horizon of possible worlds⁸⁵⁹. Projection is a process that appears in the mediation of the 'Hyper Being of the System and Meta-system'

⁸⁵⁷ This was the subject of the preceding chapter.

⁸⁵⁸ The Neganary is the trace of difference between the operator (verb) and operand (noun) prior to their arising as separate entities.

⁸⁵⁹ We are assuming here that the differences in the propensities of content are signs of their separation from the Singularity.

prior to the projection that is being articulated through Wild Being on the threshold of the Domain. That projection process starts from the Form, which is understood in terms of Pure Being's mediation into the System. As a result, we see the Quadralectic as not only being articulated as a trajectory across the schemas, but also as being augmented by these different kinds of Being with different mediations at each stage. In general, patterns nest into forms that, in turn, nest into systems, that nest into meta-systems that are then projected into domains, which become worlds where all possible perspectives are taken as a totality. At the level of Hyper Being, the System could be viewed as a Set (design), while the Meta-System could be viewed in terms of Mass (the design implementation within an operating environment). This projective trajectory has four moments that interact in the Quadralectic, and this interaction gives character to the intentional morphe as it modifies the content of the System in the context of the Meta-system. Because we place Hyper Being between System and Meta-system in this trajectory, there is an analogy with the Lifecycle of the Emergent Event represented in terms of the Foundational Mathematical Categories⁸⁶⁰. So, the trajectory across the schemas can be articulated in terms of the Lifecycle of the Emergent Event expressed as the series of Foundational Mathematical Categories etched in the Nondual Nomos. We can think of the Foundational Mathematical Categories as performing the role of mediation in each case. Thus, we can align the two series in the following way:

⁸⁶⁰ The names for the Foundational Mathematical Categories are as follows: Singularity, Site/Event, Multiple, Set, Mass, Whole, Holon/Integra, Holoid; See Emergent Engineering or Emergent Science and Engineering working papers by the author at <http://holonomic.net>.

nondual – manifestation	standing
MEDIATION = HOLOID seventh	mediation
Facet -1, 0 dimensions	Schema with dimensions
<i>nondual – emptiness</i>	standing
MEDIATION = SINGULARITY neganary	mediation
Monad 0, 1 dimensions	schema with dimensions
<i>singular content – Ultra Being (hunk)</i>	standing
MEDIATION = SITE/EVENT zeroth	mediation
Pattern 1, 2 dimensions	schema with dimensions
<i>product – Pure Being (solids)</i>	standing
MEDIATION = MULTIPLE first	mediation
Form 2, 3 dimensions	schema with dimensions
<i>process – Process Being (surfaces)</i>	standing
MEDIATION = SET second	mediation
System 3, 4 dimensions	schema with dimensions
<i>trace – Hyper Being (lines)</i>	standing
MEDIATION = MASS third	mediation
Meta-system 4, 5 dimensions	schema with dimensions
<i>propensity – Wild Being (points)</i>	standing
MEDIATION = WHOLE fourth	mediation
Domain Projection 5, 6 dimensions	schema with dimensions
<i>singularity – Ultra Being (singularities)</i>	standing
MEDIATION = HOLON/INTEGRA fifth	mediation
World 6, 7 dimensions	schema with dimensions
<i>nondual – void (plenum)</i>	standing
MEDIATION = HOLOID sixth	mediation
Kosmos 7, 8 dimensions	schema with dimensions
<i>nondual – Manifestation</i>	standing
MEDIATION = SINGULARITY seventh	mediation
Pluriverse 8, 9 dimensions	schema with dimensions
<i>nondual – Amanifest</i>	standing

Table 9.1. Mediations between Schemas as the Foundational Mathematical Categories and Philosophical Categories in relation to the Standings.

The exercise here is to take several different series of concepts already discovered in previous work⁸⁶¹ within this research program and to show how they can be interleaved to

⁸⁶¹ As exemplified in various working papers by the author, cf. <http://holonomic.net>.

give added meaning and thus illuminate our problem of describing the Quadralectic. We will expand on Wisse's concept of Mediation, and connect it with the Foundational Mathematical Categories that perform mediation. The Foundational Mathematical Categories are aligned with the trans-Peircean Philosophical Categories. We know that Hyper Being exists between the System and Meta-system, and that Hyper Being manifests in that transition, so, it is merely a matter of aligning the other kinds of Being as well as other Standings (Existence, Manifestation, and the Amanifest), to produce a model of the trajectory of the Emergent Event as it unfolds at the various schematic levels. This interleaving of the various series is speculative, and we engage in it as a thought experiment to give context to the unfolding of the moments of the Quadralectic at the level of Hyper Being between the System and Meta-system. Understanding that context is important. The whole thrust of Quadralectics is to relate concrete ideas to their context through mediations. Here, we are applying this same idea to our own study as we will attempt to understand the temporal unfolding of the schemas together with the kinds of Being through a series of Mediations based on the Foundational Mathematical Categories. The whole point is to see how the various schemas work against each other, and interfere with each other, in order to find the anomalies that appear in their interleaving and interlacing. We do not claim that this model is fully correct, but it is used here to give a temporal picture of the context of the Quadralectic, which can help us to understand the philosophical issues surrounding the formulation of this network of concepts. The network, as a trajectory of the kinds of Standing and the kinds of Mediations, is based on the Foundational Mathematical Categories, as well as the kinds of schemas and dimensions that will form an environment between the System and Meta-system for the Quadralectic to operate within. It shows that the Quadralectic is only one type of transformation operating in a broader series of transformations.

The Trajectory of the Emergent Event

If the Mediation is related to the Foundational Mathematical Categories, then it is also related to the trans-Peircean Philosophical Categories, i.e., the Neganary, Zeroth, First, Second, Third, Fourth, Fifth, Sixth, and Seventh. In this way we can explain how the arc of the trajectory through the schemas is lined up with the Foundational Mathematical Categories and the trans-Peircean Philosophical Categories via the Mediations. This helps us understand how the trajectory can be aligned with the Lifecycle of the Emergent Eventity. The Schemas align with the dimensions such that there are two dimensions per

schema and two schemas per dimension according to the S-prime Theory⁸⁶². If this is true then the Quadralectic not only operates within the relationships between the moments of the System/Meta-system level, but also across the trajectory itself. So, let us explore this trajectory and see if we can make sense of it. It unifies the Lifecycle of the Emergent Event with the Quadralectic across the trajectory of the schemas, which allows us to talk about the Foundational Mathematical Categories and the trans-Peircean Philosophical Categories as well. Bringing in the Philosophical Categories as well as the Foundational Mathematical Categories gives a great deal of definition to the trajectory, which includes the Quadralectic because this trajectory allows and initiates *possibility* into the world, and our focus is to increase our knowledge of the context in which the Quadralectic operates.

Facets can be compared to Quarks⁸⁶³, and since Quarks never appear on their own, they are the faceted elements within fundamental particles⁸⁶⁴. The Facet schema can be at either zeroth or negative one dimensions⁸⁶⁵. The Facets transform into the Monad through the mediation of the Singularity, in other words, the Monad is the unique instance of a fusion of the Facets it represents⁸⁶⁶. The Monads are the contents (hyle) of Patterns⁸⁶⁷. Monads are transformed into Patterns by the mediation of the Site/Event⁸⁶⁸ Foundational Mathematical Category, which has been described by Badiou in Being and Event. At a local site an event occurs⁸⁶⁹ and this represents something like a quantum measurement⁸⁷⁰ where the Singularity affects spacetime because there is a separation of ambiguously overlapped states that may have existed previously⁸⁷¹. The Site/Event Foundational

⁸⁶² S-prime is the author's hypothesis for General Schemas Theory. S-prime posits that there are two dimensions per schema and two schemas per dimension.

⁸⁶³ Han, M. Y. Quarks and Gluons: A Century of Particle Charges (Singapore: World Scientific, 1999). Halzen, F. and Alan D. Martin. Quarks and Leptons: An Introductory Course in Modern Particle Physics (New York: Wiley, 1984).

⁸⁶⁴ Kane, G. L. Modern Elementary Particle Physics: The Fundamental Particles and Forces? (Reading, Mass: Addison-Wesley Pub, 1993).

⁸⁶⁵ Thus, they can appear as either singularities or as spacetime. This is how a transformation is made from singularities into spacetime entities, which are monads.

⁸⁶⁶ The basic idea is that there is a Singularity in virtuality and that facets of monads are the splintering of that Singularity into various contents whose overall structural pattern points back to the Singularity.

⁸⁶⁷ On the other hand, monads are identical to each other, thus they are repetitions of the archetypal monad of a particular kind whose versions are distributed in spacetime.

⁸⁶⁸ The Site/Event Foundational Mathematical Category is the advent of local spacetime. which is discussed by Badiou in Being and Event in terms of the Event that occurs at a Site. See Badiou, Alain. Being and Event (London: Continuum, 2005).

⁸⁶⁹ Heidegger calls this Ereignis, a Happening. See Polt, Richard F. H. The Emergency of Being: On Heidegger's Contributions to Philosophy (Ithaca, N.Y.: Cornell University Press, 2006). P. 80 but throughout the book.

⁸⁷⁰ Alter, Orly, and Yoshihisa Yamamoto. Quantum Measurement of a Single System (New York: Wiley, 2001).

⁸⁷¹ Here it is assumed that there is an analogy between Quantum Measurement (where superposition breaks down into a probability distribution on measurement) *and* the relation of a virtual Singularity with its content images in spacetime.

Mathematical Category constrains observation and we can use Observer Mechanics⁸⁷² to model it. This is a local measurement and thus a local distinction is created within the broader global four-dimensional plenum, which we refer to as a *hunk*⁸⁷³. There is a breakup of the four-dimensional hunk into regions. In the four-dimensional hunk all knots unravel. The hunk breaks up into three-dimensional spaces that are uncrossable, i.e., in which no movement occurs. This three-dimensional space is the realm of Pure Being. But in the appearance of Pure Being there is a mediation of Pattern into Form through the *Multiple Foundational Mathematical Category* described by Badiou in Being and Event. Pure Being is a frozen three-dimensional space in which there is no change (as described by Parmenides⁸⁷⁴ and Zeno⁸⁷⁵ from the point of view of Presence Metaphysics⁸⁷⁶). In that space there can be Forms, perhaps thought of as *Platonic solids with synergy*. However, we see that the Pattern is transformed into the Form via the mediation of the Multiple. The inconsistent Multiple is the *uncountable prior to counting*. It is in relation to the Multiple that the ‘ultra one’⁸⁷⁷ is produced, which is the basis of countability and by which the Multiple becomes consistent. Thus, *content* is normally *not counted* but leaves an *overall impression* and is open to *endless horizontal exploration in phenomenology* and this shows that *it is something real*. We normally think that the first minimal system of operations that appears (Pattern), can be understood as *flux, structure, value, and sign*⁸⁷⁸ and that the practices that can be levied on them as a means of mediation are *desire, avoidance,*

⁸⁷² Bennett, Bruce M., Donald D. Hoffman, and Chetan Prakash. Observer Mechanics: A Formal Theory of Perception (San Diego: Academic Press, 1989). See also <http://www.cogsci.uci.edu/personnel/hoffman/ompref.html> accessed 080921.

⁸⁷³ Heller, Mark. The Ontology of Physical Objects: Four-Dimensional Hunks of Matter (Cambridge UK: Cambridge University Press, 1990); See also Sider, Theodore. Four-Dimensionalism: An Ontology of Persistence and Time (Oxford: Clarendon Press, 2001).

⁸⁷⁴ Tallis, Raymond. The Enduring Significance of Parmenides: Unthinkable Thought. Continuum Studies in Ancient Philosophy (London: Continuum, 2007).

⁸⁷⁵ Zeno, Cleanthes, and A. C. Pearson. The Fragments of Zeno and Cleanthes. Philosophy of Plato and Aristotle (New York: Arno Press, 1973).

⁸⁷⁶ Fuchs, Wolfgang Walter. Phenomenology and the Metaphysics of Presence: An Essay in the Philosophy of Edmund Husserl. *Phaenomenologica*, 69. (The Hague: Nijhoff, 1976).

⁸⁷⁷ “ultra one” is the terminology used by Badiou in Being and Event when he discusses the process through which oneness is introduced into the Multiple taking it from inconsistency to consistency. See Ashton, Paul, A. J. Bartlett, and Justin Clemens. The Praxis of Alain Badiou (Anamnesis. Seddon, Melbourne, Australia: re.press, 2006). p.89.

⁸⁷⁸ In previous writings by the author these have been identified as the four different types of Pattern. These are taken from Klir and Baudrillard. Klir describes Structure and Flux (meta-structure) in Architecture of Systems Problem Solving (ASPS) Op. cit., and Baudrillard describes value and sign in For a Critique of the Political Economy of the Sign. Both of these authors see these fundamental elements of pattern as chiasmically related. We see all four as forming a double chiasm. See Baudrillard, Jean. For a Critique of the Political Economy of the Sign. (St. Louis, MO.: Telos Press, 1981). See also “Advanced Pattern Theory for Pattern Engineers” which is part of the Anti-Thesis working papers by the author at <http://holonomic.net>

dissemination, and *absorption*⁸⁷⁹. Each of the dissipative ordering (neg-entropic) practices can be practiced in relation to any of the modes of Pattern articulation. The results of these practices are products that have Pure Being appear as solids in three-dimensional space (in most cases). This means that we only consider them when they are wholly present and at the height of their development. Whatever the product is, it has uncountable or multiple contents under an explorable horizon, which approaches infinity depending on its level of reality.

Forms transform into Systems. They are mediated in that transformation by the Set Foundational Mathematical Category. A Set is the empty framework of projection. That is what allows the design to be a projection to be filled in by Forms with content. A Design is always a set of Forms, which are then instantiated to inhabit the arena of the operating environment, usually with copies of themselves interacting as a System. Thus, a design is always a template for the relationships between objects that we call a “design pattern”⁸⁸⁰. To fill in this template, one must go through a design and development *process*, and thus enter into Process Being beyond the concept of the product when it is presented as pure Form. In Process Being the *now moment* becomes a frozen surface within the block of uncrossable three-dimensional space. The System is mediated by the Meta-system (open-scape) through Hyper Being in terms of Mass. Hyper Being provides the opening that leads to the realm of possibilities. Forms can have multiple configurations within a System. Possible configurations suggest the definition of an architecture⁸⁸¹. But the Meta-system itself is taken as a Mass. That Mass gives underlying continuity to the System from its background in the Meta-system. The Mass is related to the Third of Peirce, which is continuity. The Mass provides continuity by the identical nature of its instances. The Meta-system is transformed into the Domain via the mediation of Wild Being and the Foundational Mathematical Category of the Whole. The Domain holds the target of the

⁸⁷⁹ These have also been previously identified by the author as the various types of practices, or what Deleuze and Guattari call the “Machines.” They identify “desiring” machines, but there must also be avoiding, absorbing, and disseminating machines or practices. It is by these practices that we deal with the various types of patterns. The idea that there have to be four such practices instead of only one is proposed by the author. For the definition of the monolithic “desiring machine” see Deleuze, Gilles, and Félix Guattari. Anti-Oedipus: Capitalism and Schizophrenia (Minneapolis: University of Minnesota Press, 1983). See also Thousand Plateaus, Op. cit.

⁸⁸⁰ Shalloway, Alan, and James Trott. Design Patterns Explained: A New Perspective on Object-Oriented Design. Software Patterns Series (Boston, Ma: Addison-Wesley, 2002).

⁸⁸¹ Bass, Len, Paul Clements, and Rick Kazman. Software Architecture in Practice. SEI Series in Software Engineering (Reading, Mass: Addison-Wesley, 1998). See also Shaw, Mary, and David Garlan. Software Architecture: Perspectives on an Emerging Discipline (Upper Saddle River, N.J.: Prentice Hall, 1996). See also Buschmann, Frank. Pattern-Oriented Software Architecture: A System of Patterns (Chichester: Wiley, 1996).

projection by which the System moves through the Meta-system toward its target goal, which is the wholeness of the product to be produced within some Domain. In order to do that, one must take into account the propensities, dispositions, and tendencies of the things, which are being combined with their materials. Those tendencies appear as lines of flight⁸⁸² from points that are impossible to connect. The Domain is transformed into a World via Ultra Being and the mediation of the Holon/Integra. This is the point where the mysterious Singularity⁸⁸³ appears that was noted to exist between the schemas of Domain and World.⁸⁸⁴ The Holon/Integra is related to Mathematical Category Theory and it represents the meta-levels of relationships that could possibly become to over-determined within the Whole. When this is taken to the ultimate degree, then we get the transformation of the World into the Kosmos through the Holoidal, which is the interpenetration and intra-inclusion of all things, and this can only occur via the nondual of the Void. The Holoidal produces the Singularity again (as zero divisors) and this starts the Lifecycle of the Emergent Event over again in a new context. This Singularity would be a noumena arising from the Pluriverse in the Kosmos. But noumena can also arise from within and those noumena are signified by the Neganary. Noumena are both within us and outside us. Thus, there are two faces to the Singularity of the Noumenal.

What we can see from this quick run through of the Lifecycle of the Emergent Event, as shown in the context of the schemas, is that *fundamental transformations need to take place at each stage*. These transformations are starting from Singularities beyond the content of things. Each Monad of content enters and combines at each schematic stage (Pattern, Form, System, and Meta-system) to produce the whole, but then becomes overdetermined as an integral holon until it reaches the idealized holoidal level of complete interpenetration. From this you can see that some of the most basic work in forming the design of the Emergent Event comes at the point of the mediation of the System with the

⁸⁸² Op. cit. Deleuze defines the concept of a “line of flight” as a propensity to move in a ‘desiring machine’ across the ‘rhizome’.

⁸⁸³ As a speculation we can wonder whether this mysterious Singularity is the real meaning of what Hegel calls Spirit. The fact that the singularity is between Domain and World puts it precisely in the right position to be given this interpretation. This would give some specificity to Hegel’s claims about Spirit while at the same time allowing us to understand Spirit as a Singularity rather than some abstract level beyond consciousness. In other words the point at which the ‘I becomes We and the We becomes I’ is a singularity between World and Domain. There is not a subsumption of consciousness as Desan thought into a Planetary Man, or the existence of a spiritual realm connecting all humanity as was proposed by Pierre Teilhard de Chardin had proposed called the noosphere. See Desan, Wilfrid. Desan, Wilfrid. The Planetary Man. (New York: Macmillan, 1972). See also A Noetic Prelude to a United World. (Washington, D.C.: Georgetown University Press, 1961). See Teilhard de Chardin, Pierre. The Human Phenomenon. (Brighton: Sussex Academic, 2003). Rather between the social and the personal there is a singularity which fits well with the ideas of the personal and collective unconscious developed by Freud and Jung.

⁸⁸⁴ We noted previously that there appears to be a Singularity in the series at this point, which is unexplained.

Meta-system. *That is when the realms of possibilities open up.* This sheds light on why we have made this the focus of our research. Furthermore, understanding the context also helps frame our comprehension of the entire process that occurs within the Quadralectic.

The Quadralectic in terms of the Sub-schemas in relation to Minimal Methods and Realtime Viewpoints

So, let us go back and consider the mediation between Form and System. We noted that it occurs in terms of Set. But we would like to suggest that this mediation was already addressed when we considered the Integral Systems Engineering Method⁸⁸⁵ (ISEM), which was originally oriented toward a software audience but actually had a basis in Systems Theory. We can also reference our exploration of the Approaches⁸⁸⁶ to the schematic levels, which we identified as meta-methods in terms of the Gurevich Abstract State Machine Method⁸⁸⁷ and Wisse's Metapattern method⁸⁸⁸. In the development of ISEM under the rubric of Software Ontology⁸⁸⁹, we noted that Hyper Being was at the core of any real-time software system⁸⁹⁰. Software is merely an embodiment of Derrida's *Differance*, which involves differing and deferring⁸⁹¹. In ISEM we have noted that there are four viewpoints of any real-time system, these are: data, function, event, and agent⁸⁹². We also noted that the minimal methods are the bridges between these viewpoints. These minimal methods that have been singled out are the Virtual Layered Machine⁸⁹³, Use-case⁸⁹⁴ mappings, Data Flows⁸⁹⁵ (Objects⁸⁹⁶), Sequence Diagrams⁸⁹⁷, Agent and Resource

⁸⁸⁵ See Wild Software Meta-systems by the author at http://works.bepress.com/kent_palmer. This electronic book contains a set of domain specific languages that embody the minimal methods of Software Design.

⁸⁸⁶ See "Self-duality of System and Meta-system Methods" in Application of General Schemas Theory: Design Methods and Meta-methods by the author at <http://holonomic.net>.

⁸⁸⁷ Börger, E., and Robert F. Stärk. Abstract State Machines: A Method for High-Level System Design and Analysis (Berlin: Springer, 2003).

⁸⁸⁸ Wisse, Pieter. Metapattern: Context and Time in Information Models (Boston: Addison-Wesley, 2001).

⁸⁸⁹ See "Software Ontology" in Wild Software Meta-systems Op. cit.

⁸⁹⁰ To lower meta-levels of Being (Pure and Process) the meta-level of Hyper Being looks like a singularity at the core of the real-time system. Each higher meta-level of Being looks like a Singularity to the lower meta-levels of Being. But only Ultra Being is truly a Singularity. It is truly a singularity because it is utterly opaque and non-representable, where as when we transition to Hyper Being from lower meta-levels of Being we find that there is still some room for thought and intelligibility even if it is severely restricted. In a true Singularity there is no room for thought or intelligibility left when that level is transitioned to by our inquiry.

⁸⁹¹ Stiegler, Bernard. Technics and Time, 1 (Stanford, CA: Stanford University Press, 1998). pp. 138-139; See also Technics and Time, 2 Disorientation (Stanford CA: Stanford Univ. Pr, 2008).

⁸⁹² These form the domain of real-time system design along with the requirements viewpoint. These viewpoints are related to the Methodological Distinctions, which are types of ordering for the variables identified by Klir. Requirements are related to *no order*, Agent and Function are related to *partial order* and Event and Data are related to *full ordering*. The minimal method duals are related to *partial order with distance*, and *linear order without distance*. See Op. cit. Klir ASPS.

⁸⁹³ Allworth, S. T. Introduction to Real-Time Software Design (New York, NY: Springer-Verlag, 1984).

Discusses virtual machines.

⁸⁹⁴ Armour, Frank, and Granville Miller. Advanced Use Case Modeling: Software Systems. Addison-Wesley object technology series. Boston: (Indianapolis, IN: Addison-Wesley, 2001).

Diagrams⁸⁹⁸, State Machines⁸⁹⁹, and Petri Nets⁹⁰⁰, as well as the relationship between event and data that represents relativistic intervals. These methods are identified as slices of Turing Machines⁹⁰¹, which are defined as the basic representations of systems. Universal Turing Machines⁹⁰² are the basic representations of Meta-systems. Gurevich Abstract State Machines⁹⁰³ are generalizations of Turing Machines taken to any level of abstraction. The Metapattern method⁹⁰⁴ allows context oriented design to serve as a means for identifying objects and as a basis for creating patterns of those objects.

⁸⁹⁵ Yourdon, Edward. Modern Structured Analysis. Yourdon Press Computing Series (Englewood Cliffs, N.J.: Yourdon Press, 1989). Or see the classic Yourdon, Edward, and Larry L. Constantine. Structured Design: Fundamentals of a Discipline of Computer Program and Systems Design (Englewood Cliffs, N.J.: Prentice Hall, 1979).

⁸⁹⁶ Yourdon, Edward. Object-Oriented Systems Design: An Integrated Approach. Yourdon Press Computing Series (Englewood Cliffs, N.J.: Yourdon Press, 1994). Wegner, Peter. Perspectives on Object-Oriented Design (Providence, R.I.: Brown University, Dept. of Computer Science, 1991). Wegner, Peter. Conceptual Evolution of Object-Oriented Programming (Providence, R.I.: Brown University, Dept. of Computer Science, 1989). Wegner, Peter. The Object-Oriented Classification Paradigm (Providence, RI: Department of Computer Science, Brown University, 1987).

⁸⁹⁷ Fowler, Martin, and Kendall Scott. UML Distilled: A Brief Guide to the Standard Object Modeling Language (Reading, Mass: Addison Wesley, 2000) p. 53, Chapter 4 on Sequence Diagram in UML which I call "Worldline and Scenario" diagrams.

⁸⁹⁸ Goma, Hassan. Software Design Methods for Concurrent and Real-Time Systems. The SEI series in software engineering (Reading, Mass: Addison-Wesley, 1993). He invented DARTS Methodology, Design Analysis for Real Time Systems. See Goma, Hassan. Software Design Methods for Real-Time Systems (Ft. Belvoir: Defense Technical Information Center, 1989).

⁸⁹⁹ Wagner, Ferdinand. Modeling Software with Finite State Machines: A Practical Approach (Boca Raton, FL: Auerbach, 2006). Op. cit. Fowler, M. UML Distilled p. 107, Chapter 10 on State Machines in UML.

⁹⁰⁰ Jensen, K. Coloured Petri Nets: Basic Concepts, Analysis Methods, and Practical Use (Berlin: Springer-Verlag, 1992). Peterson, James Lyle. Petri Net Theory and the Modeling of Systems (Englewood Cliffs, N.J.: Prentice-Hall, 1981).

⁹⁰¹ Sipser, Michael. Introduction to the Theory of Computation (Boston: PWS Pub. Co, 1997).

⁹⁰² Op. cit. R. Herken The Universal Turing Machine

⁹⁰³ Borger, Egon. "Ten Years of Gurevich's Abstract State Machines" Journal of Universal Computer Science, vol. 3, no. 4 (1997), pp. 230-232, Springer; See also <http://www.eecs.umich.edu/ealgebras/> accessed 080921.

⁹⁰⁴ Op. cit. Wisse, P. Metapattern.

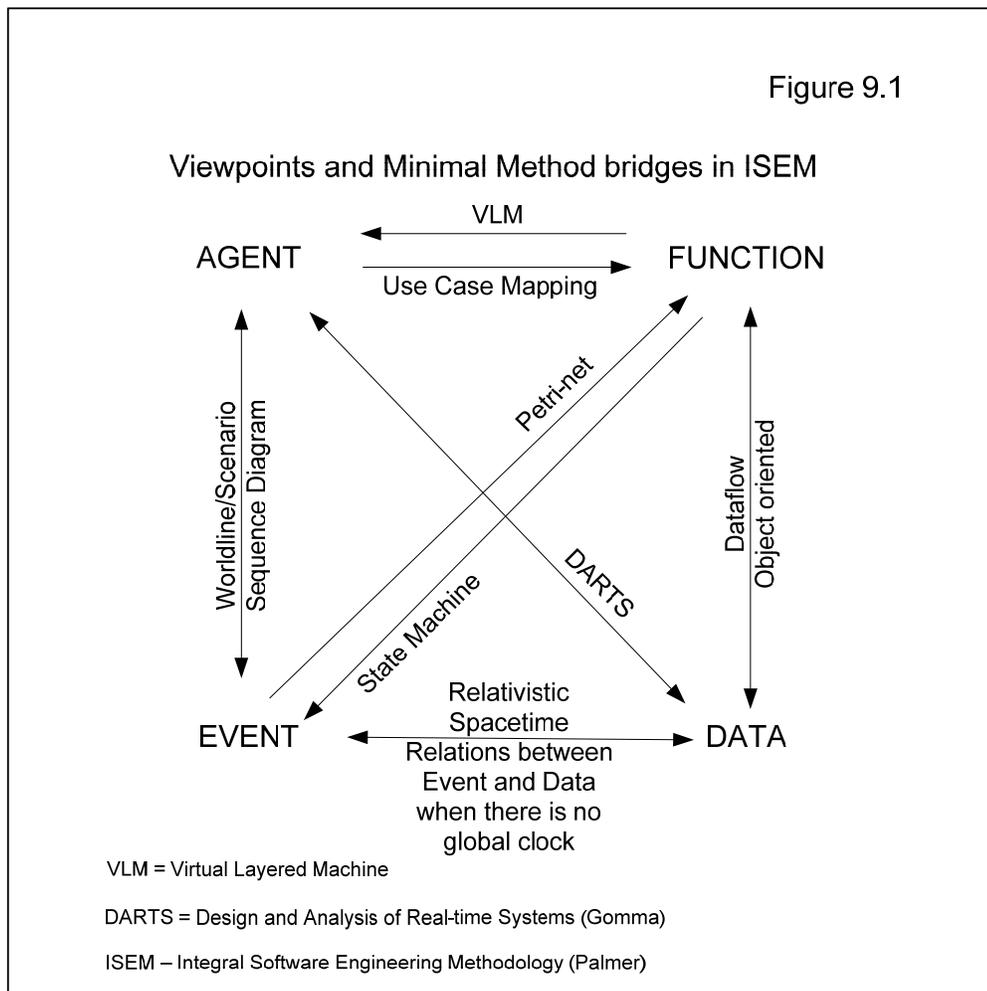


Figure 9.1. Viewpoints and Minimal Method Bridges in Integral Software Engineering Methodology.

In this picture, the fundamental viewpoints of the System, i.e., data, function, agent, and event specify the Domain of requirements and the design of real-time systems. In the context of these viewpoints, we intend to design the System as an *emergent whole with appropriate synergy*. But, to do that we need to establish the forms as figures on the background of the System, as well as upon the deeper background of the Meta-system (open-scape). The System, as it operates, will instantiate its design elements and will operate with multiple instances of these elements in a Mass. So, the operating system is considered a Mass within which the Form (software object) has discrete changing relationships with other Forms (software objects).

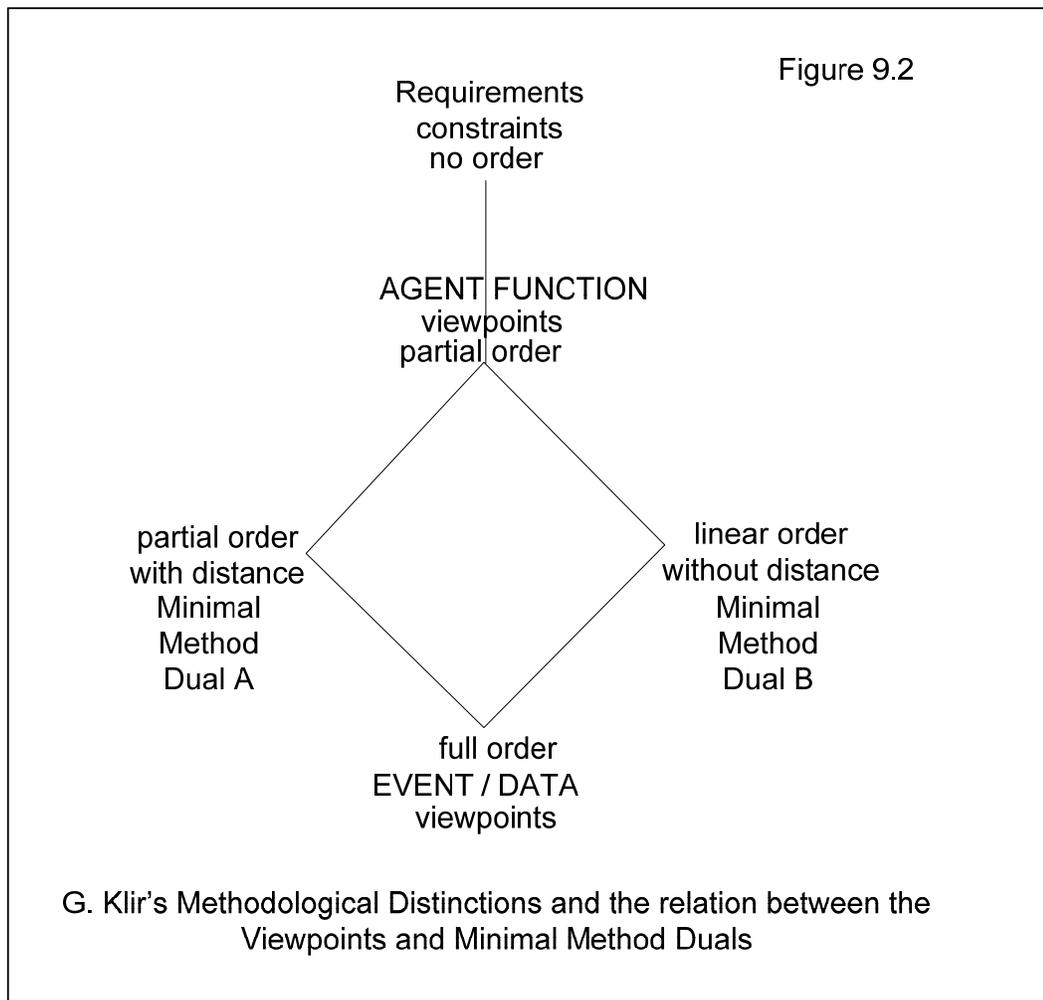


Figure 9.2. Relation between Methodological Distinctions and the Structure of the Viewpoints and Minimal Methods.

We are forced to impose multiple perspectives on the real-time software system design because the software is posed within Hyper Being and has a Singularity at its core. As a result, not all of the design can be seen at one time, but rather we must *move between perspectives* to see the whole design. ISEM languages were formed as an attempt to understand the connection of elements between domain specific languages that represent the methods. Different languages contain elements that are the same, even though they are called by different names in various methods. It is these elements that are held in common between the various minimal methods that allow them to connect together around the Singularity of the real-time system to approximate a view of the ‘whole’ of the real-time system. Real time software systems give us a model of the relationship of Hyper Being to the System and Meta-system. Hyper Being appears as an interstice, or interface, between the System and Meta-system. The hardware system can be seen as being embodied within

the CPU of both Pure and Process Being in the accumulator and the pointer registers⁹⁰⁵. Thus, software is able to move orthogonally from the hardware environment into a virtual one where we have become dependent upon the complex systems we design. It is through software that the System can adapt to its environment more flexibly. Software allows for different modes of functional logic to be applied in different circumstances, and thus gives the System adaptability within its environment.

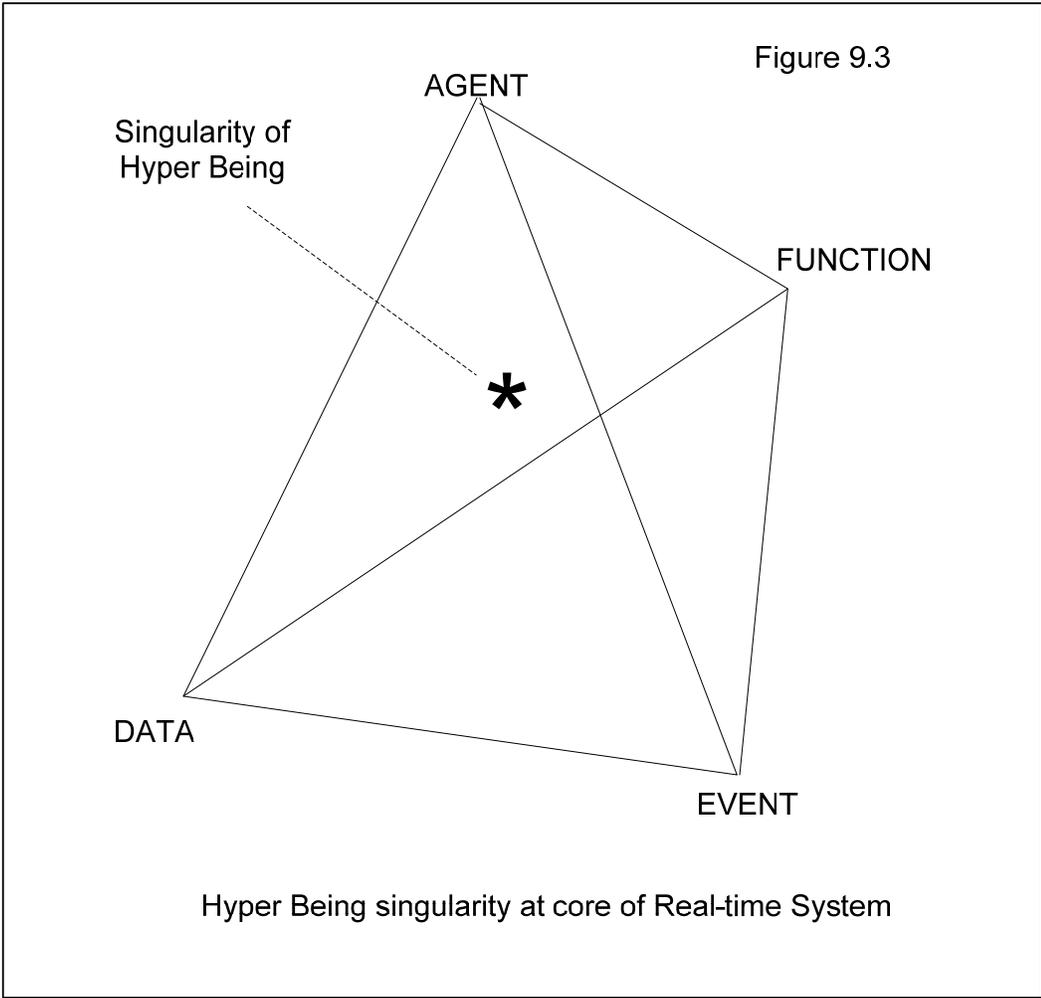


Figure 9.3. Hyper-being Singularity at the core of the real-time System.

⁹⁰⁵ See "Software Ontology" in Wild Software Meta-systems by the author.

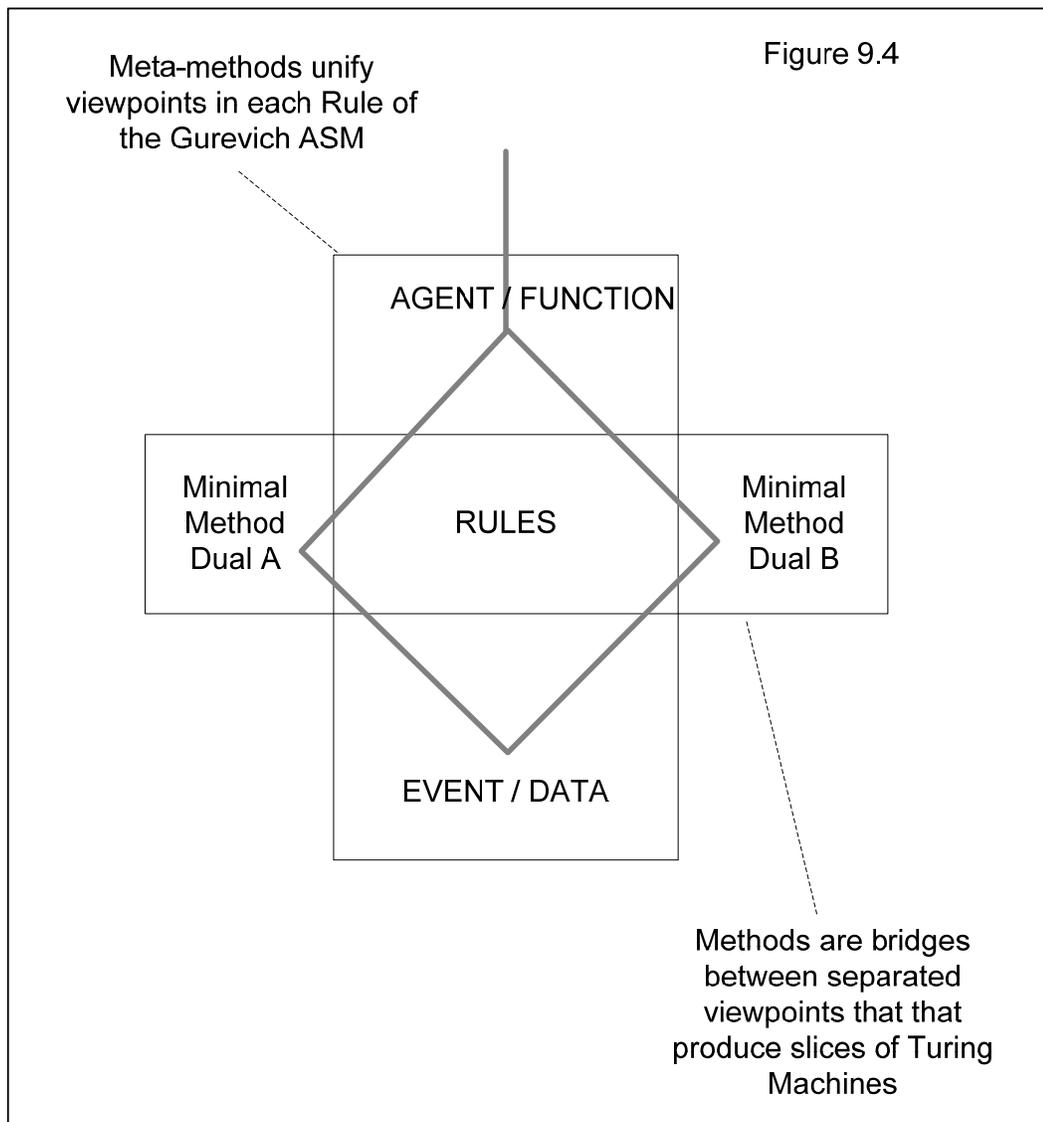


Figure 9.4. Relation between Methods and Meta-methods.

When we conceive of the essence of a System from different designated perspectives, and then codify that essence into a design, then we are operating within the moments of the Quadralectic. In each case that operation must take context, surroundings, situation, and circumstance into account with respect to *specific* content (intext), behavior, stance, and representation, which are mediated by the FOCUS, SIGNATURE, OBJECT, and IMAGE.

Representation(FI): concept: FOCUS circumstance(BI): **sense**

A *representation* is a diagram of the minimal methods for the System that is under design, and this gives us a concept of what is to be built and allows us to focus on a specific part of

the system⁹⁰⁶ in a certain circumstance (or perhaps, in a certain mode), which allows us to make sense of the functioning of the System.

Behavior: essence: OBJECT: situation: **goal**

The *behavior of the objects* within the System, allows us to understand the *essence* of the System within a situation with respect to achieving specific goals as they appear in the Concept of Operations.

standpoint: perspective: IMAGE: surroundings: **vanishing point**

The stance relates to the trace perspective that sees an image in its surroundings in relation to a vanishing point, or intentional target.

Content (Intext): design: SIGNATURE (signifier): context: **pragmata**

The intext is the content of the design, which manifests through combining the minimal method representations in specific instantiated ways that form the signature of the System as a specific design out of the myriad possible designs. This design appears in a particular context, and it is seen to embody certain pragmata, i.e., practical reasons, which allow embodiment to occur so that the System will actually work within the world.

The Quadralectic is a nexus that allows us to bring together the perspectives of the System from the domain of real-time systems. Together, the Turing *representation* of the System and Meta-system, in tandem with the *Metapattern method* allow us to use context, situation, circumstance, and surroundings as a basis for organizing the System, and Meta-system. Wisse⁹⁰⁷ makes the point that the hierarchy of inheritance is more effectively organized with context, rather than with arbitrary dependencies that ignore context. So, the meta-methods that apply to both System and Meta-systems naturally combine with the minimal methods that are specific to the domain of real-time systems, which give us a robust representational ability. But the Quadralectic shows us that design, in terms of methods, is broader than normally thought. A methodology is a series of minimal methods that determines a given sequence of views of the system that is under design. Beyond that there are the meta-methods that apply to all the schemas as well as both the System and Meta-system. The Gurevich Abstract State Machine Meta-method gives a *dynamic representation* of the System as a Turing Machine. Context is also important and Pieter

⁹⁰⁶ A slice of its Turing Machine.

⁹⁰⁷ Op. cit. Wisse, P. Metapattern.

Wisse demonstrates this with his Metapattern method. He shows how to leverage context within the design process, which gives us a natural bridge between the System and the Meta-system. By leveraging the Foundational Mathematical Categories and the Philosophical Categories as a context within the trajectory of the Emergent Event, we can see how these design methods and meta-methods are situated in an overall framework. The interaction of DeSign⁹⁰⁸ Engineering with various perspectives, with conceptualization, and with our understanding of essences helps to further situate the design, which we understand as the third meta-level of Sign. Thus, the design is unified at the Hyper Being level. This interconnected field is what gives the design its power to organize the essence of the Emergent Event so that it conforms to the concepts that emanate from our various perspectives. The power of the mathematical foundations comes to our aid by producing representations that work to create pictures, plans, and models of the actual thing we hope to produce. At each level of the schemas there are sub-schemas that articulate the relationship between representation and repetition at the various dimensions where each schematic element exists as part of our designs.

Representations of the System

But, we want to go further and explore how the System is broken into its modalities within the Quadralectic. We can do this in a way that is similar to B. Fuller's Synergetics⁹⁰⁹. We realize that there are four forms that embody the 720 degrees of angular change that allows the minimal system to stand still in spacetime. Those four are the tetrahedron, the torus, the mobius strip, and the knot. Each of these very different kinds of figures are all related to each other in terms of the embodiment of angular change. B. Fuller calls the Tetrahedron a minimal system. Thus, we can think of the other figures as other representations of the minimal system under different constraints. These four representations can stand in for how we see the System under the optics of the Quadralectic. It shows how different the same System will appear under the various lenses of the Quadralectic. It also shows that there is a fundamental relationship between embodiment and the spacetime environment. In other words, Relativity Theory dictates that things must be spinors to be stable in spacetime and that 720 degrees of angular change can be encoded into Form in different ways. This also gives us some insight into the role that the sub-schemas play in as much as

⁹⁰⁸ 'DeSign' emphasizes that design is an activity related to the expression of Semiotics as way of capturing the nature of the designed artifact prior to its implementation. We call the semiotic artifact that represents the design the "Design Object". We call the implemented produced artifact based on the ground plan of the design the "Object of Design", and we call the synthesis of the two the "Designed Object".

⁹⁰⁹ Op. cit.

the sub-schemas are cut up in the same way. The sub-schemas of Form are: Whole, Picture, Plan, and Model. We notice that of these four representations, two are three-dimensional (tetrahedron, torus), one is two-dimensional (mobius strip), and one is one-dimensional (knot). We speculate that the torus represents the *whole schema construct* because the torus can act as a modulo mapping to the area of a *hypersphere*. The mobius strip, being two-dimensional, is like the *picture*, and the knot is like the *plan*, while the tetrahedron, since it is put together out of pieces, represents the part-whole relationships of the *model*. Each of these elements has its own special relationship to higher order four-dimensional figures. The mobius strip is related to the Kleinian bottle, which needs the fourth dimension to refrain from crossing itself. By the addition of one point and four lines, the tetrahedron becomes a pentahedron, which is a minimal solid in four-dimensional space. The knot unravels when pushed into the fourth dimension. Its self interference does not hold its organization any longer. The knot represents the archetype of self-organization, i.e., organization *against* itself through *self-interference*.

The fusion of sub-schemas and Moments of the Quadralectic:

Sub-schema	3d shape of minimal system	3-torus representation	4d shape that extends minimal system
Whole	Torus	3-torus as torus of tori	Hypersphere
Picture	Mobius Strip	3-torus as cube with identified sides without twist	Kleinian bottle
Plan	Knot	3-torus as 3 intertwined links rather than knot	Unfurling to the UnKnot
Model	Tetrahedron	3-torus as Pascal lattice 1-3-3-1 with zero cells through 3 cells assigned to lattice elements	Pentahedron

Table 9.3. Fusion of Sub-schemas with Moments of Quadralectic as mediated by the Hypertorus.

Note that in our initial analysis we identified the moments of the Quadralectic with the schema and sub-schemas. But this results in a series that is at odds with the way they are ordered when we consider their relationship to the Emergent Meta-system Cycle and the Emergent Eventity Lifecycle as seen in the Foundational Mathematical Categories. Here, the emphasis is on the *sameness* between the two fourfolds of the sub-schemas and moments. Later, the emphasis will be on their *difference* as operators and operands. This

later differentiation will entail a change in their ordering, which occurs by a ‘symmetry breaking.’ The order here follows the cycle of the unfolding of the sub-schemas, which are associated with the moments of the Quadralectic that are most closely aligned with them. If instead we follow the order dictated by *existence* in the Foundational Mathematical Categories and the Emergent Meta-system *synchronization*, it will become clear that the proper order is different, and, in that case, it moves from representation (concept) to behavior (essence), to stand (perspective), and to content (design). Here we are looking at a point prior to the full differentiation of the sub-schemas and the moments. When that differentiation occurs and the existential cycles start driving the Quadralectic, then this order will change. There is a ‘symmetry breaking’ in which concept and essence change places, as do perspective and design in the sequence of the unfolding of the Quadralectic. In the later ‘symmetry breaking,’ the operators of the Quadralectic become differentiated from the operands of the sub-schemas. Here, we can take a tentative, or first look, at the Quadralectic through its prototypical identity with the sub-schemas, which will later be lost.⁹¹⁰ The later transposition is analogous to the flip we observed in the unfolding of the axioms of the Axiomatic Platform. As a result, the ‘symmetry breaking’ transformation that occurs when the Quadralectic operators split off from the sub-schemas must be considered essential, rather than extraneous, to our argument. But first we need to understand these operators in their fused and indeterminate form where the Quadralectic operators are the same as the operands of the sub-schemas. This fusion is similar to the juxtaposition of the minimal system representations in the hypertorus. Later we will explore what happens when the split between operator and operand occurs. In that case the same sort of flip that we saw in the Axiomatic Platform will rearrange the relationships between the operators and the operands that they were once fused with.

Whole – Torus – 3-Torus - Hypersphere – essence <sub-schema>
--

The whole schema represents the essence of the entity that is being produced as well as its emergent properties. The emergent properties can be compared with the modulo difference between the surface of the torus and the surface of the hypersphere. The series of modulo

⁹¹⁰ In the later cycle the sequence will be Whole (concept, representation) -> Picture (essence, behavior) -> Plan (perspective, stance) -> Model (design, content) -> Whole.

differences from sphere, to torus, to hypersphere breaks down in the infinite surface area of the hypertorus. For example, within the same surface area one can move between something with a definitive extent in three-dimensional space and something that is impossible to represent (without distortion) that lies in four-dimensional space. A hypersphere is like a sphere with another dimension, there is a sphere around each of the sets of three axes within the four axes. But these four spheres are fused into a higher super-synthesis much like the unity of the sphere in the third dimension, which is the simplest undifferentiated form. However, in this super-synthesis there is differentiation because we can see the hypersphere as two spheres, which turn inside out as they spin in the fourth dimension, or we can see the hypersphere as foliated into tori (and thus differentiated) with respect to lower dimensional projections that are nested within tori. In fact, one way of relating a hypersphere to the torus is to see it as two tori that are wrapped around each other so that each one passes through the whole of the other. The possibility of four spheres fused together into a figure is hard to imagine for creatures who are stuck in the third dimension. But we can know that the surface, whatever shape it is, is a discrete modulo in relation to the surface of a torus and a sphere. This is because the hypersphere ($S^2 + S^1$) is a sphere ($S^1 + S^1$) and a circle (S^1) added to each other topologically. The torus is two circles that are orthogonal with separate radii: $S^1 \times S^1$. The hypertorus, on the other hand, is three circles multiplied: $S^1 \times S^1 \times S^1$. The topological operations of adding and multiplying circles are discrete rational moves that are modulo operations. So, there is an indirect supervenient path to the emergent characteristic of the four-dimensional surface from both the sphere and the torus. We can define the essence of the torus as topologically differentiated and opposed to the sphere, which is topologically undifferentiated. We can also see that when we take them into the next higher dimension they open up into something that is unrepresentable but calculable, which is different from the representable but incalculable nature of the hypertorus. This can be described as a *projection* of the *design concept*, via the *illusory continuity* of the *idea* to a higher level *super-synthesis* from which the *wholeness of the lower level form* can be recovered without constructing it from the sub-schemas of the *pictures, plans, and models* alone. Essence escapes the constraints of the geometry of the torus and the hypersphere via the unrepresentable aspects of the hypersphere. The hypertorus is merely a three-dimensional version of the torus that must be embedded in four-dimensional space in order to be more than merely the sum of spinning tori. In four-dimensional space the hypertorus does not completely escape representation as does the hypersphere.

Behavior: essence: OBJECT: situation: **goal** <moment>

The essence defines the constraints on the behavior of the attributes (or characteristics) of the object, in this case, it is the torus, which is the topological differentiation of the sphere within its three-dimensional situation. Yet, there is a tendency toward the illusory continuity of the non-representable goal of the hypersphere as a super-synthesis, which has the emergent properties of four-dimensional space, rather than those limited properties of three-dimensional space. From this super-synthesis it is possible to extract the foliations of the hypersphere from out of the torus as it is projected back down into three-dimensional space based on the Hopf fibrations. The hypertorus is a singularity that does not present us with a comparable super-synthesis. It is merely a super-torus of tori that is three-dimensional in a representation related to the torus. In its four-dimensional form a super-torus of spun tori becomes a single object that splits into two tori. Then, those tori together form a higher level tori although this multiplication of circles ($S^1 \times S^1 \times S^1$) does not provide the unity of the hypersphere that would allow us to call it a super-synthesis.

Picture – Mobius Strip – Hypertorus Cube – Kleinian Bottle – concept <sub-schema>

We conceptualize the essence, and that implies a de-emergence. The mobius strip is like the representation in as much as there is a reduction of dimensionality from the object (with its essence) in relation to our concept of the object. But the mobius strip is an image of the nondual, and concepts are nondual. They cannot be located in representations, but instead overflow representations. Yet, in the concept, there is an intrinsic relationship between the local and global that we see in the mobius strip. The mobius strip is locally dual, but globally nondual. And thus, the representations, for the most part, exist as dichotomies. Ultimately those dichotomies are hard to maintain and there is semantic drift, so that one could drift around the surface of distinctions in order to turn the distinctions upside down. Thus, in a meaningful, structural way, one must be prepared to accept the possibility of the myriad distinctions that will form the background for our concepts. As a cube, with its identified opposite sides, the hypertorus is an embodiment of representation and repetition. Whatever is represented in this mimetic space is repeated within the infinite

three-dimensional cellular universe that is projected from the hypertorus cube in all directions. When we look out the windows of the hypertorus cube we see back into the compact space of the cube itself as replicated through the virtual windows that give it access back to itself via four-dimensional space. We see ourselves as standing on top of ourselves as we look down and standing below ourselves when we look up. We see ourselves as part of an infinite hierarchy that is self-inclusive without otherness. If we look forward we see ourselves from the back in a long line of copies (of ourselves) and if we look back we see ourselves standing behind in another infinite line. If we look to the side we also see ourselves multiplied in the ranks of an infinite phalanx. So, there is an infinite repetition in all three dimensions of whatever is represented within the hypertorus cube. This becomes a Kleinian bottle if we twist the sides up-down or left-right in the process of identification. In this case the enantiomorphism of the fourth dimension appears in which 'right and left' or 'up and down' can become transformed. Concepts escape their representations and repetitions in this mimetic space. Because the hypertorus cube is three-dimensional, it does not escape the repetition of representations and thus does not reach the concept's unrepresentable nature that is embodied in the Kleinian bottle or the complementary nondualities that make inside and outside into nonduals.

Representation(FI): <u>concept</u> : FOCUS circumstance(BI): sense <moment>
--

We make various representations for our concepts in different circumstances. This allows us to focus locally even if there is a semantic drift globally across any team or group that is making the same distinction. Humans are variety producers⁹¹¹ so they will attempt to impose every possible variation upon a given distinction. The goal is to make sense, so we have to compare the representation to its background circumstance in order to find the right interpretation so that we may derive the most appropriate indicated trace concept. The trace concept that is appropriate is always a nondual distinction between the myriad representations and repetitions that are structurally produced. Concepts always escape the structural field of the representations and repetitions that we structurally analyze and attempt to capture in a rule or formula.

⁹¹¹ Beer, Stafford. The Heart of Enterprise. Managerial Cybernetics of Organization, 2 (Chichester UK: Wiley, 1979).

Plan – knot – Hypertorus Links – unfurling – design <*sub-schema*>

As we begin to envision a holistic picture⁹¹² of an emergent system, we find ourselves in the nascent states of developing a plan. That plan is a theory of the whole that we wish to develop in our design. Design is essentially Theorizing⁹¹³. That plan must have the elements of minimal self-organization. That self-organization will unfurl when exposed to the fourth dimension. In the fourth dimension we will be able to furl and unfurl the design freely and thus explore the design landscape. Self-organization is organization against the self, i.e., the appearance of self-limitation that acts upon itself to control itself. We want to follow designs to their optima rather than imposing our ideas upon the designs, which can cause them to be unnecessarily complicated. Thus, we want the minimal number of self-constraints in the self-organization of the design plan. This will lead to a more elegant design while imposing only the minimal variation that is necessary for the exploration of the design landscape. But design also needs to take into account the interference of the *other*. The hypertorus is an intertwined set of links that represent this interaction with otherness. It encompasses the complexity of a three body problem, which in this case is simplified to just three circles (S1 X S1 X S1) intertwined. Much of design is directed at attempts to resolve mutual constraints between other elements while it simultaneously tries to instill self-organization into the design. Thus, the transformation between the knot and intertwined links exemplifies the constraints under which design is always operating. Yet, in the nondual state of the fourth dimension both knots and links unfurl and this leads to simplifications that resolve multiple problems at the same time, which is the hallmark of good design.

Context (Intext): design: SIGNATURE (signifier): context: **pragmata** <*moment*>

⁹¹² ‘Theory’ means “to see” or “to visualize”.

⁹¹³ Blum, Alan. Theorizing (London: Heinemann, 1974).

The design is the third meta-level of the Sign and has an intrinsic onefold nature but exists in Hyper Being, i.e., in the level of traces in the realm of possibilities. The design is composed of its content and the context for that content. Wisse gives us the Metapattern method, which illustrates how we can use the *context* as a way to organize the *content* of the design, while taking into account that each design has its signature, i.e., its diagrams using the minimal methods. We advocate a method in which the requirements are stated as axioms that are then transformed into a Gurevich Abstract State Machine where the data objects are defined by employing the Wisse Metapattern method. Once the state machine exists, then we may introduce performance concerns in order to organize the functional architecture into a physical architecture that will meet real-time performance goals. That real-time system architecture must be organized in terms of the minimal methods in relation to the canonical perspectives of data, event, agent, and function. This is how the whole system becomes projected into the domain via the meta-system of the design landscape. The signature of a specific design is related to the signatures of other possible designs as we explore the design landscape. And all those differences and the decisions that are made in the various trade-off spaces are pragmata, i.e., practical reasons (*metis*). *It is the pragmata that guides design rather than causal (or logical) reasoning or the use of abstract methods.*

Pragmata always escape from reified theories, methods, and even meta-methods that are the basis of thought. As Paul Feyerabend says in Against Method⁹¹⁴, there is no possible method that can hold up in all circumstances and we need to continually escape from the "Way After"⁹¹⁵, the method by which we try to teach others to follow our lead in our design processes. The *way* between self-organization and organization with respect to the *other* is a highly constrained path that may have many twists and turns. It is based on human ingenuity and creativity at the highest level and it is what is necessary to create a system that works in its intended environment. We notice that the transformation between the knot and the interlinked circles (as two types of *self* and *other* interference) provides a resolution of contradictions and an avoidance of wicked problems. This is accomplished through *metis*, or practical reason.

⁹¹⁴ Feyerabend, Paul. Against Method: Outline of an Anarchistic Theory of Knowledge. (London: NLB, 1975).

⁹¹⁵ Meta-hodos: Method means the "Way After", a way to lead others to the same conclusion.

Model – Tetrahedron – Hypertorus Three-space – Pentahedron – perspective <sub-schema>

As we explore the design space and take our cue from the various performance characteristics that change as we move through the design landscape, then we need to model the system; and the icon for that is the Tetrahedron, which is made out of the following parts: points, lines, and surfaces. Those parts each have their own essence and there are a limited set of those parts that synergistically combine to make the model of the whole that fits together in a way that will work into the Constructed Whole Form. The tetrahedron is the minimal solid of three-dimensional space, but when we add a point in four-dimensional space equidistant from the others then we get a pentahedron, which is the minimal solid of four-dimensional space, and so on up the ladder of minimal solids and spaces. Without space, you cannot stand back at a distance and form a perspective of what you are building. Thus, the generation of dimensionality is necessary for deriving a holistic view of what you are building. In the design space, dimensions show up as refactoring transformations between designs. Many times these refactoring differences take a dual approach toward the design organization, which leads to a fundamental transformation in the organization of the design. When *perspective* is introduced, we notice that it is characterized by its stance in relation to the surrounding horizon. This stance is mediated by the *image* that is formulated by one's point of view, which reflects its dual in the vanishing point. Viewpoint (stance) and vanishing point (intentional target) stand for the subject/object duality. Both the subject and noumena are invisible in the representation itself, although they frame it as a necessary duality.

But between the tetrahedron and the pentahedron there is an unexpected mediation by three space itself in as the topology of the Hypertorus. Thus topologically three-space in which the tetrahedron exists implies four space within which the pentahedron exists. Three space is the bridge between the tetrahedron and the pentahedron because it is three-space that must open out into four space by its fourfold repetition within the fourth dimension. All design for us takes place in three space and thus has to deal with the inherent limitations of that space and the physics that is imposed upon it by the physics. It is these inherent limitations of our finitude in three space and the physics of our universe that distinguishes the possible from the impossible, and we need to find ways to use higher dimensional perspectives on the space in which we are embedded to solve the design problems

presented to us in this constrained space of our finitude. Design is always attempting to find new perspectives to confront the constraints of our finitude within the physical universe and the relation to dimensions within which we live.

standpoint: perspective: IMAGE: surroundings: **intentional target**⁹¹⁶ <moment>

This organizational framework becomes a domain when it is combined with multiple perspectives. So, the data, event, function, and agent perspectives determine the endpoints of the ‘minimal method bridges’ that form a Domain, and that Domain is endowed with the characteristics of computability and is associated with the Turing Machine. But, *perspective* is made possible by the existence of dimension. Dimension is generated by the Pascal Triangle, and it is fundamentally related to the schemas by the S-Prime law of (at least) two dimensions per schema and two schemas per dimension. It is the relationship between dimension and the ‘representation and repetition dichotomy’ that creates an environment that makes it possible to distinguish the sub-schemas. And it is the sub-schemas that are articulated in their archetypal form in these four figures that also connect to the four moments of the Quadralectic. This is a very powerful model of how the Quadralectic operates. It illustrates the relationship between the *local object* and *spacetime in general*, which, in turn, necessitates the existence of spinors. Anything that is to relate to the global context of spacetime must spin 720 degrees. *That is twice around a circle in order to be stable. Stability can express itself in different ways, one way is through the sub-schemas, while another way is through the moments of the Quadralectic. It turns out that these two are interrelated.* The Quadralectic uses the sub-schemas of each schema as the means for creating designs that approximate the wholes of the schemas. It is through these degenerate approximations that the bridge to the ‘emergent whole’ is produced. Thus, the sub-schemas give us a way to move toward the emergent artifact that is being presented through pictures, plans, and models. But we cannot reach that intentional target unless we move up to a higher dimension and participate in a super-symmetry at that higher dimensional and nondual level. The Quadralectic is made up of moments that can use these sub-schemas to bring the emergent design into embodied wholeness. The relationship of the Whole schema to the three sub-schemas is like the relationship of a real number to the

⁹¹⁶ also associated with the 'vanishing point' in perspective art

$i+j+k$ imaginaries in the Quaternion. In other words, the sub-schemas are trapped in repetition and cannot re-approximate the Whole schema. But the Quadralectic allows us to bridge this gap, because the essence of what each sub-schema can be combined in the movement of the Quadralectic and this will forge the disparate parts of the design into a whole that would otherwise be elusive to the representations. Thus, because the Quadralectic operates in time, it can take what each sub-schema has to offer and compress these attributes into an embodiment of the Whole schema from pictures, plans, and models. The Quadralectic, *in time*, puts together what the sub-schemas had rent asunder *in space*. The hypertorus represents this three-space as mediating between the representable tetrahedron and the non-representable pentahedron models. The Quadralectic unites the dimensional differences and the ‘representation and repetition’ difference while bringing unexpected emergent unity where there was previously only separation and difference. The higher dimensional open clearings, which are represented by higher dimensional spheres, give us a perspective that allows us to construct complex models that can resolve constraints in lower dimensions. Higher dimensional spaces allow us the flexibility and room to freely apply different possibilities from a point that is separated by distance from the possibilities we are manipulating. When we do this we are able to find a super-syntheses that allows us to simplify down to the lower syntheses of the Whole Form, which is more than merely a construct. The higher level perspectives of the higher dimensional open clearings always escape the working area where the problematic is expressed. This is where we can resolve the contradictions, conflicts, and interferences that are made in the design process.

Here, we have provided a hypothetical framework for our Phenomenology of Systems by using the Meta-system within the context of the schemas as a whole. That phenomenology must be related to hermeneutics, ontology, and dialectics. Hermeneutics has to do with the interpretation of DeSign Engineering. In engineering design we are doing more than merely shifting around symbols, we are attempting to create a plan with emergent properties that corresponds to the picture of what we want to build, which we can model and transition into actual products. So, within our practice, we need to be more than phenomenologists describing the cognitive features of design within development, we need to recognize the ontological distinctions that define who we are as humans in relation to the things that we create. We need to interpret the signs and objects and their relationships in terms of their proper contexts. We also need to be dialecticians and this is where the Quadralectic comes into play, because what we are doing is more complex than what dialectics can capture. Monolectics is the mode often relied upon in architecture, i.e., it is

an arbitrary decision concerning the structure of the architecture that we build without taking into account the design space. Dialectics comes from the idea of ‘give and take’ in discussion where we make decisions together as a team by making use of the natural variety of our insights and our multiple perspectives on the design problem. We now have the idea that architectural design plans should be the result of teamwork rather than the will of the individual system architect acting as the demiurge. But dialectics is not enough and we need to consider trialectics beyond that. Trialectics means that the relationship between three things, rather than two, are considered, and that is what Pieter Wisse has given us in his Ennead structure, which is, in fact, archetypal and fundamental. Here *trinality* comes into play as a fundamental type of three-way complementarity that underlies the concept of mediation. We see this embodied in the hypertorus but we also see that it does not offer any super-synthesis from which we can recover the synthesis of the whole form. Rather, the hypertorus mediates between the representations of the minimal system as a stabilizer in four-space, and in the four-dimensionality of spacetime itself. In this way we have a transformation between the System and the Meta-system via a mediating device and we can see that the hypertorus is another image of the Ennead. But even the Ennead of Wisse’s Sign Engineering is not enough because we need to relate signs to what is ‘other than signs’ from various perspectives such as function, agent, data, and event to produce a domain of rigor that coordinates viewpoints. This means that we need a Quadralectic where the various moments of the process form the minimal system of a tetrahedron.

Once we have the tetrahedron, we may seek stability in spacetime within the context of the design landscape that we wish to translate into the spacetime of the real world. Then we will find that there are four natural forms of stability given to us by Mathesis. These are the tetrahedron, mobius strip, torus, and knot. These can be seen as embodiments of the moments of the Quadralectic process through which design interacts with other non-design moments to accomplish the *translation of design* into an *emergent reality*. This set of figures also gives us a view of the relationships between the sub-schemas as well. And while the sub-schemas give us the *spatial* representations, it is the Quadralectic that gives us the *temporal* operations. Yet, the mediation between the minimal system representations and the Quadralectic *as seen in the hypertorus* is unstable. As a result, it is crucial for this structure to transform. Later we will see how this structure undergoes a transformation where the Quadralectic temporal operations break apart from the sub-schemas that are embedded as forms in space. This initiates a reordering that brings this theoretical structure in line with the structure of the Emergent Meta-system and the Lifecycle of the Emergent Event. It takes both *time* and *space* working together as *spacetime* and *timespace* in order

to invoke the Emergent Event. The split between spacetime and timespace corresponds to the ‘symmetry breaking’ that will appear later where the Quadralectic operators separate from the sub-schema operands. The key is that the design is a meta-level of the sign, and it cooperates with other trace moments in Hyper Being to create the *possibility* of the Emergent Event. Embodiment comes from Wild Being, and the unrepresentable noumenon of the utterly new comes from Ultra Being. The process and product that we use to pull these into existence has little chance of success without the higher kinds of Being that will allow us to subject our projections to the realm of possibilities and the propensities of material things. The Quadralectic is inscribed in the Nomos and appears within the interactions of Existence as the Void. Within the Lifecycle of the Emergent Event the Quadralectic appears as Emptiness. We merely need to move ‘in sync’ with the Quadralectic in order to *realize* and *actualize* the emergent artifacts that are (as yet) unheard of but could be part of an Emergent Event. The Quadralectic represents an appeal to fourfold symmetry and complementarity that is beyond triality. The minimal method, with its fourfold set representations can provide a bridge into the fourth dimension through the third dimension when it is embodied as the hypertorus within its triality. We speculate that the next level of the emergent organization and its complementarities are mathematically related to the Freudenthal-Titts Magic Square⁹¹⁷, while Emergent Science focuses on the limits of the Quadralectic in relation to the Foundational Mathematical Categories. The higher torus, which is inherently four-dimensional, is a four-torus that can act as a bridge between the fourth and the fifth dimensions. Non-dual Science explores the relationship of the Quadralectic to both the Special Systems and the Emergent Meta-system. Emergent Engineering takes these results and uses them as the basis for their discipline as a sub-set of Systems Engineering as we know it today. But, in the future, Systems Engineering will be replaced by Schemas Engineering and will be an integral part of Emergent Engineering. The Quadralectic gives Systems Engineering a unique basis for understanding our design methods based on an understanding of the kinds of Being and the role they play in conditioning the arrival of the Emergent Event. If we merely emphasize and focus on the Product, we really only partially understand what we are actually doing when we create emergent products. We need to understand more than just the process that leads to those products. We need to understand the higher kinds of Being and how they

⁹¹⁷ Dixon, Geoffrey M. Division Algebras: Octonions, Quaternions, Complex Numbers, and the Algebraic Design of Physics (Dordrecht: Kluwer Academic Publishers, 1994) p.191. Rowlands, Peter. Zero to Infinity: The Foundations of Physics. Series on Knots and Everything, v. 41. (New Jersey: World Scientific, 2007) 15.5, pp. 386-387. See dissertation overflow Chapter 17 on the supplementary disk.

contribute to the success of our development projects and how our projects are related to emergent artifacts. Perhaps then we will actually accept that we are not controlled by outdated ontological ideas that affect the nature of our human existence and its inherent possibilities for creativity.

Meta-levels of the System and the Meta-system

On Reversing Our View of Systems in Engineering

This chapter explores the transformation of the System and the Meta-system at the various meta-levels of Being. We will consider how the higher dimensional spaces give us the landscape in which Designs are produced and how that leads to problems of non-representability. We then go on to look at the various aspects of Being and how they are transformed at the various meta-levels of Being and how that impinges upon our understanding of Designs.

The Various Kinds of Being in the System and Meta-system

In this series we have sought to give some insight into what happens when we move up the meta-levels of Being. Each schema is articulated at the various meta-levels of Being, and the *system schema* is no different in this regard. The Meta-system, as openscape, is the dual of the System and in the process of analyzing the relationship of the System to the Meta-system, we have also considered the formal and structural schematic levels of these Systems. Each schema expresses its different characteristics and unique nature within each meta-level and this allows us to speak of the Pure System, the Process System, the Hyper System, the Wild System, and the Ultra System. At the Pure System level we are dealing with a configuration, but when we take *process* into account, and allow dynamism, then the duality between the system and process come into view, and we see that systems change *in time* as the relationships between the forms and their placement in the configuration changes over time. Thus, the System Schema can be expressed either as three-dimensional or four-dimensional, the Meta-system, on the other hand, is either four-dimensional or five-dimensional. And so the System and the Meta-system share the fourth dimension. Due to the fact that the Meta-system is five-dimensional it encompasses four-dimensional space and time as an orthogonal dimension⁹¹⁸. As a result we can also

⁹¹⁸ This means there is a cobordism (i.e., co-border) between System and Process views within the higher dimension of the Meta-system. <http://en.wikipedia.org/wiki/Cobordism> accessed 090102.

describe it in terms of configurations that relate to two orthogonal time dimensions⁹¹⁹. Orthogonal time allows us to think about the implications of the heterochronic⁹²⁰ in the context of the Meta-system. But there is indecision between these time-frames that appears with the heterochronic and this leads us to consider the model of the Hyper System, which also lacks decision concerning time-frames. A System really has to decide which time-frame to choose, and it is only the Meta-system that has the luxury of carrying two time-frames. The Hyper System exists within this Meta-system (with two time-frames) but suffers from indecision when a choice must be made since the System can only choose one of the time-frames. We can think of these time-frames relativistically. For example, we can think of them in terms of different clocks in different inertial frames. Relativity Theory is the prerequisite for understanding the heterochronic. The Hyper System opens up realms of possibilities in relation to the actualities of the System. We can think of the heterochronic as different Chreodes⁹²¹ (trace process paths), that a developing System could take. There is a decision point at which the Hyper System must take one path or another. The Wild System, on the other hand, is sensitive to the inclinations, propensities, tendencies, and dispositions within the landscape. Wild Systems can be seen as Chaotic Systems in which local propensities have completely taken over and disorganized the System, pushing it through a series of bifurcations into chaos. The Ultra System is the Singularity beyond all the representations of a System. The Ultra System organizes the System from within and warps the space of the System through invisible distortions of the System's phase-space.

We need to contrast this with the complementary levels of the Meta-system as Pure Meta-system, Process Meta-system, Hyper Meta-system, Wild Meta-system, and Ultra Meta-system. The Pure Meta-system is a four-dimensional spatial environment within which a Pure System configuration exists. A Process Meta-system gives another dimension of time

⁹¹⁹ These appear in F theory developed by Cumrun Vafa, it is the next higher theory than the M theory of Witten in String Theory. Itzhak Bars "Survey of two-time physics" *Class. Quantum Grav.* 2001 18 pp. 3113-3130. See also <http://en.wikipedia.org/wiki/F-theory> accessed 081005 There are versions of F-theory with two orthogonal time lines. See Bars, Itzhak "Survey of Two-Time Physics" *Class.Quant.Grav.* 18 (2001) pp. 3113-3130 arXiv:hep-th/0008164.

⁹²⁰ Defined as occurring at different times, as in the genetic unfolding of two different species where the same trait appears at different times. <http://en.wiktionary.org/wiki/heterochronic> accessed 090102. This meaning is not used here. By heterochronic, we mean operating in orthogonal timelines at once. This denies the fundamental assumption of metaphysics that there is only one time line. F-theory posits two orthogonal time lines, which is similar to the theory of Dunne in the Serial Universe where there multiple dimensions of time just as there are in space. See Dunne, John William. *The Serial Universe* (London: Faber, 1934).

⁹²¹ See Waddington, C. H., *Tools for Thought: How to Understand and Apply the Latest Scientific Techniques of Problem Solving* (St. Albans : Paladin, 1977) *Chreodes* are canalization paths in an epigenetic landscape. See Gilbert, Scott F. "Diachronic Biology Meets Evo-Devo: C. H. Waddington's Approach to Evolutionary Developmental Biology" *American Zoologist* 2000 40(5):729-737; doi:10.1093/icb/40.5.729 <http://icb.oxfordjournals.org/cgi/content/full/40/5/729> accessed 090104

to this four-dimensional realm, and thus allows the Meta-system to operate as an ‘operating system’, which means that it is managing resources beyond merely providing the four-dimensional plenum or arena where the system resides. The Hyper Meta-system is again represented as opening up the realm of possibilities so that the Meta-system becomes a design landscape for possible systems. The Hyper Meta-system is again indecisive concerning its time dimensions and thus opens up a plane of temporal possibilities that will provide various temporal realms where the system states can develop. This will, in turn, provide us with a phase map for these system states. The Wild Meta-system is a chaotic environment for the System. In essence, it renders the System inviable, because it is one thing for the System to become chaotic, but another thing entirely for its environment to become *unstable* and chaotic. The Ultra Meta-system is a source for the Meta-system. It is the arena that provides niches for systems to be created. Meta-systems appear as Sources, Origins, Arenas, and Horizontal Boundaries. The Meta-system provides a wider boundary (usually at the horizon) for the unmoving system. Within that boundary various systems come together to interact. They appear and disappear from that arena based on the filtering that the Meta-system performs vis-a-vis the systems that it allows into its arena. All systems *enter* the arena at specific origin points and *leave* at points called ‘sinks’, but the systems themselves are generated from the sources beyond the arena and those sources are singularities in relation to the Meta-system arenas. The ultimate Singularity for the Meta-system is the one that the boundary, arena, origin, and source unfold from, and we shall identify where and how this ultimate Singularity operates within the Ultra Meta-system. The sources beyond the arena are like fragments of this ultimate Singularity that give rise to the whole Meta-system. Meta-systems are like markets⁹²². They are the environments and eco-systems where systems appear, interact, go through their lifecycle, and disappear. Meta-systems signify that the environment is not just a plenum, but has its own order. That order is expressible in terms of Turing Machines. For example, in the System, the Turing Machine *stops*, but the Universal Turing Machine associated with the Meta-system, *never stops*⁹²³. It provides the arena for other Turing Machines to operate within, like the applications within a computer operating environment.

⁹²² See working papers by the author [Markets as Meta-systems](#)

⁹²³ Herken, Rolf. [The Universal Turing Machine](#) Op. cit. From the Universal Turing Machine it is a small step to hypercomputation. See Ord, Toby. “Hypercomputation: computing more than the Turing machine” (University of Melbourne) <http://arxiv.org/abs/math/0209332> accessed 081005.

Openness and Clearing in Higher Dimensional Spaces and Non-representability

Once we realize that there are different ways to understand the System and the Meta-system at the various meta-levels of Being, then we can disambiguate many of the problems that we have with systems and their environments by specifying what meta-level of Being we are discussing at any given time. The various meta-levels the System and the Meta-system are almost completely different things, although there is a nesting among these various meta-levels that characterize them as being closely related despite their differences. Schemas are *projections of spacetime organizations* upon things, they are templates of pre-understanding. Several key ideas come together in the schemas that are important for us to understand. Systems exist as projections within the ecstasy of our spacetime articulation, and it is within this clearing that things take on their Being. Being is a projection that overwhelms and organizes from within all beings. Spacetime is not a plenum for us. It is organized beforehand into specific and different schemas. Of these, the System and the Meta-system are the two central schemas. Other important experience-able schemas are Pattern, Form, Domain, and World⁹²⁴. We are quite used to combining the Pattern, Form, and Systems Schemas together to obtain a Formal Structural System⁹²⁵. But we are less used to the combination of the Meta-system, Domain, and World, which encompass the Formal Structural System and provides its environment. The *openness* within things shows up as a *clearing* that appears within these higher dimensional schemas. We can see this when we relate the higher schemas to the higher dimensions. And, in addition, we must consider the *expansion* of the hyperspheres⁹²⁶ within this region of the higher experienceable schemas⁹²⁷. It is within that region that these hyperspheres find their greatest *inward* dimension. That *inward dimension of openness* is the openness that Hillary Lawson⁹²⁸ points to as an “openness within which things are articulated”. We quite regularly use these higher dimensions as a basis for articulating things conceptually by exploring their orthogonality to each other. For instance, we can think of this realm as the realm of categorization and classification in which we articulate independent categories all the way up to the ontological categories of Kant (physical things) and Aristotle

⁹²⁴ See Schemas Anti-thesis: The Individual Schemas a series of working papers on each schema by the author at <http://holonomic.net>.

⁹²⁵ See working paper by the author on ‘Formal Structural Systems’, which is an unused proto-chapter for this dissertation. An excellent example of a formal structural system is illustrated in Monod, Jacques. Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology (New York: Knopf, 1971). See also Klir, G. Architecture of System Problem Solving. Op. cit. See also Wilden, A. System and Structure. Op. cit.

⁹²⁶ See <http://mathworld.wolfram.com/Hypersphere.html> accessed 081005.

⁹²⁷ i.e., Meta-system, Domain, and World, which relate to dimensions four through seven.

⁹²⁸ Closure Op. cit.

(articulated subjects). This ability to separate things that are independent of each other and then aggregate them in various ways is essential to understanding things and ordering them. *Concepts are non-representable in themselves.* In the openness of the higher dimensional spaces of the hyperspheres, *concepts can become nodes of meaning.* We postulate that this meaning has a separate ground in Beyng from the differences that appear in Being.

How is it possible to have these nodes of meaning that exist but are non-representable, although we represent them with terms in our language and in diagrammatic form? We know that a concept can have many different representations, none of which capture the entirety of the concept's meaning, and so there is always an *overflow* of representation, or an *under* representation, which leaves the concept unrepresentable in its essence. That non-representability of a concept is just like the non-representability of objects in higher dimensional space. *Our hypothesis is that the concept actually operates in the openness of the clearing in higher dimensional space within the hyperspheres that are opened up by the higher dimensions associated with the schemas.* So, when we are specifying formal structural systems we are assuming that they are embedded within the background of the Meta-system, Domain, and World. The Meta-system is the environment of the formal structural system. The Domain is the unifying coordination of perspectives based on the possibility of movement. And the World is the totality of such perspectives whether coordinated or not. It was necessary to expand the Ennead by adding the moment of perspective to the Quadralectic because this will allow us direct access to the Domain and World Schemas. We assume that we can produce perspectives with respect to Systems, and that we can coordinate those perspectives. We assume that the perspectives we have are part of a finite set of the totality of the possible perspectives of that Formal Structural System. We take this higher level of schematic organization for granted. But it is this higher level of organizational arrayed possibilities for observation, manipulation, and production that allow us to condition the ways that we deal with the Formal Structural Systems that we endeavor to design and build. A design is usually expressed as a semiotic representation of a Formal Structural System. Thus, as a preparation for our work on the lower schemas there should be more emphasis on these higher schemas that provide its higher dimensional environment. That is why we have tried to engage in Systems Phenomenology. It will help us to recognize the various Ontological levels that condition the nature of the System and Meta-system as they unfold from their singularities into articulation. But it is not just a Phenomenology that we need, i.e., a detailed investigation of how systems actually appear and how they embody different ontological meta-levels in

that appearance, we need Dialectics and Hermeneutics as well. That is because the schemas are templates of pre-understanding that will give sense, meaning, significance, and relevance to the design process. And that happens due to the dialectical, conceptual, and physical unfolding that occurs in design development. Dialectics means that we recognize when lower level complementarities combine to produce higher level emergent wholes. For Dialectics to be possible, we must at least allow a para-consistency of the type studied by G. Priest⁹²⁹, which is the ability to allow contradiction and reason to exist side by side in a complementary fashion. This means our reason has to be robust, adaptive, and fault tolerant. We must avoid the mechanical and blind reasoning that results from using algorithms such as Artificially Intelligent Theorem Provers⁹³⁰. We have extended normal Hegelian Dialectics to the level of Trialectics⁹³¹ and Quadralectics⁹³² in order to understand the relationship between design and other essential features⁹³³ of emergent systems. The goal of Sign Engineering is to represent⁹³⁴ the System prior to its being built. DeSign Engineering must put together a visionary conceptualization of the emergent essences and perspectives that an emergent entity needs for testing in order to assure that it will embody the reality that we want it to have, that it will be true to its specifications, and that all the various parts are fully determined in their identity and difference relative to themselves and their environments. DeSign Engineering is needed to clarify the emergent properties that are the actual products of our intentions, freed of unintended consequences.

Aspects of Being in the Meta-levels of the System

We must recognize that, as a projection, Being is made up of four aspects: Truth, Reality, Presence, and Identity, as well as their opposites. We must also note that these aspects take on different values at each different meta-level of Being. So, when we articulate the meta-levels of the System or the Meta-system, we are also articulating the various levels of their truth, reality, identity, or presence in relation to the opposite aspects. Thus, we can talk about the difference between ‘system presence’ on the Pure Being level, versus ‘system presence and absence’⁹³⁵ at the Process Being level. Pure Being assumes that the ‘whole’

⁹²⁹ Priest, Graham, Paraconsistent Logic: Essays on the Inconsistent (München Germany: Philosophia Verlag GmbH, 1990).

⁹³⁰ Chang, Chin-Liang, and Richard Char-Tung Lee. Symbolic Logic and Mechanical Theorem Proving. Computer Science and Applied Mathematics (New York: Academic Press, 1973). Bundy, Alan. The Computer Modelling of Mathematical Reasoning (London: Academic Press, 1983).

⁹³¹ Trialectics appears in Hegel’s Phenomenology of Spirit with his definition of ‘work’.

⁹³² Quadralectics appears in Hegel’s Phenomenology of Spirit with the various voices that speak “we”.

⁹³³ Conceptual, perspectival and essential.

⁹³⁴ As a Formal Structural System.

⁹³⁵ Showing and Hiding.

of the System is accessible and available to us in its totality. Process Being assumes that there is a ‘showing and hiding’ that takes place, i.e., that part of the System is obscured, or part of it is made clear at any one point. For large systems, this fact that the System is mostly obscured and inaccessible, or unavailable, means that we need *representations* that we can *manipulate*. Part of the work that goes into systems’ development is associated with only the ‘showing and hiding’ of the System as a whole, which brings different parts of it into presence while others recede. When we think about the System, we consider it to be purely present in its entirety, but *actual* systems, as they are being built, recede from this complete availability and accessibility while we are creating them and this is the dynamic that needs to be mastered. That is why we have Configuration Management Systems. When we move into Hyper Systems their relation to Presence is much more complicated because we open up the realms of possibility, which can be either present or closed off for a particular system. The presence or absence of possibility for a System depends upon whether there is a realizable route in the design landscape for the System to evolve through within the context of the development of the design. The key question is: Which possibilities, out of the myriad possibilities, should we attempt to realize, and what would give us the best optimization of the system in respect to all of its requirements and goals? At the level of Wild Being the System is seen in terms of stability and adaptability, and as DeSign engineers, we must work toward designing Systems that will not succumb to chaotic states that can overwhelm the System. At the level of Ultra Being we consider how the warpage of the system state-space and its relationship to the singularities that appear in the virtual realms can affect the actualization of the System. In Ultra Being the non-representable aspects of the System are considered. This is the part of the System that can never be made present although it affects the operation of what is presented. For example, there may be a political constraint that is not represented in the System, which could become its major determining factor, and this can determine the success or failure of the System. The arbitrary cancelation of a design decision for political reasons can not only derail a project, but it can cause the disruption and even possible failure of the adjacent and ascendant parts of the designed system that were meant to fit and work together as a cohesive, unified entity.

The Pure System exemplifies simple truth that is verifiable. We compare the requirements to the system test results and we find out whether or not the System meets the requirements. *But the Process System is something that is progressively revealed.* The simple verification notion of truth breaks down and is replaced by deeper truths. Deeper truths concern what is covered over, then uncovered, and then covered over again within

our lifeworld. And this points to what is either structurally always absent, or always present within our experience. This deeper truth concerns the structure of the ‘showing and hiding’ relationship, such as the truth of Ontotheological Metaphysics that has ‘covered over’ the presence of the Meta-system in our tradition. The Hyper System has an even more difficult type of truth, which has to do with the revelation of *discontinuities* within the System, or between the System and its environment, or in our understanding of the relationship between our representations of the System and what the System really is. The Hyper System evolves and transforms and so does its truth. In the Wild System, that truth becomes a fact that we have completely lost control of and it takes on a life of its own. An excellent example of this is drug resistant germs. At first, drug resistant germs were generally confined to the hospital environment but now we are seeing them in the population at large because of the overuse or misuse of antibiotics by large numbers of people. The truth that we have exacerbated our own virulent diseases when we previously had them under control is difficult to face. But this is the kind of truth that appears when things go wrong due to unforeseen circumstances, or unintended consequences. The issue of global warming is another possible example. At the level of the Ultra System, truth is something unknowable because the Singularity of the System is unrepresentable when it is considered in terms of the behavior of dynamic, complex, and chaotic systems where there are singularities in the state-space of those systems. This Ultra System’s truth is the realm of ‘wicked problems’⁹³⁶, the sorts of problems whose cure is worse than the disease. An example is Chemotherapy that often makes the patient sicker than the disease and sometimes does not stem the tide of the cancer⁹³⁷. Ultra System singularities are the source of catastrophes⁹³⁸ that normally lead to the collapse of the System. Ultra Systems are embroiled in intractable problems with no solution. Avoiding these singularities in the design of a system is the key to producing something that is workable in spite of the existence of mutually negative tradeoffs that are in conflict with each other.

We have considered the aspects of presence and truth at the various meta-levels of the System. So, let us consider identity and reality. In terms of the Pure System, identity is purely determinate and its differences within itself and within its environment are clear cut

⁹³⁶ Conklin, E. Jeffrey. Dialogue Mapping: Building Shared Understanding of Wicked Problems (Chichester, England: Wiley, 2006). See also Fitzpatrick, Geraldine. The Locales Framework: Understanding and Designing for Wicked Problems. The Kluwer International Series on Computer Supported Cooperative Work, vol. 1. (Dordrecht: Kluwer Academic Publishers, 2003).

⁹³⁷ <http://www.annistononcology.com/txworse.htm> (accessed 090102) is an example of this view.

⁹³⁸ Thom, René. Structural Stability and Morphogenesis; An Outline of a General Theory of Models. (Reading, Mass: W.A. Benjamin, 1975).

and well defined. Such a System has the look of a formal system, which is well formed and clearly differentiated. But when we move up to the level of the Process System, then identity and difference give way to sameness, i.e., belonging together⁹³⁹ or family resemblances⁹⁴⁰. In other words, at some level there are similarities, analogies, similes, etc. that generate impure 'identity and difference' relationships that cannot be completely disambiguated. Process Systems have to function in this sort of environment, which is not completely clarified in terms of pure identity and pure difference. This realm of Process is signified by probability. At the level of the Hyper System the problem of identity and difference becomes even more problematic⁹⁴¹. There is complete indecision concerning what should go together and what should be separated. This is where we encounter the Gödel Proof⁹⁴². Certain statements cannot be confined to application either within or outside the System. We use the Gödel statement as a way of talking about emergence. If the Gödel statement is included, then the System has its emergent properties, if not, then the System is de-emergent and transformed into a Meta-system. The identity of the System in the face of the Gödel statement is in question, and so is the question as to whether the System will exhibit its emergent properties. At the level of the Wild System identity and difference cannot be separated, and all we have are dispositions, propensities, and tendencies that are not articulated and separated⁹⁴³. In human society these are called *trieb*, which is translated as *instinct* but actually has a broader meaning in Freud's German vernacular⁹⁴⁴. It has the connotations of drives, passions, or even *wille* (in Schopenhauer's sense⁹⁴⁵). But Wild Being can also be understood in relation to Pierre Bourdieu's concept of habitus⁹⁴⁶. At the level of the Ultra System, what is different and what is identical are either fused together and indistinguishable, or super-rationally superimposed upon each other.

⁹³⁹ Cf. Heidegger, M. Identity and Difference (New York: Harper & Row, 1969).

⁹⁴⁰ Cf. Wittgenstein, L. Philosophical Investigations Op. cit. See also http://en.wikipedia.org/wiki/Family_resemblance accessed 090102.

⁹⁴¹ Fuzzy Sets and Logic are sometimes used to try to deal with these problems. See Kosko, Bart. Fuzzy Thinking: The New Science of Fuzzy Logic (New York: Hyperion, 1993). See also Pedrycz, Witold, and Fernando Gomide. An Introduction to Fuzzy Sets Analysis and Design. Complex Adaptive Systems (Cambridge, Mass: MIT Press, 1998).

⁹⁴² Cf. Nagle, E. Godel's Proof Op. cit.

⁹⁴³ Parkes, Graham. Composing the Soul: Reaches of Nietzsche's Psychology (Chicago: Univ. of Chicago Press, 1994). Discusses Nietzsche's Psychology which was based on Schopenhauer and paved the way for Freud and Jung.

⁹⁴⁴ Edgar, Andrew, and Peter R. Sedgwick. Cultural Theory: The Key Concepts. Routledge Key Guides (London: Routledge, 2004) P. 81, Section on Drive.

⁹⁴⁵ Janaway, Christopher. The Cambridge Companion to Schopenhauer (Cambridge, U.K.: Cambridge University Press, 1999).

⁹⁴⁶ See Chapter 16.

Finally, we will consider reality. The Pure System has a reality that is assumed to be effective but is untested. That reality is something like authority, i.e., it has power but that power may not have been tested, (and so that power is illusory). The Process System's reality is based on testing. The more we test a System, the more real the System becomes until it is fully validated. And, of course, the ultimate test is in the user's environment after it leaves the lab. The Hyper System is trapped between illusion and reality. That is between the projection and its actualization. There is an indecision or a hinge between illusion and reality in the Hyper System. That is why it can appear so flexible in the design landscape. It can change at will to transform as it attempts to conform to multiple realizations within the design landscape. It has the reality of systems that are made of software and hardware together, but can change by having the software changed to correct the hardware problems. Software is the embodiment of Hyper Being within an artifact and that is what makes the hardware flexible and adaptive⁹⁴⁷. It uses its illusory aspect and joins it with reality as a means of adapting to different circumstances. Wild Systems are like artificial intelligence techniques, i.e., they are techniques that work but are opaque to our understanding. In Wild Being, illusion and reality become mixed together. An example of this is the Turing Test⁹⁴⁸ for intelligence. The test is applied to confirm that what *appears* intelligent, really *is* intelligent. In the Ultra System, illusion cannot be separated from reality and the distinction itself becomes unrepresentable.

We live and work in a world of Systems that we consider to be Pure Systems in all their *aspects*. We do not recognize or consider the higher order questions that deal with *how* the aspects *transform* as we move up the meta-levels of either the System schema or the Meta-system schema (which is its complement). As long as we think of systems as Pure Systems that are completely determinate in every aspect, we are going to fail to understand the very thing we are attempting to produce even as we produce it. In other words, we struggle as we attempt to design and build highly complex systems without even the most basic recognition of the Phenomenology of those systems. The System is not just one thing, or one plenum without any internal differentiation. Just as there is differentiation *between* the schemas that needs to be recognized, there is also differentiation *within* each of the schemas in terms of the standings of the meta-levels of Being. Understanding this essential differentiation should be the basis of our approach toward designing and building systems.

⁹⁴⁷ See Wild Software Meta-systems essay on "Software Ontology" by the author at http://works.bepress.com/Kent_Palmer

⁹⁴⁸ Shieber, Stuart M. The Turing Test: Verbal Behavior As the Hallmark of Intelligence (Cambridge, Mass: MIT Press, 2004).

We can think of these meta-layers in reverse, as levels of higher logical typing. In other words, we can think of each level as being necessary for the next level to unfold. In that case we are thinking our way *down* the hierarchy instead of *up*. But, in either case, we are saying that the meta-levels that determine the essence of the system are nested and co-determinate even if they are emergent with respect to each other. For the most part, when we start a project we think that the system we are creating is a Pure System. It is an idea that is based on the projection of an *illusory continuity*. As we contemplate the project design, we assume that the requirements we write down for it will be able to be completely verified, we consider that it will have the emergent properties we intend, and that we will be able to differentiate all its parts in a determinate way. As a result we further assume that the finished product will be able to work in the intended environment as advertised. *This is called vaporware*. It is well known in the realm of commercial products as the perfect product that will do whatever you need, and fulfill all expectations. But, within this imaginary product (as pure idea), there is a System that is being built through a work process by fallible human beings. And the process of building the System will take time and cost money, and will, in the end, have a certain performance and cost/benefit analysis.

Even using the product is a process, so there is only an arbitrary line between the ‘process of use’ and the ‘process of building’, which affects the division of labor and how contracts work within our institutions. When we move into the *process realm* from the determinate realm, we enter the dominion of probabilities where suddenly everything becomes less clear. This is a result of the interaction of the myriad factors that inevitably come into play in determining the outcome. This is the part of engineering that most of us know, the actual struggle to produce something out of meager materials in a death march⁹⁴⁹ against an unrealistic schedule with an impossible budget while aiming at improbable performance goals. And we struggle on valiantly, sometimes successfully and other times not. Very few engineers understand that at the process level where we work to produce the product, there exists a different type of System all together, one which we call the Hyper System. Only a few visionaries and architects appreciate this core system where what ‘may be’ collides with ‘what almost is’. In many systems there are levels that are emergent and this is where those emergent possibilities open out from the core of that system to make it something that can be recognized as new. This level of the system can be both difficult and easy to think about. It is easy in the sense that creating something new of our own is much easier

⁹⁴⁹ Yourdon, Edward. Death March: The Complete Software Developer's Guide to Surviving Mission Impossible Projects. Yourdon Press Computing Series (Upper Saddle River, N.J.: Prentice Hall PTR, 1997).

than learning how to accommodate ourselves to a system that someone else has created. Engineers must work with a world of parameters, characteristics, procedures, and other technical details that have been previously established by other engineers. Our goal is to take advantage of our essential desire and talent for invention. Once we do that, we will be able to experience the Hyper System. The Hyper System lives on the verge of possibilities. S. Kauffman⁹⁵⁰ calls this the “adjacent possible”, i.e., the possibilities just over the horizon of realizability. It is very exciting for engineers to breach the “adjacent possible” when they are working to design artifacts and systems that are more efficient and flexible, as well as more socially and environmentally sensitive. And we do precious little of that. Normally we are satisfied with point solutions that make their non-optimal aspects apparent only after being built. Much of the time we are forced by necessity to engage in this sort of short-sighted engineering where tradeoffs are done by fiat rather than by considering alternatives. But, be that as it may, there are very few engineers who realize that within the Hyper System there is a *Wild System*. The Wild System exemplifies the possibility within a project for the System to take on a life of its own, realizing its propensities, inclinations, dispositions, and tendencies. When the Wild System appears, you must hang on for the wild ride as things get out of control. Sometimes the System will transform itself into something unexpected and the emergent properties that are revealed will be much greater than predicted. If there is good team coherence then it is sometimes possible to allow these internal transformations of the System to open up new possibilities that will allow the project to be successful. This is the place where many casualties are produced by circumstances that go out of control. Lurking inside every System is a Wild System just waiting to get out. And when it does, it generally turns into a monster⁹⁵¹. We may refer to it as an ecological disaster, hazardous material contamination, nuclear meltdown, a space-craft failure, or an oil spill.

The hardest thing to accept is the idea that there is a non-representable Singularity that is tied to Ultra Being at the center of each System that is being built. This is due to the nature of emergence. G.H. Mead⁹⁵² reminds us that when an emergent event occurs we rewrite history and open up a new future. Different things become possible in the ‘here and now’ that did not appear possible before. This new emergent thing cannot be completely represented in the old order if it is genuinely emergent. So, with every new thing that has

⁹⁵⁰ Kauffman, Stuart A. The Origins of Order: Self-Organization and Selection in Evolution (New York: Oxford University Press, 1993). See also Investigations Op. cit.

⁹⁵¹ The Frankenstein archetype. Shelly, M. Op. cit.

⁹⁵² Cf. The Philosophy of the Present. Op. cit.

emergent properties, there must be some aspect of the new System that is not representable. This is why the sub-schemas, moments, and aspects of the Quadralectic fuse just before they collapse into the Ultra System. When you add this to that the fact that we are making new systems as combinations of artifacts that embody the various kinds of Being, then we can see that this non-representability has a double edge to it. For instance, computer hardware has pointing registers and accumulators, which embody the pointing and grasping that are the modalities related to Present-at-hand (Pure Being) and Ready-to-hand (Process Being)⁹⁵³. This allows the software to run on the hardware that either controls it, or may cause it to fail. Computer software is one of the few artifacts that embodies the in-hand (Hyper Being). In addition, we can see that artificial intelligence techniques are embodiments of the out-of-hand (Wild Being) due to their opacity with respect to our understanding. Thus, we want to create more intelligent, flexible, and resilient systems with similar Self-* properties⁹⁵⁴, and the way that we can do that is to include the types of Being within the embodiments of these artifacts. The combination of these rather ephemeral and esoteric artifacts that are nested in the more mundane hardware artifacts is what not only produces these properties, but is also what makes the systems more difficult to represent overall. So, if we accept that there is a Singularity at the center of the complex automated systems that we build, then it will become clear that the bulk of the effort in building these systems will be skirting around non-representability by increasing the number of perspectives from which the System is viewed. Thus, Domain Engineering will become more and more important as we create systems, which recognize that the Ultra System is at the kernel of the complex systems we build.

There is a more intuitive, efficient, and adaptive approach to Systems Engineering that recognizes the complexity of our design task. Traditional Systems Engineering courses present systems in terms of the Purely Present, Purely Identical, Purely True, and Purely Real. Instead, we must confront our design work from where the core of the complexity lies and establish that within every complex system there is a Singularity with the Ultra System at its kernel. With this knowledge we will know that it is not only possible, but necessary to avoid the Singularity⁹⁵⁵ in order to make the System work despite the fact that some of it is non-representable. The path around this either wholly, or partially

⁹⁵³ See “Software Ontology” essay in Wild Software Meta-systems by the author at http://works.bepress.com/kent_palmer/ Op. cit.

⁹⁵⁴ See “Self-Adaptation, Self-Organization and Special Systems Theory” at <http://holonomic.net> by the author.

⁹⁵⁵ This is like avoiding singularities in the calculation of motions in robotics by using Quaternions.

unrepresentable Singularity is only calculable if we pay attention and watch for the clues. We must realize that regardless of how much paper work we do, it may not necessarily make the System more intelligible, perhaps less so. The focus should be upon visionary and global overviews of the product that will clarify, rather than obfuscate our goals. In addition, we need to understand that there is a region surrounding the Singularity of Ultra Being that we refer to as Wild Being that has a noumenal *Wille* (ala Schopenhauer) of its own. This *Wille* is the projection of the uncontrollable aspects of our own *Wille*⁹⁵⁶. We can attempt to exert our “will to power”⁹⁵⁷, or, as Heidegger calls Nietzsche’s central concept, our “Will to Will”⁹⁵⁸, although it can rebound and manifest in unexpected ways that are often counter-productive to our original intentions. There is a noumenal substrate that is impossible to completely control. *It is important that we prepare ourselves for this obscured aspect of the System that is able to take on a life of its own.* Our lack of control over our own bureaucracies, either corporate or governmental, is an example of this. Surrounding the layers of the Ultra System and the Wild System is the layer of the Hyper System, which is what gives us the ability to produce emergent systems that go beyond what is already open to the adjacent possibilities that are just beyond what is currently being realized. Realizing a possibility such as this can initiate the type of change that will lead to an Emergent Event. So, it is the *Hyper System* where we must focus our Systems architectural work. The Hyper System is the realm that expresses the emergent properties of a new thing coming into existence. These emergent possibilities must be brought into actuality by pragmatic hard work through acknowledging the Process System. Finally, at the end of a long road we hope to have a viable product that we can present to customers, or at marketing events, or trade shows, which is fully packaged with a high probability of soundness, appropriateness, and reliability. We tend to begin product development by envisioning the product in its finished form. This approach actually makes the product more difficult to produce. If instead, we start with the *non-representable Singularity* and work our way out of that quandary, then we will have a much more realistic view of the design and development process.

In the context of this more realistic Systems Phenomenology, we have shown how the Quadralectic helps us to understand the nature of design by putting it in the context of

⁹⁵⁶ This is the message of the movie Forbidden Planet (Fred M. Wilcox, Director, Warner Brothers, 1956).

⁹⁵⁷ Nietzsche, Friedrich Wilhelm, Walter Arnold Kaufmann, and R. J. Hollingdale. The Will to Power (New York: Random House, 1967).

⁹⁵⁸ Heidegger, Martin, and David Farrell Krell. Nietzsche (San Francisco: Harper & Row, 1979).

other human faculties that are necessary for unfolding the design. Creativity⁹⁵⁹ is the fundamental underlying human process that is expressed in a design. We wish to make the point that design is an interconnected field embodied by the Third Meta-level of the Sign. So, our DeSign engineering must have an interconnected field as the object of its intentionality within the domain of possibility. And this design object needs to interact with conceptualizations, perspectives, and emergent essences so that it can provide us with a conceptual basis for pinpointing the emergent essences that we are extracting from the realm of possibility so that the design object can then be reconstituted into a product that is both representable and intelligible. Concepts appear in higher dimensional spaces. We are open to grasping concepts that appear in the higher dimensional spaces through the unfolding of orthogonal dimensions associated with the hierarchy of the schemas. Concepts are the traces of these higher dimensional structures within our experience and our representations of these concepts are limited to the third dimension. What is true of concepts is also true of essences, perspectives, and designs. The traces of higher dimensional structures are themselves non-representable but can be understood through schematization. These traces are only accessible through the third meta-level of Being where possibility appears. The appearance of possibility as a combinatoric field structure allows us to open out into the vistas of the higher dimensions. This is the meaning of the 'clearing of Being', which is an *openness* that allows us to cope with the complexity of life in our experience even as we unconsciously confront, use, and take for granted these complex higher dimensional structures. In Hyper Being, Quadralectics can become a means of mutual reinforcement of these trace structures, which makes it possible for the higher dimensional noumena to be conceptualized from various perspectives. This allows for designs to be articulated through conceptual design and for the artifact to emerge as an actualization in the lower levels of Being. Once we understand that Quadralectics is a necessary level of complication that we need to confront in order to achieve an accurate picture of design, then we will understand how the relationship of that dynamic within the Third Meta-level of Being relates to the Lifecycle of the Emergent Event as well as to the Cycle of the Emergent Meta-system that signifies the workings of the dynamic of existence.

⁹⁵⁹ Koestler, Arthur. The Act of Creation (London: Hutchinson, 1976). A classic on creativity. See also Pope, Rob. Creativity: Theory, History, Practice (London: Routledge, 2005).

Kinds of Meta-system Open-scapes

Exploring the Meta-levels of the Duals of the System

This chapter introduces the meta-levels of the sign as they correspond to their articulation in the various meta-levels of Being. Following this, the different types of Meta-system open-scapes at the various meta-levels of Being will be explored. From there we turn to our cultural taboo concerning Masses in relation to our emphasis on Sets, which is analogous to our blindspot, or inability to recognize the Meta-system. By going beyond this cultural taboo we can construct a complete model of the phenomenal field and show how it is structurally related to the Quadralectic.

Meta-levels of the Sign

Our focus has been on the System and the kinds of systems that exist at the various meta-levels of Being. But our survey would not be complete unless we considered the kinds of Meta-systems as well. We note that the System and Meta-system are strict inverse duals of each other. They are completely different from each other, but in complementary ways. And like all schemas, they have differentiation at the various meta-levels of Being, and that is how we tell the schemas apart⁹⁶⁰. A System is different from a Meta-system at its higher meta-levels. Here we use the term ‘meta’ in two different senses. The ‘meta’ in Meta-system means *beyond*, what is beyond the System, i.e., the *environment*. But the ‘meta’ in meta-levels means referring to a *lower logical level*, where each meta-level is a *language* that describes the *lower* meta-level. This comes from Russell’s (via Copi⁹⁶¹) theory of higher logical types⁹⁶². Russell’s theory distinguishes between the higher logical types that go *down* the hierarchy from the meta-levels, which is actually the *same* as going *up to a higher logical type*⁹⁶³. So Pure Being is a higher logical type than Process Being, but

⁹⁶⁰ Schemas have different organizations in their meta-levels and this is what makes them essentially different from each other.

⁹⁶¹ Copi, Irving M. [The Theory of Logical Types](#) (London: Routledge and K. Paul, 1971).

⁹⁶² Whitehead, Alfred North, and Bertrand Russell. [Principia Mathematica](#) (Cambridge UK: The University Press, 1925). See http://en.wikipedia.org/wiki/Type_theory and see also <http://plato.stanford.edu/entries/type-theory/> accessed 081012.

⁹⁶³ Higher logical types are lower meta-levels.

Process Being is a meta-level to Pure Being. Thus, Process Being supplies the *language* that talks about Pure Being, but Pure Being supplies the *foundation* for Process Being. We normally talk about this in terms of supervenience and emergence. Higher logical types are supervenient to lower logical types, i.e., meta-levels. But emergent Meta-levels predominate over the higher logical types. In other words, what is supplied at the higher logical type is necessary but not sufficient for the meta-level to arise. The meta-level arises as something emergent from the higher logical type, it is something new that cannot be derived through the simple analysis of a progression. We often arrive at the meta-levels, at least nominally, by repeating a word that relates to the concept we are exploring. So, for instance, with respect to the *sign*⁰, which is something determinate that appears on a page creating a word that uses the sign as a letter, we then have the first level of the Pure Sign. But the *sign*² of a *sign*¹ is at the meta-level. When we repeat the term *sign*, the second repetition has a different meaning than the first. We indicate this by superscripts that show the power to which the term is taken. We need to clarify that when we are talking about the sign in this instance, we are discussing the *abstraction of the idea*, not the *ontic instances*. There is an ontological difference between *signs*⁰ and the *Sign*¹. The *Sign*¹ is at the first meta-level while the *signs*⁰ are at the zeroth meta-level. All concrete *signs*⁰ exist at the zeroth meta-level until there is a leap to a level of abstraction where we consider the *essence*⁹⁶⁴ of all *signs*⁰, which is what we term to be the *Sign*¹. From that abstraction we begin a series of leaps to the various meta-levels. If we come *down the hierarchy*, then we speak of the *next lower foundation*, or *higher logical type*. Higher logical types are lower on the hierarchy, which is a point of possible confusion in the terminology of Logical Type Theory.

⁹⁶⁴ In this case ‘essence’ means that the Pure Sign is an illusory continuity connecting all signs to the idea of a sign. The meaning of the term ‘essence’ changes at each meta-level of Being. Normally we use the third meta-level of the essence when we speak of the moments of the Quadralectic.

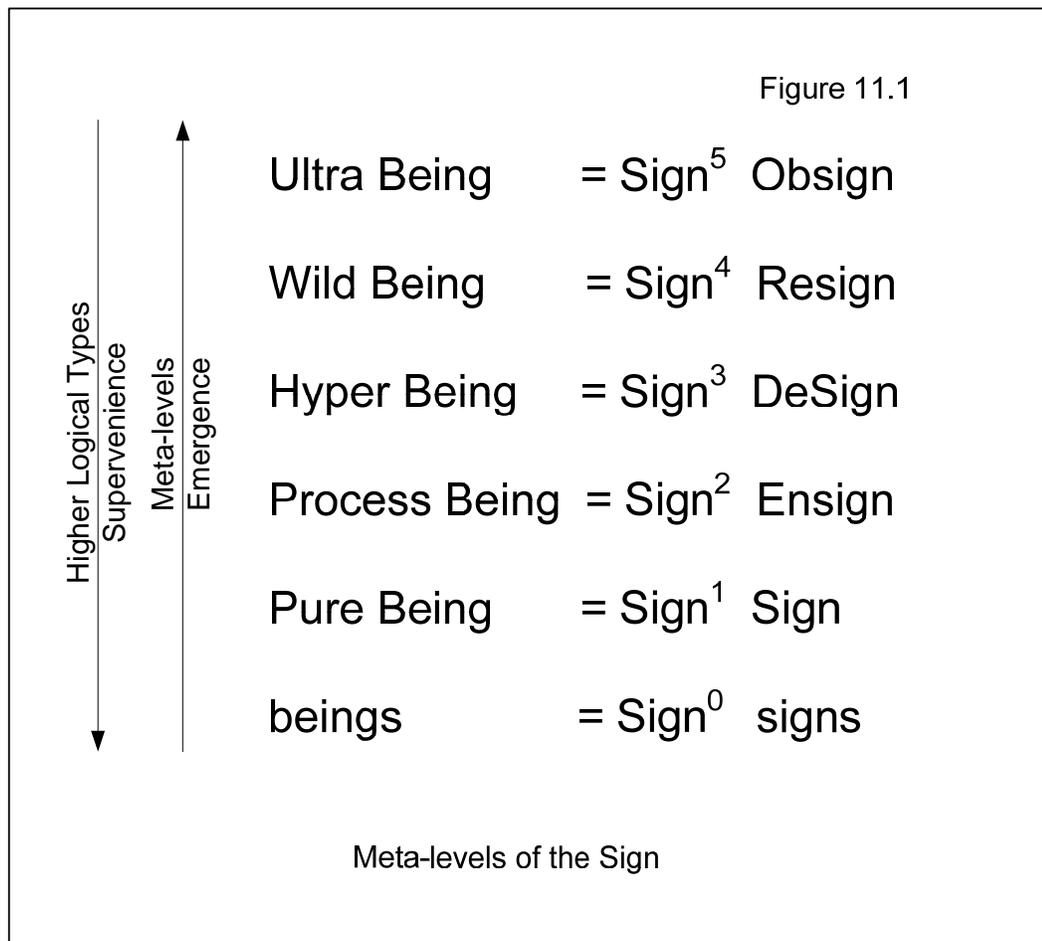


Figure 11.1. Meta-levels of the Sign.

Next, we try to capture the emergent *aspect* of the sign at the second meta-level by using the term *ensign*. In order to illustrate our point, we are using the various prefixed terms in the English language that relate to the sign. In this case the *ensign* is a *person* who has the *role* of making signs. They are engaged in the process of signing. The *process of signing* is different from the signs themselves. In design we are engaged in producing signs that represent the System to be built and the process of creating and maintaining those signs underlies the static signs that are produced. The *ensign*, or Process Sign, is at the second meta-level and relates to the *signs of signs* (or we could say the *signs of sign making*). This type of sign² is one of the differentiations of the Pattern schema along with value, structure, and flux. When we go up to the next meta-level of the sign³, then we posit that at that level we discover the design. A design is a sign³ of a sign² of a sign¹. We call that the Hyper Sign. The Hyper Sign is the *trace* of a sign². It is a *hinge* between the Process Sign and the Pure Sign. It is the hinge that takes us into a realm of possibility. Possibilities are traces of *what can be* that impinges upon *what is* through the process of *becoming*. For the most part, these are discontinuous transformations that can be understood through

structuralism. The articulation of these traces, or hinges (as Derrida calls them when he describes Differance as “differing and deferring” in *Of Grammatology*⁹⁶⁵) are the guidelines of the design landscape through which the design may evolve into many different possible designs. Our point is that designs are an interconnected combinatoric field at the third meta-level of the sign. Thus, a design has its own kind of Being, which is the basis of its reality in Sign Engineering. Systems Architecting is *initially presented* as a *process* that takes place in Process Being although its *final product* only *actually appears* in Pure Being. Architecting, itself, is a process. But that process is directed at the design, which is in Hyper Being. Hyper Being consists of a landscape of possibilities where we look for the traces of the Hyper Sign that serve as hinges between various possibilities. When we participate in the designing process, a whole landscape of possibilities opens up that we can perceive through our skills and intuition as an emergent capability for exploring possible worlds such as the ones that are discussed by David Lewis⁹⁶⁶, who believes that these *possible worlds* are all as equally real as the mundane world. Our focus on Systems Engineering Design must be on this level of Hyper Being⁹⁶⁷. Yet, most of our conceptual effort goes into *suppressing* this level of Being and the other higher levels of Being. This diminishes our ability to grasp the full scope of the design process. Hyper Signs appear at the meta-level of Hyper Being in the same way that products appear at the level of Pure Being. The actual process of product development and work appears at the Process Being level. Hyper Signs are radically different and vastly more difficult to understand, but they have their own truth, reality, identity, and presence that appear at the Hyper Being meta-level. Sign Engineering is focused on a particular type of Sign: the *De-sign*. This is a new understanding of the nature of *De-sign*⁹⁶⁸.

Previously, Design has always been seen as either a *collection of signs representing the thing to be built*, or as the *process that represents the thing to be built*. In effect, these two ways of looking at design (in terms of the Pure Product or the Process) are not adequate because they are *not rooted in possibilities*. If, instead, we say that the design is something at the level of Hyper Being, and that it is in fact a Hyper Sign, then we will have a

⁹⁶⁵ Derrida, Jacques, Translated by Spivak, Gayatri Chakravorty, *Of Grammatology* (Johns Hopkins University Press, 1998).

⁹⁶⁶ *On the Plurality of Worlds* Op.cit.

⁹⁶⁷ At this level of the ‘Hyper Being of the Sign’ we are dealing with complex higher dimensional ensembles of concepts that are mapped onto lower dimensional representations. The relationship between these two contrasting dimensional concepts can bring about emergent effects when they are actualized through implementation. .

⁹⁶⁸ In this case, “*De-Sign*” emphasizes that Design is a meta-level of the Sign. This is a new understanding of the nature of Design, i.e., that it is expressed and is embodied by Hyper Signs.

completely different view of the Design – one that is related to the essential nature of possibility while taking into account the role that possibility plays in the fostering of the Emergent Event. That means that the design is comprised of the traces of possibilities⁹⁶⁹ and the hinges *between* these possibilities⁹⁷⁰. Representing what is built, or the process by which something is built, is a subsidiary concern. We get a sense of this when we talk about the design vision, i.e., our projection of the whole thing to be designed. Interestingly we can think of the landscape of design as a Meta-system, as the de-emergent dual to the designed system itself. Moving across the landscape of design basically involves taking apart and reconstructing the System that is under design as we create images of it at various points in the design landscape. These various images of the design are compared in order to try to find optimal designs. But, although designs may consist of images that are made of signs that represent each possible configuration, they are essentially different from the *collection of signs*. In effect, each design is a meta³-sign. The sign and the ensign intersect in the design, and the design opens up a realm of possible designs from that intersection. So, there is both the *focus of the design* as a path through the interconnected field of possibilities and the *concept of the sign*, which marks a certain combinatoric permutation within that field. Envisioning the landscape of design from the point of view of the Meta-system allows us to see the interaction of that image with all the constraints that exist within the landscape possibility. Within that landscape the multiple constraints on the design interact. As some parameters are modulated, other dependent variables change to produce the characteristics of any one image of a possible design within the landscape. Design as Hyper Sign emphasizes the exploration of the design landscape in relation to the *point design*⁹⁷¹ that is chosen to be the optimal design within that landscape. There may be a ‘Pareto clustering’⁹⁷² of multiple optimizations that need to be traded off with each other in order to make the final decision as to what is the best of these designs. We think of each design image as being traced like dotted lines with each one being produced as if by a genetic algorithm⁹⁷³, which is then bounced against a fitness function that would be used to determine the ‘Pareto optima’ from the group. Finally, it is a trade

⁹⁶⁹ i.e., complex relations between higher dimensional concepts.

⁹⁷⁰ Hinges suggest the possibility in one direction or another within the Design landscape.

⁹⁷¹ A point design is one in which the possibilities of design are not considered or measured against each other.

⁹⁷² Schulze, Peter C. *Engineering Within Ecological Constraints* (Washington, D.C.: National Academy Press, 1996). pp. 61-62. Davis, Morton D. *Game Theory: A Nontechnical Introduction*. Science and Discovery (New York: Basic Books, 1970). p. 118. See also http://en.wikipedia.org/wiki/Pareto_efficiency accessed 081012.

⁹⁷³ Mitchell, Melanie. *An Introduction to Genetic Algorithms*. Complex adaptive systems (Cambridge, Mass: MIT Press, 1998). Vose, Michael D. *The Simple Genetic Algorithm Foundations and Theory*. Complex Adaptive Systems (Cambridge, Mass: MIT Press, 1999).

study between these ‘Pareto optimal cluster possibilities’ that determines the best design (given all the constraints), which will be the design that we will try to develop or ‘realize.’ So, there are at least four classes of designs within the design landscape: the *designated as the target* design, the *other Pareto optimal designs* that cluster around it, the *myriad other sub-optimal designs*, and ultimately the plethora of possible, but unworthy, or *impossible designs*. Our point is that by conceptualizing the design as a Meta³-sign, we will better understand the target of Sign Engineering. The object of Sign Engineering is not merely the production of images of systems based on signs, nor is it the process of sign creation in the service of engineering, but rather it is the attempt to reveal the *trace*, which is the interconnected combinatoric field of the *design as a whole*, which is the trade-off of optimal parameters that are among the myriad possible tradeoffs within the design landscape. So, the design, *as trace*, connects the *whole* of the design *landscape* (which is a Meta-system) to the design of the System that is under design. The design is the *hinge* between the System and the Meta-system of the design landscape. The design aims at something emergent in a de-emergent context.

Beyond the sign, ensign, and design we posit two more levels of the sign: the Wild Sign, which we call the *resign*, and the Ultra Sign, which we call the *obsign*. Remember that Wild Being is the realm of Being where things go out of control and descend into Chaos. At the level of the resign, we are faced with the limits of the representable. At the level of the obsign, which is in Ultra Being, we have surpassed the representational limits and can only *indicate* the Singularity because representing it is beyond our ability. The resign and obsign, as third and fourth meta-level signs, also play important roles as obstacles to our designs. Sometimes we introduce defects into our designs. We are then resigned to the fact that, as humans, we make errors and thus introduce defects into our products, which we refer to as the *flaws* in the design. Resigns can be thought of as those defects. Resign comes from the ‘cancelling out’ of a sign in double entry book keeping. We actually want those flaws to resign, i.e., to be cancelled out of the design so that it may be restored to its internal integrity. But there is another side to the resign that is positive instead of negative. Sometimes there are fortuitous turns of events that *appear* to be errors, but in the end, turn out to be serendipitous, and this is where we unexpectedly find a synergy that we can exploit, which is not expected but allows some extra measure of efficiency in our design. In such a case we find ourselves re-signing, (or re-assigning) i.e., reinterpreting the signs in a different way than originally intended, and this is where we might think of the design as

taking on a positive life of its own. There is something called ‘thinking through artifacts’⁹⁷⁴, where the artifacts support our thoughts and allow us to come to conclusions that we might not come to otherwise⁹⁷⁵. This is a positive way of re-signing at the Wild Being level where we discover propensities, tendencies, inclinations, and dispositions in the materials of the design itself, which help us to organize it better. The Obsign, on the other hand, is a seal that is placed on something. At the level of the obsign we do not understand our own signs any longer, they are forgotten or lost in oblivion, and they become oracles to us. The signs become cryptic and secret or mysterious to us and that is when they reach the *limit* of what is representable. When we can no longer understand what our own signs mean, then we have encountered the obsign. Suddenly, our own representations become a foreign language to us. This is very common because that is *how we encounter someone else’s design*. In other words, other people’s design documentation is for us, at first, an obsign. We need to decipher it and as we do, we bring it down into the resign, then the design, then the ensign, and finally into signs whose interpretation we think we understand. But as Naur⁹⁷⁶ says, this is really only possible if we can talk *with* the original designers, because otherwise truly understanding the design is almost impossible.

Many times it is easier to re-*de*-sign⁹⁷⁷ something from scratch rather than to try and understand this foreign language of the obsign. The reason for this is not only that the private language or the individual proclivities of designers seem foreign to us, but it can also be due to the fact that there are assumptions that the designer makes that are not represented in his documentation, although these assumptions will continue to affect the system under design, even though they are not overtly or clearly stated. These assumptions, whether they are at the paradigm, or the episteme level, or even at the level of an interpretation of Being, can render the signs completely opaque. This is especially true when we are trying to read a software design back out of code. All the signs that represent the software product are present, but we cannot understand them unless we progress up the hierarchy of sign interpretation to the higher meta-levels. So, first of all, we must turn that static code into ensigns, i.e., signs of operations to be performed within a context. From there, we may glean the design if we are lucky. But that is thwarted by the fact that the code may have flaws, or hidden assumptions that are the unspoken context of the code,

⁹⁷⁴ Knappett, Carl. Thinking Through Material Culture: An Interdisciplinary Perspective. Archaeology, Culture, and Society (Philadelphia: University of Pennsylvania Press, 2005).

⁹⁷⁵ Nielsen, Martin M. “Representations at Work”, *Outlines*, 5 (2), (2003) pp. 69-77.

⁹⁷⁶ Computing: A Human Activity (ACM Press/Addison-Wesley, 1992) See “Programming As Theory Building (1985)”.

⁹⁷⁷ Resign, design, sign = re-*de*-sign the normal response to an incomprehensible ob-sign.

which we must resign ourselves to, which means that we need to find different reinterpretations of the signs that make sense as hypotheses through the application of Peircian abduction⁹⁷⁸, rather than through deduction or induction. In general, as we learn to code, there will be obsigns, which are things we cannot understand that must be transformed into comprehensible signs. The Pure Sign is purely present and accessible but the Ultra Sign is absent and continues to hide itself. The Process Sign represents the action performed by the code, but the Wild Sign are its defects or hidden synergies, or hidden assumptions. Each of the other levels of sign are duals of each other that relate to Pure and Ultra, or Process and Hyper. These dualities serve as the background on which the Design, as Hyper Being, appears. But there are other dualities between 'Pure and Process,' and 'Wild and Hyper' Being that need to be considered as well. From this we can see that there is an asymmetry that is built into Ultra Being as a Singularity.

Once we understand the various meta-levels of the sign, then it is possible to recast Sign Engineering to be primarily directed at the third meta-level of the sign where possibility as a modality⁹⁷⁹ that stands against the limits of necessity by opening and allowing the possibility of emergence. That realm stands apart from the constraints of Pure, Process, Wild, and Ultra Being levels, which are either facilitations or inhibitors of this open realm of possibilities that design can clarify, unify by connecting possible elements and totalize by exploring all the possible permutations of those elements. The field of interconnected combinatoric possibilities contains permutations, which specify design points in the higher dimensional meta-system of the design landscape, which has different modalities such as actuality, potentiality, possibility, necessity and impossibility. The design representations carry these modalities and have unity and totality in the context of the *dis*-unity and the *de*-totality of the Meta-system. The representations unify by giving us the image of an emergent system, and they totalize by relating that image to all other possible system images in the design landscape. From this, a two-fold whole is realized. It is an emergent whole greater than the sum of the parts of the designed thing, and a de-emergent whole that is less than the sum of its parts (which is the design landscape). The traces form the hinge between these two wholes. The emergent thing strives toward unity, which is the embodiment of the totality of its parts, and this allows it to realize its emergent wholeness. But, there is a counter movement in the design landscape, which strives toward dis-unity and de-totality. The dis-unity of the design landscape is demonstrated by the way that some

⁹⁷⁸ Rescher, Nicholas. Peirce's Philosophy of Science: Critical Studies in His Theory of Induction and Scientific Method (Notre Dame: University of Notre Dame Press, 1978).

⁹⁷⁹ Chellas, Brian F. Modal Logic: An Introduction. (Cambridge UK Cambridge University Press, 1980).

parts of it are held together, while other parts are kept separated and held apart. This is how the various constraints of the levels of Being operate on the System together. The de-totally of the design landscape is the separation of each of the possible images of the System across the design landscape. But the combination of dis-unity and de-totally does not make the design landscape any less a whole, rather it imbues it with the wholeness of an interconnected combinatoric field. And that wholeness of the field provides an ambience for these holes or niches so that each ‘system image’ may fit into the entire landscape. De-emergence is the dual of emergence. In order to realize emergence through the implementation of our design, we have to impose de-emergence on the whole design landscape, which is different than what is designated as a real, identical, present, and true whole.

Exploring the Higher Scapes

Now that we have explored the *sign* and showed that the *design* is a meta-level of the sign, we can look more carefully at the meta-levels of the Meta-system. To avoid confusion between the two different uses of the prefix “meta”, we will shift to the *open-scape* terminology. We will talk about the meta-levels of the open-scape. *X-scape* comes from our search for a positive term for the meta-system in English. And it turns out that the term ‘scape’ is the key. A *scape* is what can be viewed of a *land-scape* from a certain point within it while not moving. The panorama of the landscape is taken in by the viewer, but from a fixed point. Yet, the word *scape* nearly always appears with a modifier, like land, sea, mind, etc. So we choose the modifier “open” to signify a variable that can be used to replace whatever modifier is appropriate. For example, we would say *design-scape* for the ‘design landscape.’ We will use the term open-scape to describe what appears around us at a given point in the landscape when we are looking around but not moving. We are *open* to what may *appear*, such as when an animal senses danger, freezes, and looks around, perhaps sniffing the air, seeking signs of danger. We often see this stance in animals when they are taking in the Meta-system of their immediate environment around a fixed point where some danger might appear. We will call this meta-system an open-scape. We use this terminology in order to talk about the various meta-levels of the open-scape. There is the Pure open-scape (or just Scape, for short), the Process Scape, the Hyper Scape, the Wild Scape, and the Ultra Scape. The Pure Scape is what appears as statically arrayed in the panorama around the fixed point. So, using our analogy of the design landscape, we can think of the open-scape around the System as a point solution for a design. As we engage in this view, we are considering the other possible system images within it as far as

we can see to our horizon. We are considering many possible systems in every direction, such as system parameters, or the scale of what can (or should be) built. All these system images relate to the point solution. But there is another landscape that is completely different that needs to be considered, which is the actual operating environment of the System. The design landscape offers alternatives of fitness for the operating environment for the envisaged system. There is an Old English word for this called *meet*. A System that fits into its niche in the operating environment is *meet*. It *meets* the operating requirements and fulfills its task⁹⁸⁰. We cannot really consider the landscape of possible designs as something separate from the operating environment of the System, instead, these two relate to each other in an intrinsic way in terms of their degrees of fitness, or adaptation, or attunement between the System and its environment. A good model of this is the Panarchy⁹⁸¹.

We wish to point out the *double vision* that occurs when we stand in a particular spot in the environment and consider what is actually there *and* the possible appropriate and fit forms that are needed for the System to operate effectively in the given environment. Yet, there is also a double vision that occurs when differentiating between what actually *appears* in the environment and the design landscape of *possible fitness* to that environment. It is as if the *possible realm* of the design landscape haunts the *actual landscape*⁹⁸². Both are centered on the System, but these are two views of the System. One view is at the level of representing the *pure product* while the other view sees the System on a level that embodies *possible design configurations*. To bring these two visions together we need to consider the Process Scape. The Process Scape is the Meta-system acting as an operating environment for the System. The Meta-system works to bring resources to the System, and it organizes these resources that it allocates to the System. The System is *meet* if it can accept the resources that are distributed by the Meta-system and do its part in receiving those resources. But accepting these resources depends on its adaptation to its niche. The better the System is adapted, then the better it is going to be at accepting, transforming, and producing outputs according to its environment. So, in the process of resourcing the System within its niche, there is ‘a bringing together of the things’ in the environment, and the process of assessing

⁹⁸⁰ A system that is shown to meet its necessary operating conditions in its operating environment is called validated.

⁹⁸¹ Gunderson, Lance, Holling, C. S., Panarchy: Understanding Transformations in Systems of Humans and Nature (Washington, D.C.: Island Press, 2001). See also “Panarchy, Emergent Meta-systems and Gaia: A Mathematical Grounding for Panarchy Theory and the Mythic projection of Gaia as global Emergent Meta-system” by the author at <http://holonomic.net>

⁹⁸² See papers on Markets as Meta-systems for another example by the author.

the ‘fittingness of the system’ to the environment so that the environment can *resource* the System. The Pure Scape is what is *around* the System, including what is *present*, as well as what is *absent* from what the System needs. The Process Scape does the work of the operating environment to resource and maintain the System in its niche with the System contributing to the operating environment if it is animated. The Hyper Scape is the intersection between the Process and Pure Scapes that opens out into possibilities, and this creates the design landscape, i.e., design-scape. But this is the design landscape from the point of view of the Meta-system, and *not* the System under construction. Thus, from a Meta-system point of view we are considering the whole design landscape, i.e., all the possibilities at once. But this is also related to the observed landscape in as much as the observed landscape can affect the viability of the System. *A System remains in a negative feedback loop with respect to the positive feedbacks (in both the positive and negative directions) that affect the System.* There is a range of ways that the environment can change to affect the System, and the system design needs to account for the ways that it may need to adapt in order to remain a viable System within a changing environment. So the fittingness of a System within a Meta-system needs to be seen as dynamic and adaptive, or at least resistant to the effects of environmental change. At the level where the Meta-system of the design landscape opens out to all possible systems, we need to consider how the constraints of the surrounding meta-systemic environment affect the viability of the System. Thus, wider footprints in the design landscape need to be designed to react to the variability in the actual landscape that encompasses the System. The Hyper Scape raises the intensity of the System’s environment and this brings the System closer to the limits of its viability, which raises the ante of the System’s performance in its varied environments and could even bring it to a possible breaking point. So, we see here that there is an overlap between the field of possible system designs and the variability of the environment within which the System must contend. If a System needs to have a wider environmental coping footprint, then it must levy more constraints on the system design and call for increased adaptivity and resilience and other Self-* properties like self-organization, self-management, self-repair, etc⁹⁸³.

The Wild Scape pushes beyond the Hyper Scape toward a chaotic environment, which could overwhelm the System. The Ultra Scape is the catastrophic event that destroys all or almost all the viable systems within a landscape, or seascape, or any open-scape. As we

⁹⁸³ “Self-Organization, Self-Adaptation, and Special Systems Theory” and “Autonomic Systems and Special Systems Theory” at <http://holonomic.net> by the author.

move up the levels of the Meta-system we go into more and more disordered environments. This puts greater and greater constraints on system design, which, in turn, calls for a more intelligent system design. This suggests that human intelligence might have been born of coping with successive catastrophes. It turns out that as we constrain the behavior of the System in a more and more unpredictable environment, then greater and greater Self-* properties are required. Ultimately, the necessity of intelligence becomes a prerequisite for survival. But just as there is a double view of the design landscape and the operational environment, there is also the virtual space of the Ultra Scape and its actualized embodiment in the Wild Scape. In other words, the Ultra Scape is a virtualized space described by Rene Thom's Catastrophe Theory⁹⁸⁴ in which there are singularities that cause folds in the control space that represents singularities that cause catastrophic transformations in the spacetime in which the system operates. This virtual space is the realm where singularities warp spacetime in such a way that it produces discontinuous transformations. The Wild Scape is the realm of what Merleau-Ponty calls "Flesh"⁹⁸⁵, which is the incarnate embodiment of chiasmic propensities within the materiality of things. This is the first stage within spacetime in which there are fragmented points of intensities that Deleuze and Guattari call the *body-without-organs*⁹⁸⁶. We have previously talked about this as *points that cannot be connected but have their own propensities, or tendencies, which indicate the Singularity beyond spacetime*. In this terminology, the propensities are thought about as potentials to be actualized. But those potentials exist as seeds in an embodied state. The Wild Scape can be seen as a landscape of those potentials prior to the definition of their possibilities where possibilities are seen as traced paths toward actualization. Actualization occurs probabilistically at the level of the Process Scape, and becomes determinate in the Pure Scape.

Systems and their Scapes are duals of each other. Each meta-level of the System relates to its dual meta-level of the Scape. So Pure Systems fit into Pure Scapes, Process Systems fit into Process Scapes, Hyper Systems fit into Hyper Scapes, Wild Systems fit into Wild Scapes, and Ultra Systems fit into Ultra Scapes. But each of these meta-levels are different

⁹⁸⁴ Thom, Rene, Structural Stability and Morphogenesis (Boulder, CO: Westview Press, 1989).

⁹⁸⁵ Olkowski, Dorothea, and James Morley. Merleau-Ponty, Interiority and Exteriority, Psychic Life, and the World (Albany, NY: State University of New York Press, 1999). Dillon, M. C. Merleau-Ponty's Ontology (Evanston, Ill: Northwestern University Press, 1997) p. 214. Hass, Lawrence. Merleau-Ponty's Philosophy. Studies in Continental Thought (Bloomington: Indiana University Press, 2008).

⁹⁸⁶ Deleuze, Gilles, and Félix Guattari. A Thousand Plateaus: Capitalism and Schizophrenia (London: Continuum, 2004). p. 166. Deleuze, Gilles. The Logic of Sense. European Perspectives (New York: Columbia University Press, 1990). p. 88. Deleuze, Gilles, and Félix Guattari. Anti-Oedipus: Capitalism and Schizophrenia (Minneapolis: University of Minnesota Press, 1983). p. 93.

and complementary between the two schemas. The difference in the meta-levels is what makes the schemas different from one another. But this difference is a strict duality in each case. The Pure System is what we normally see in the literature, i.e., a set of objects and their relationships within a boundary. The Pure Scape is the plenum beyond that boundary that stretches to a given horizon, and this includes the objects and relationships that exist between the boundary and the given horizon, but without movement. The Process System is the dual of the Process Scape. The Process Scape provides a panorama for the Process System. The System takes time to be what it *is*. It operates in a cyclical time loop. The Process Scape has an encompassing cycle time that operates in the background while serving the System. The Process Scape is like an operating environment for the Process System, i.e., the running application on a running operating environment (Universal Turing Machine). The Hyper System fits into the Hyper Scape. The Hyper System opens out to its design landscape, while the Hyper Scape is the entire design landscape from the point of view of the System under design. The Hyper System cares only about what is germane to its design, while the Hyper Scape takes a global view of the design patterns for all possible systems. The Wild System fits into the Wild Scape. The Wild System considers potentials that could be realized for a particular System, while the Wild Scape considers all potentials that could be realized by *any* system. The Ultra System fits into the Ultra Scape. The Ultra System has its singularity, but the Ultra Scape considers all singularities behind all systems within the global design landscape.

Figure 11.2

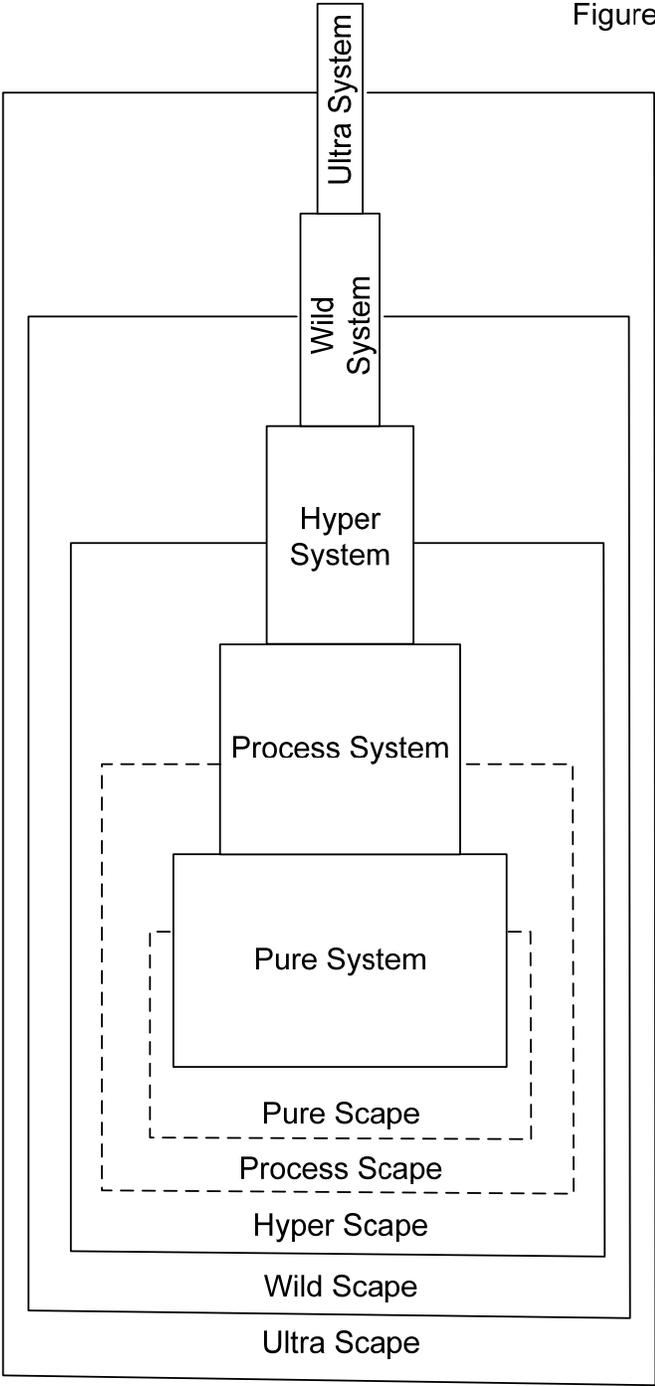


Figure 11.2. Relation of Meta-levels of the System to the Meta-level of the Open-scapes.

Resisting the Mass Taboo

One way to think about the relationship between the System and the Meta-system is in terms of the relationship between Set and Mass. In the Western tradition we have a blindspot for the Meta-system, and at the same time, we have a blindspot for Masses. When these two blindspots combine we do not recognize the complementarity between Meta-systems (Scapes) and Systems. But one of our fundamental assumed interpretations for the Meta-system is to interpret in terms of Mass. Our Systems Phenomenology needs to recognize this fundamental assumption in which Masses have traditionally been considered a taboo viewpoint in the ontotheology or the logocentrism of our tradition. Masses are associated with excrement in our culture. So we have sayings such as “Shit happens”⁹⁸⁷. This is a way of saying that things move from a Set and System mode into a Mass and Meta-system mode⁹⁸⁸. By lumping all Masses and Meta-system modes into a taboo mode, we fail to articulate them properly in terms of their own essential differences and we fail to discriminate them from the System and Set mode. Therefore, it is imperative that we release the Mass and Meta-system concepts from their taboo status and overcome our reluctance to affirm their presence. The Mass and Meta-system modes are very real and viable and they affect our design concepts and decisions. Part of the premise of the Philosophy of Presence is to denigrate what is made absent. The Mass and Meta-system concepts are made absent so that we can over emphasize the System and Set concepts and their confluence. This is a nihilistic relationship that explains why the schemas over emphasize the Set and the System, while there is a complete ‘hiding and obscuring’ of the Mass and Meta-system approach toward things. This nihilistic relationship has the effect of hiding the Special Systems⁹⁸⁹, which are partial thresholds of organization between the System and the Meta-system. Systems and Meta-systems must be clearly distinguished in order to see the Special Systems. What we would like to posit is that all these terms are actually equivalent, and that they are *crossed*, in other words, there are system sets, system masses, meta-system sets and meta-system masses⁹⁹⁰. All these play a role in our Emergent Engineering work.

⁹⁸⁷ Wajnryb, Ruth. Expletive Deleted: A Good Look at Bad Language (New York: Free Press, 2005).

⁹⁸⁸ See Douglas, Mary Tew. Purity and Danger: An Analysis of Concepts of Pollution and Taboo ((London: Routledge & K. Paul, 1970).

⁹⁸⁹ Reflexive Social, Autopoietic Symbiotic, and Dissipative Ordering are the Special Systems.

⁹⁹⁰ The system sets are ambiguous when the system set is in the overlapping region between the system and anti-system. The system masses are amorphous and the meta-system sets are vague. The meta-system masses

A complete Systems Phenomenology would recognize all four of these combinations. Rather, we obscure three of them and place all the emphasis on the System Set. Now, we notice, that for the most part, design is precisely a System Set. This means that when we design a System with emergent properties, we produce designs for each different kind of part, and then we replicate those different kinds of parts to create the System. If it is hardware, we fabricate the different parts, and if it is software, we copy the different parts. The parts are designed to be interchangeable, which means that the parts are reduced to their *kinds* within the design, and these kinds are designed so that when they are replicated, the various replications will work together as a whole. So, we see that design is caught in the *Philosophy of Presence* that dominates our culture, and that the System Mass, the Meta-system Mass, and the Meta-system Set are absent from our design work. Even if we are designing a Meta-system, we will treat it as a Set. In the Meta-system, we have sets of different kinds of systems that interact. In a System, we have sets that consist of different kinds of Forms. Within these Forms we have a set of different kinds of Patterns, and so on down the nested hierarchy of the schemas. Now, the transformation from Set to Mass occurs when the System is operated. In that case, the different kinds of parts are instantiated and they interact with each other during the execution of the System. If it is hardware, then the various pieces have to be furnished and connected physically. But in software, the instantiation occurs when the various templates of parts are given resources and deployed internally during initialization. The point is that in an operational execution, the System Set turns into a System Mass, and the Meta-system Set turns into a Meta-system Mass. The System Mass interacts with the Meta-system Mass and this interaction is what is tracked when we use our verification and validation tests to see if the System is working. What is interesting to note, is that when the System goes into operation as a Mass and interacts with the Mass of its environmental Meta-system, then we track it by tests, but we do not have a *logic* by which to understand its functioning. It turns out that masses have their own logic, which is just as strong as Syllogistic Set Logic⁹⁹¹. This logic is a Pervasion Logic⁹⁹², or Boundary Logic⁹⁹³, and it is a full logic of a different form from the syllogistic logic that has been developed in our tradition. Also, when we consider mathematics most

are obscure. See “Markets as Meta-systems” by the author at bubblenomics.biz. These are the four combinations of distinct/indistinct and pure/impure, which are the permutations that create the possibilities of deconstructing the pure and distinct system boundary.

⁹⁹¹ Speca, Anthony. Hypothetical Syllogistic and Stoic Logic. *Philosophia Antiqua*, v. 87 (Leiden: Brill, 2001).

⁹⁹² Matilal, Bimal Krishna. Logic, Language, and Reality: Indian Philosophy and Contemporary Issues (Delhi: Motilal Banarsidass, 1990). P. 143.

⁹⁹³ Bricken, Wm. Syntactic Variety in Boundary Logic. Op. cit.

of it is ‘set based,’ with only a few branches of mathematics being ‘mass based,’ such as geometry and topology. Not only is our logic weak when it is dealing with masses, but our mathematics is also weak in this respect. But, like Descartes’ discovery of the relationship between Algebra and Geometry, we need to exploit the isomorphism and the functors between Syllogistic Logic and Pervasion Logic, and use the Pervasion Logic to understand the functioning of the mass-like Systems and Meta-systems rather than considering them taboo states.

One way to develop this idea phenomenologically is to realize that in the same way that Systems have a dual in processes, Meta-systems have a dual in meta-processes, and these conceptual duals are related to the perceptual counterparts of gestalts/flows, and proto-gestalts/proto-flows. When we understand that there is this isomorphism between system/process and meta-system/meta-process *and* gestalt/flow and proto-gestalt/proto-flow, then we can compare this with the set/mass distinction and derive a complete framework for understanding the Phenomenology of the System and the Meta-system. There is a cube of states that exist between *a*-temporal/temporal, conceptual/perceptual, and set/mass relationships. That cube has the following components:

System set
Process set
System mass
Process mass
Meta-system set
Meta-process set
Meta-system mass
Meta-process mass
Gestalt set
Flow set
Gestalt mass
Flow mass
Proto-gestalt set
Proto-flow set
Proto-gestalt mass
Proto-flow mass

Table 11.1. Facets of the Field of Design.

Once we realize that this is the full panoply of states, then we can see that mapping from ‘concept to percept’ to ‘set/mass’ distinctions allows us to develop a full Phenomenology

of the System within the context of taking into account the difference between Pure and Process Being.

Within this field we must add the fact that it is necessary to understand how concept and design relate to perspective and essence as it is understood in terms of perception within the Quadralectic. Furthermore, it is necessary to understand that *beyond* the Pure and Process Being, each part of the field is associated with the Hyper, Wild, and Ultra Being characteristics. The Quadralectic needs to recognize that when we shift between Set and Mass modes, we are changing the types of logic and the types of math that apply. Also, there are mixed states that relate the Set and Mass to each other. For instance, a combination of Set with Mass is a *list*, but a combination of Mass with Set is a *solution*. If we follow this line of thought we can see that there is a very complex phenomenological field in which the Quadralectic operates and this has barely been explored due to the taboos against the Meta-system, Mass, and meta-levels of Being higher than Pure Being. We are, in essence, restricting ourselves to a very small part of this field, which is the full field within which the Quadralectic ranges. Thus, a large part of the *complete field* is rendered unconscious within the engineering discipline⁹⁹⁴. What we need to do instead, is to understand the transformations between the various states in this field, which are the combinations of the distinctions that have been specified here.

When we alternate between the concept/design *or* the perspective/essence moments of the Quadralectic, we are actualizing the relationship between the System/Meta-system in relation to the Gestalt/Proto-gestalt. When we alternate between Pure and Process Being, i.e., *a*-temporal/temporal, we are actualizing the relationship between the System/Meta-system in relation to the Process/Meta-process. This is what distinguishes the difference between concept/essence and design/perspective. We consider concepts and essences as something static, while we consider designs that change perspective during their development as something dynamic. When we alternate between Set/Mass, we are *actualizing* the relationship between continuous and discrete models of phenomena with their associated logics and mathematics. This is what distinguishes the difference between essence/design and concept/perspective. In other words, essence and design are ‘set-like.’ Essence is a set of attributes and their constraints. Design is a set of parts that comprises a

⁹⁹⁴ Literary Criticism applies to literature, but it has not been applied to engineering texts because these texts represent the unconscious of our technological culture, they are considered unreadable. See Wimsatt, William K., and Cleanth Brooks. Literary Criticism; A Short History (New York: Knopf, 1957). Richards, I. A. Principles of Literary Criticism (New York: Harcourt, Brace, 1961).

whole that works together. Both of these are ‘set-like.’ On the other hand, concepts are ‘mass-like,’ they are ‘mass-like’ in the way that abstract nouns represent concepts. Perspectives are necessary for seeing dimensional images within the mass of space. Thus, we can see that there are three configurations of the Quadralectic and they correspond to these fundamental divisions in the field:

Concept/design//perspective/essence = representation///experience

Concept/perspective//design/essence = Mass///Set

Concept/essence//design/perspective = a-temporal///temporal

So, in this way we can understand that the Quadralectic corresponds to the fundamental distinctions in the complete phenomenological field. For the Quadralectic to operate, we need to recognize the entire field and bracket the taboos that plague our understanding of our own work with Systems. There are three modes of the Quadralectic that correspond to the three possible combinations of its major elements. Because there are four elements to the Quadralectic, the combinatorics present $4*3*2*1 = 24$ possible combinations. But here we are only interested in the major division that breaks into the three major modes that occur at the level of *three* in the Quadralectics. If we discount the alternation of pairs, then we obtain these three modes and they are brought to the fore. As we have shown, the three modes correspond to the major distinctions we have made within the field, i.e., representation/experience, *a*-temporal/temporal (Pure/Process), and Set/Mass. This field, itself, is the basis for the development of the higher meta-levels of Being. We see Hyper Being in the discontinuities between these states of the field. We see Wild Being in the propensities that things present in the various sectors of the field. We see Ultra Being as something that is beyond representation in the field, although it affects whatever is within the phenomenological field. So, the higher meta-levels of Being first describe the break-up of the field, which comes from a singularity as it is expressed through independent and non-connectable points. Following that, they display uncrossable lines, uncrossable planes, and finally, a solid that does not allow any movement. These levels of impossibility

describe the unfolding of the phenomenological field from the singularity beyond the field that represents the Emergent System with its unprecedented properties. In this current state, the Emergent System cannot represent what is sanctioned by what is currently designated as real facts, theories, paradigms, epistemes, or interpretations of Being. If we see the Quadralectic as our means for foraging through the entire field of possibilities by bringing all its resources to bear on our problem, then we will suddenly understand the nature of the Quadralectic in a deeper way. The Quadralectic is the means by which the entire phenomenological field is transformed into a new facticity, theory, paradigm, episteme, or interpretation of Being. The Quadralectic and the Phenomenological Field as a whole, which equally encompass what appears and what does not appear, are duals of each other. The Quadralectic is the means by which the complete field transforms itself by giving access *to* itself *from* itself. That transformation is an Emergent Event, and that is why the Quadralectic is aligned and synchronized to the Lifecycle of the Emergent Event. This lifecycle is inscribed as the sequence of the Foundational Mathematical Categories, which are the means of representation within all the schemas. The Quadralectic is also aligned and synchronized with the Emergent Meta-system, which is characterized by the relationship between the Normal System and the Special Systems that exist as ‘partial thresholds of order’ between the System and Meta-system. The Emergent Meta-system (as a cycle) is a representation of existence, thus it represents the fundamental ability for something to exist beyond all the projections of Being. The Quadralectic actualizes the projection of the Emergent Event within the full panoply of the kinds of Being. The kinds of Being not only interleave, but distinguish the Special Systems from the System and Meta-system. Projection and Existence⁹⁹⁵ are *intertwined* as well as being *inverse duals* of each other. The Emergent Meta-system represents the dynamic of existence that supports the dynamic of projection. The kinds of Being not only separate the Foundational Mathematical Categories, but also separate the Special Systems from the System and Meta-system. The Foundational Mathematical Categories inscribed in the Nomos exemplify Emptiness while the Emergent Meta-system exemplifies Void. The difference between Emptiness and Void is Ultra Being. Once Ultra Being is posited as a singularity, then the other types of Being unfold from it, first as Wild, then Hyper, then Process, and then as Pure Being, and these occupy the meta-levels beyond all beings. These meta-levels distinguish the Schemas from each other. In this unfolding from the Singularity, a crucial point comes at the level of Hyper Being where the possibilities emerge. That is what

⁹⁹⁵ What is found beyond all projections.

makes the emergence of the ‘new and unheard of’ possible. And it is that possibility that we exploit in Emergent Engineering Design by using the Quadralectic. What we need to understand is that the Quadralectic, as a ‘whole,’ must be appreciated in relation to the ‘phenomenal field as a whole’ after we abandon the taboos of the Philosophy of Presence that governs everything we do. Once we have abandoned this prejudice (that is fundamental in our culture), we will treat what is *present* and *absent* equally, just as we should treat what is real and illusory, true and fictitious, and identical and different equally. Once we give what is due to all the aspects of Being and their opposites, then we will have a complete understanding of the nature of Being and its place in relation to Emergence. The aspects of Being appear in Existence too, and that is what connects Being with Existence. They are both Standings and they are both articulated by the aspects within our worldview.

The Schemas are the basis of the worldview because they provide the pre-understanding of the organization of things in spacetime as articulated by dimensionality. Out of each Schema appears the Standings, which include the kinds of Being, Existence, Manifestation, and the Amanifest. Out of each standing comes the four aspects: Identity, Presence, Truth and Reality. Out of each aspect comes the three Regions, which are the two invisible duals and the nondual. They are represented as three, three-dimensional spaces that, along with our own dimensional space, makes up four-dimensional space, or four-dimensional time, i.e., the heterochronic. Out of each region comes the two limits: supra-rationality and paradox. And out of these two limits, the three nonduals emerge, one at a time, and this is what constitutes Plato’s Divided Line⁹⁹⁶. This is the transcendental structure of the Worldview. This transcendental structure becomes immanent in an Emergent Event. When we design something that is new, we sometimes initiate an emergent set of changes. These changes are discontinuous and they transform the four dimensions of time. They rewrite the past, open up new possibilities, initiate new procedures, and establish a new mythological basis. That transformation of the Emergent Event is brought about by implementing the concepts outlined in the Quadralectic that brings the entire phenomenal field into play. As H. Dreyfus states, “marginal practices brought to the center, and central practices sent to the margin are the basis of such transformations”⁹⁹⁷. But, the margin is the area of the phenomenal field that is repressed by the Philosophy of Presence. If we step *outside* the Philosophy of Presence, (which is also referred to as Ontotheology, or

⁹⁹⁶ See Plato’s Republic.

⁹⁹⁷ Dreyfus, Herbert.,– “From gods to God and back”, Berkeley Philosophy Department, Fall 2008, Phil 6 Course Recording. Not a direct quote.

Logocentrism and dominates our culture in the Metaphysical Era in general), then we will have access to a wider view of the phenomenal field of the System, other Schemas, and the Meta-system that encompasses the System. Quadralectics and the full phenomenal field are complementary to each other. Quadralectics is the means by which the full field transforms itself by bringing about the Emergent Event. This occurs through the manifestation of the Emergent Lifecycle in the form of the Foundational Mathematical Categories appearing out of the Nomos to affect the Physis⁹⁹⁸ and Logos. In addition, it also occurs through the Manifestation of the complementarity of Being and Existence by recognizing the way that the dynamic of Existence is exemplified by the Emergent Meta-system and how it intertwines with the kinds of Being to produce ‘a projection out of existence,’ and ‘an existence out of the projection of Being’. The kinds of Being determine the manifestation of the Emergent Event in the World, as well as in the other schematic levels, such as the Domain, Meta-system, System, Form, and Pattern. Complete transformation within the World takes place through the stages of the Quadralectic. It is Emergent Science that studies this entire process, and Emergent Engineering is the means that we use for applying all the Schemas that are presented by General Schemas Theory. At this point in time we have emphasized the System Schema and have forgotten the Meta-system, we have emphasized the Set, and forgotten the Mass, and finally we have emphasized the ‘a-temporal finished product’ and de-emphasized or forgotten the Process. Once we remove the Meta-system and Mass viewpoints from our philosophical and cultural blindspots, we can begin to recognize the *Process* and stop subordinating it to the *Product*. As a result, we will gain access to a wider phenomenal field and allow the Quadralectic to work more efficiently. This will produce the Emergent Eventities that we desire to disseminate and help us to avoid being absorbed into the Philosophy of Presence that now dominates our approach toward creating what is new in the systems that we engineer.

⁹⁹⁸ Also more commonly known by a transliteration from the Greek as ‘physis’. Spelled as ‘physis’ to make it more recognizable as being related to physics. See <http://en.wikipedia.org/wiki/Physis> accessed 090102.

Toward Working Designs

Methods, Meta-methods, Lifecycles, and Integrity

This chapter applies what we have learned about Meta-systems and Systems Phenomenology to our understanding of System and Meta-system design methods. The meta-methods of Gurevich and Wisse are explored as well as their relationship to minimal methods that are used in realtime design. Finally, the integrity of the Design is assessed in relation to the problem of Semantics. Heidegger's concept of Beyng is used as a basis for a solution to this problem. Design is seen as a multi-faceted process that produces a Golden Thread of meaning that is woven by the dynamic interplay of the moments of the Quadralectic.

Meta-Methods

Once we have understood the nature of the Quadralectic and the *phenomenal field* upon which it operates, we can consider the *meta-methods*⁹⁹⁹ that *mediate* between the field and the Quadralectic. The Quadralectic describes the relationship and interaction between Sign Engineering and other elements found at the Hyper Being level, such as Conceptualization, Perspectives, and Essences. Sign Engineering must be carried out by methods that are adapted to the schemas that it is dealing with. Here we are talking about the methods¹⁰⁰⁰ that will be used to represent Systems and Meta-systems. To begin with, there are at least two meta-methods that we will use to describe the System and the Meta-system. One is the Gurevich Abstract State Machine¹⁰⁰¹, which is a generalization of the Turing Machine. We have already said that both the System and the Meta-system can be represented by Turing machines, one by the normal Turing machine and the other by the Universal Turing machine, i.e., the meta-Turing machine. So, it is only natural that the generalization of the Turing machine that we find in the Gurevich Abstract State Machine method should apply

⁹⁹⁹ In this case, meta-methods means universal methods that apply to all schemas. See “Application of General Schemas Theory: Design Methods and Meta-methods” by the author at <http://holonomic.net> accessed 081026.

¹⁰⁰⁰ In the foregoing study we have posited that the minimal methods for real-time systems are the same for both Systems and Meta-systems.

¹⁰⁰¹ Bôrger, E. Abstract State Machines Op. cit.

to, and describe, both of these central schemas. The other method that we will bring to bear is the Metapattern method of Wisse. The significance of the Metapattern¹⁰⁰² method has been demonstrated through the application of Wisse's theory of the Ennead¹⁰⁰³, which we have now expanded into the Quadralectic. The Metapattern method must be expanded in order to be attuned to the Quadralectic. But, in essence, the method of Wisse, which is unique in the literature, will survive this expansion because most of the concepts embodied in the Quadralectic already exist in his Metapattern method. The essence of the Metapattern method is the use of *context* as the basis for the identification of objects. The Gurevich Abstract State Machine method does not help us to identify objects. We can make a crucial generalization by saying that we will talk about higher order and lower order *schemas* instead of *objects*. We will take the Meta-system as the context for the System, the System as the context for Form, the Form as the context for the Pattern, etc. In every case the context is the next higher encompassing schema. *As a result, the Metapattern method applies to all the schemas by relating one schema to its adjacent higher one as a context for what is projected to be in the lower schema.* As we have noticed, the Quadralectic gives us a vocabulary to talk about the various elements that exist at the lower schema in the context of the higher schema. But, in our case, we are focusing on the *Form* in the context of the System. The identification of these entities in this context allows us to pin down the references that will appear in the rules of the Gurevich Abstract State Machine. Rules are particularly interesting because they embody the intersection at the nodes of the four different perspectives on a Real-time System¹⁰⁰⁴. So, the rules implicitly carry a Domain with them. That Domain distinguishes between *space and time* as *data and event*, and it relates those *fully* ordered aspects to the *partially* ordered aspects of the *agent and function*. There is also an additional perspective that is unordered, which is expressed in language and related to requirements. Thus, if we follow G. Klir's methodological distinctions¹⁰⁰⁵ we see that there are actually five perspectives that represent the different levels of ordering in any Domain.

¹⁰⁰² Wisse, P. Metapattern Op. cit.

¹⁰⁰³ Ennead has been previously explored in depth. It is the philosophical grounding of the Meta-pattern method, which we associated with the Axiomatic Platform that is the minimal structure representing second order mediation.

¹⁰⁰⁴ In other words, rules implicitly contain data, event, agent, and function perspectives on real-time systems.

¹⁰⁰⁵ Klir, G. Architecture of Systems Problem Solving Op. cit.

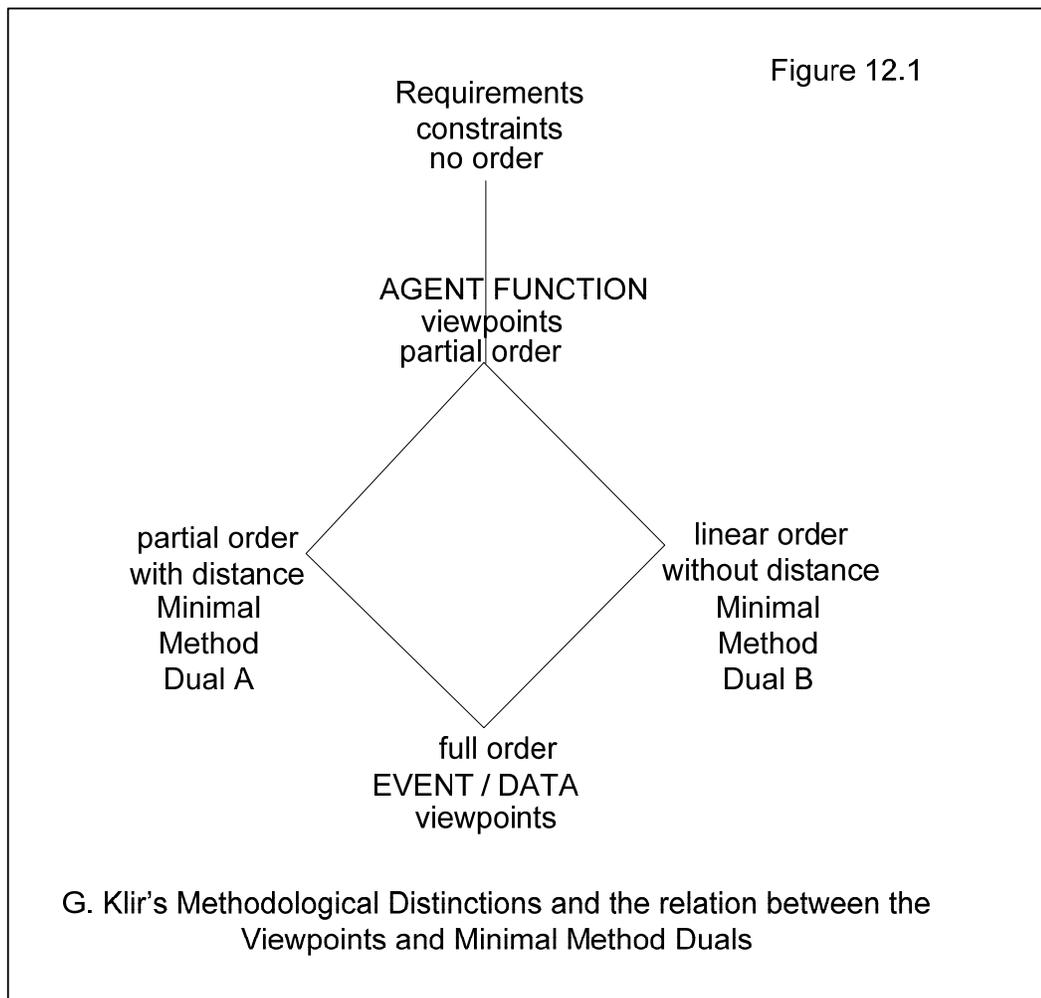


Figure 12.1. Lattice of Methodological Distinctions.

This lattice determines the Domain structure of both the System and Meta-system design. The five perspectives are as follows: the *requirements* that are unordered, *agent* and *function* that are partially ordered, and *data* and *event* that are fully ordered. Between these ‘partially ordered’ and ‘fully ordered’ perspectives there are two nodes, one is partially ordered *with* distance, and the other is linearly ordered *without* distance. These nodes determine the duality of the minimal methods. Minimal methods form the relationships between the viewpoints within the Domain. There is a set of these minimal design methods, which are mostly found consolidated in UML¹⁰⁰⁶ and SysML¹⁰⁰⁷. These are

¹⁰⁰⁶ Fowler, Martin, and Kendall Scott. UML Distilled: A Brief Guide to the Standard Object Modeling Language (Reading, Mass: Addison Wesley, 2000).

¹⁰⁰⁷ Weilkiens, Tim. Systems Engineering with SysML/UML: Modeling, Analysis, Design (Amsterdam: Morgan Kaufmann OMG Press/Elsevier, 2007). See also Holt, Jon, and Simon Perry. SysML for Systems Engineering. Professional Applications of Computing Series, 7 (London: Institution of Engineering and Technology, 2008). Systems Modeling Language (SysML) Specification, version 0.9 DRAFT 10, January

dataflow¹⁰⁰⁸, DARTS¹⁰⁰⁹, state machine¹⁰¹⁰, petri-net¹⁰¹¹, virtual layered machine¹⁰¹², use-case mapping¹⁰¹³, worldline and scenario¹⁰¹⁴, as well as the various ways that events and data can be combined. A methodology is the sequential use of these minimal methods. Traversals of the minimal methods in different sequences can motivate different designs. The key point here is that rules contain all four perspectives, i.e., data, event, function, and agent, in a single construct so that every rule is an intersection of the four ordered perspectives. In this way the Gurevich Abstract State Machine method becomes a bridge between requirements and design. The minimal methods are used to create the design of the System or Meta-system. But prior to this first approximation, a computability test can be made by converting the entire system into a Gurevich Abstract State Machine. This test is implemented to see whether there is a computable solution for the ‘problem set’ in the requirements. Performance will dictate that a design exists beyond the Turing machine representation. In order to reach the Turing machine representation, we need to *identify objects* and we could use the Wisse method for that. In the Wisse method, objects are inherited by *context* within the System rather than by *arbitrary non-contextual inheritance schemes*. In other words, identities are tied to contexts and contexts have hierarchical relationships that are natural, rather than the artificial schemes that are imposed on the objects when we do not consider context. The Wisse method and its extension with the

2005, SysML Partners Specification of SysML at <http://www.sysml.org/docs/specs/SysMLv1.0a-051114R1.pdf> accessed 081017.

¹⁰⁰⁸ Hatley, Derek J., and Imtiaz A. Pirbhai. Strategies for Real-Time System Specification. (New York, NY: Dorset House Pub, 1987).

¹⁰⁰⁹ Design and Analysis of Real Time Systems (DARTS) method of Gomaa. See Gomaa, H. Software Design Methods for Concurrent and Real-Time Systems. (Boston MA: Addison-Wesley, Longman Publishing Co., 1993).

¹⁰¹⁰ Schneider, Fred B. The State Machine Approach: A Tutorial. (Ft. Belvoir: Defense Technical Information Center, 1986).

¹⁰¹¹ Peterson, James Lyle. Petri Net Theory and the Modeling of Systems. (Englewood Cliffs, N.J.: Prentice-Hall, 1981).

¹⁰¹² Shumate, K. 1988. “Layered virtual machine/object-oriented design.” in Proceedings of the Fifth Washington Ada Symposium on Ada (Tyson's Corner, Virginia, United States). WADAS '88. ACM, New York, NY, pp. 177-190. See also Meyer, C., Wallis, M., and Meier, M. 1989. “Experiences in Applying the Layered Virtual Machine/Object-Oriented Development Methodology to an Ada Design Effort” in Proceedings of the Conference on Tri-Ada '89: Ada Technology in Context: Application, Development, and Deployment (Pittsburgh, Pennsylvania, United States). TRI-Ada '89. ACM, New York, NY, pp. 416-422. See also Shaw, M. 1991. “Heterogeneous Design Idioms for Software Architecture” in Proceedings of the 6th international Workshop on Software Specification and Design (Como, Italy, October 25 - 26, 1991). International Workshop on Software Specifications & Design. IEEE Computer Society Press, Los Alamitos, CA, pp. 158-165. Riehle, D., Fraleigh, S., Bucka-Lassen, D., and Omorogbe, N. 2001. “The Architecture of a UML Virtual Machine” in Proceedings of the 16th ACM SIGPLAN Conference on Object Oriented Programming, Systems, Languages, and Applications (Tampa Bay, FL, USA, October 14 - 18, 2001). OOPSLA '01. ACM, New York, NY, pp. 327-341.

¹⁰¹³ Bittner, Kurt, and Ian Spence. Use Case Modeling. (Boston, MA: Addison Wesley, 2003). See also Armour, Frank, and Granville Miller. Advanced Use Case Modeling: Software Systems. Addison-Wesley Object Technology Series. (Boston MA: Addison-Wesley, 2001).

¹⁰¹⁴ Called Interaction Diagrams in UML.

Quadrlectic gives us a way of relating one schema level to another, while the rules give us a way of representing causation within those representations. Thus, these two meta-methods are complementary and more fundamental than the UML or SysML collections of minimal methods that are used to define system and software architectural design. However, we can see how minimal design methods (that combine into a methodology of design for realtime systems) can unfold from the combination of the Wisse and Gurevich meta-methods because they are implicit within them. We can use this unfolding as a way to understand the development of a System's lifecycle phases.

We will begin with requirements that establish the axioms of the System in individual statements. Thus, we will begin in Logos and move toward Physus and then back to Logos. Requirements are composed of functional and performance demands on the System. We need to apply appropriate requirements to the engineering process. Because the entire process of Requirements Engineering¹⁰¹⁵ is fairly well understood, we will not dwell on it here. The key gap that exists in current development is between requirements and architectural design. This gap is a major hindrance to building successful Systems, but could be filled by the Gurevich Abstract State Machine Model. That model is a causal and computable model of the functionality of a System where the *rules* are the intersection between the four viewpoints that are *ordered*, which is different from a *requirements* viewpoint, which is *unordered*. We are successively traveling from an unordered, to partially ordered, to a more ordered, and finally to a fully ordered viewpoint in space and time. Rules represent causality and bring together these viewpoints in a way that we can test the computability and the causal nature of the solutions that we intend to use as answers for the requirements within the first approximation. We could build the Gurevich Abstract State Machine and attach it as an appendix to the requirements document. This would be an implementation of the System concept that would appear in the Concept of Operations (ConOps)¹⁰¹⁶ document, if one exists for the System. We use contexts to manage the identities and inheritance of the objects within the System and this is what fits the System to the Meta-system that the Wisse method specifically and explicitly represents. Once we have a refined causal model, then we are ready to transform the

¹⁰¹⁵ Hull, Elizabeth, Ken Jackson, and Jeremy Dick. Requirements Engineering. (London: Springer, 2005). See also Young, Ralph Rowland. The Requirements Engineering Handbook. Artech House technology management and professional development library. (Boston: Artech House, 2004). See also Robertson, Suzanne, and James Robertson. Mastering the Requirements Process. (Upper Saddle River, NJ: Addison-Wesley, 2006).

¹⁰¹⁶ Hitchins, Derek K. Systems Engineering: A 21st Century Systems Methodology. (Hoboken, N.J.: Wiley, 2007). P. 228.

System in a manner that will allow it to meet its performance requirements. These transformations will introduce synergies into the System that will make it more efficient in carrying out its functional task. The functional architecture must be implicitly designed into the rules so that when the System is transformed into a physical architecture, it will take into account the necessary organization that is needed to create the most efficiency with respect to performance requirements. By following this path we will dis-engage the four ordering perspectives from each other and employ minimal methods to bridge the gaps between the viewpoints. The minimal methods are associated with the dual orders (linear order without distance and partial order with distance) that exist in the lattice of Methodological Distinctions between partial and full order. These open up a space where the viewpoints can simultaneously operate, which is the design space of the physical architecture of the real-time system. We will move from the ‘architectural design’ down to the ‘detailed design’ by specifying the System’s *kinds* of objects and their *structures*. First, we will analyze the outward structural characteristics and then move on to the internal structures that are needed to support those outward structures by using formally hidden information¹⁰¹⁷ and object-oriented design¹⁰¹⁸ methods in tandem with design patterns¹⁰¹⁹. The essential¹⁰²⁰ design is a Sign System, that stands in for the implemented *physical* System before it exists. We look at the design from the multiple points of view of stakeholders as well as the canonical points of view of the ordering. The design is a set of components whose essence is defined based on our conceptualization of what the System must perform and how that should be accomplished. Wisse calls this ‘Sign Engineering’, which takes us up to the point of full implementation. It is based on the Quadralectic in terms of its relationship to the phenomenal field. We are seeking to embody emergent properties in the new System we are designing. Thus, our focus is on Emergent Engineering regardless of the schemas that are involved.

¹⁰¹⁷ Baldwin, Carliss Y., and Kim B. Clark. Design Rules. The Power of Modularity, Volume 1 (Cambridge, Mass: MIT Press, 2000). p. 73.

¹⁰¹⁸ Coad, Peter, and Edward Yourdon. Object-Oriented Design. Yourdon Press computing series. (Englewood Cliffs, N.J., Yourdon Press, 1991). Booch, Grady. Object-Oriented Analysis and Design with Applications. The Benjamin/Cummings Series in Object-oriented Software Engineering. (Redwood City, CA: Benjamin/Cummings Pub. Co, 1994). Page-Jones, Meilir, and Larry L. Constantine. Fundamentals of Object-Oriented Design in UML. The Addison-Wesley Object Technology Series. (New York: Dorset House Pub, 2000).

¹⁰¹⁹ Shalloway, Alan, and James Trott. Design Patterns Explained: A New Perspective on Object-Oriented Design. Software Patterns Series. (Boston, Ma: Addison-Wesley, 2002). Douglass, Bruce Powel. Real-Time Design Patterns: Robust Scalable Architecture for Real-Time Systems. The Addison-Wesley Object Technology Series. (Boston, MA: Addison-Wesley, 2003).

¹⁰²⁰ Sometimes called ‘physical’ even though it is semiotic in nature instead of ‘essential.’ Essential is the preferable terminology.

At the end of the design process there is a split where Software *Sign* Engineering continues as Software Engineering. Otherwise there would be a transition to Hardware Engineering or some other sort of actual manipulation of physical material that, in itself, may have its own sign engineering component, (such as component level requirements and design). It is interesting that this split between Sign Engineering (system design and the entire software lifecycle) and Physical Implementation (physical hardware construction and assembly) is marked by a class split between Engineers and Technicians. If anything is to be physically moved or physically manipulated, then skilled laborers are given that particular work and that division of labor fulfills their corporate and union contracts. Engineers are only meant to engage in the manipulation of *signs*, and as long as the task remains in the realm of *signs*, they will continue to work within the confines of that realm, but if the manipulation demands labor that is manual *only*, then the work reverts to technicians. This situation is most commonly experienced in large companies. This line between technicians and engineers can be different in different companies and with different unions, and in some cases even the engineers are unionized. *The distinction comes at the point where there is a transfer from deciding what should be done to the actual manual implementation of the design specification through shop orders or manufacturing work instructions.* On the other hand, this does not apply to Software Engineering because it remains in the realm of *Signs*. So, when Pieter Wisse distinguishes Sign Engineering as the central task of Engineering, it is important to understand just what engineering is. We tend to romanticize Engineering as a hands-on activity, which it actually *is* in small firms that are not unionized and lack the class distinction between Engineering and the ‘touch labor’ of Technicians. Once we realize that this social distinction is important in defining the nature of Engineering, then we will see that there is a radical split in Engineering between what is actually *sign related* and what has *components* that are based on the *manipulation of materials* that is normally done by Technicians. We could say that when Engineers do ‘touch labor,’ then they are actually acting as Technicians as well as Engineers. The social hierarchy is Scientist, Engineer, and Technician. Scientists discover the design of nature. Engineers use that design of nature to create semiotic designs of artifacts that can perform tasks that could not be done otherwise. Technicians manipulate the materials of the artifact that is under construction and they execute that role under the directives of the Engineers. This tells us that from the point of view of their social role, Engineers are fundamentally defined by their relationship to the *design*, and *not* the *end product* per-se. And this engineering design relationship is not the design of nature, as such, but a *different* and *emergent design* of an artifact that is based on *knowledge of the design of nature*.

On the other side of the implementation part of the development process, there is the work of integrating, verifying, and validating the design as we build components to produce the System. This is the other side of Engineering, as opposed to the requirements and design side. Yet, it is essentially tied to design and the requirements that define what will be verified, validated, and integrated. Building up the artifacts of the Design Process that must be implemented, and showing that they indeed display the emergent properties that were intended, is the obverse of creating a design based on requirements that will result in the emergent properties. That mirror of the design occurs in the Mass-like realm where the Set-like design is instantiated and embodied and replicated. Those Mass-like properties produce an *emergent whole* when the System is executed and operated. Our point is that the crux of Engineering is the design. This is because the requirements come from outside. Producing a design is not only an *inward* aspect of Engineering, but it is intrinsic to the discipline. All the other aspects of the production process are *extrinsic*. Verification relates to the requirements. Validation relates to the outside world. Integration relates to the physical components of the design. Design is a fundamental transformation between extrinsic requirements and the implementation of the physical thing that is being produced. In large companies implementation is done by Technicians rather than the Design Engineers if there is ‘touch labor’ involved. There is a socially constructed barrier between engineering proper and hands-on engineering. However, if the implementation stays in the realm of Signs, as with Software Engineering, then Engineers continue to do it. After the design process, the focus of Engineering is generally on showing that requirements can be verified, that the design can be validated, and that the pieces of the System can be integrated. All of these activities are outward facing (in order to prove to others that the System works) or they are an *implication* of the design (such as integration, which puts together the designed parts that are dictated by the design). If it can be accepted that design is the crux of engineering, (and that the design is actually a meta-level of the Sign), then it follows that Wisse’s “Sign Engineering” is the heart of the Engineering process. Without the design there would be no ‘new thing with emergent properties’. *Our argument is that the heart of Engineering is the production of Emergence*. This is not to say that the other aspects of Engineering are not important. In fact, we would argue that the structure of Engineering is, itself, modeled on the structure of emergence¹⁰²¹. Once we accept this position concerning the centrality of the Emergent Design to Engineering, then we can appeal to the Quadralectic (an expansion of Wisse’s Ennead) to be used as a basis for Sign

¹⁰²¹ See CSER 2004 presentation “The Foundations of General Schemas Theory” by the author.

Engineering. This expansion will be necessary to define the core process of Emergent Engineering. Engineering revolves around the production of Emergence as a property of Artificial Systems or Artificial Meta-systems that are developed as products. That activity preconditions all the other activities of engineering and thus poses the question of how *emergence* comes about in Systems (such as Artificial Systems) and how this is important to engineering, especially Systems and Meta-systems Engineering. As we explain how the System is transformed by looking at it from different kinds of Being, and how the Quadralectic comes about, we are actually providing a theoretical basis that will help Sign Engineering to operate more effectively, then we have not only explained the core of Systems Engineering, but we are grounding it upon a firm, theoretical, and phenomenological foundation. By doing this we are giving reasons for the intrinsic features of Systems Engineering, but *design* is the key to *all* engineering, and not just for Systems Engineering. Design is key because the goal is to produce artifacts with emergent properties that the *whole* of product design encompasses, which the *parts* lack when they stand separately. Explaining how that works in particular cases is the focus of Emergent Science. But explaining how we can build such emergent artifacts is the focus of Emergent Engineering, and that comes down to explaining how Sign Engineering is the core of Engineering, and how Design is a Meta-level of the Sign, and how Design allows the Emergent to be represented and approximated symbolically prior to the System being built. Everything else in the production process is a consequence of the design that is put into action and embodied in material and then assembled and shown to actually work as advertised. In our exercise of ‘grounding’ Systems Engineering, we have given explanations that form that grounding. *All that is new and now clarified by the explanations in this grounding is the fact that the design is a meta-level of the Sign*, and that it must be approached in terms of the moments of the Quadralectic that operate within Hyper Being. Engineering must understand Hyper and Wild Being in order to understand itself. We know that even Plato understood this. In the Timaeus he has the Demiurge¹⁰²², who is designing the world, use the third *kind of Being* to embody the world. Plato even hints that he understands the role of Wild Being in creativity and design. Plato demonstrated this by restarting his narrative of the Timaeus a third time as if he were going to introduce yet another kind of Being, but then he only obliquely indicates Wild Being. Moving beyond the chasm between the *possible* and the *actualized* is a task that can only

¹⁰²² See <http://en.wikipedia.org/wiki/Demiurge> accessed 081017.

be done by bringing Hyper Being and Wild Being together and applying them to the Design Process.

Our Systems Phenomenology, with recourse to Ontology, Dialectics, and Hermeneutics has allowed us to understand that the System is not just purely present and constant in Being, but that it must be articulated at each of the various meta-levels of Being if it is to become an Emergent Eventity. Among these meta-levels, the Hyper Being meta-level is particularly important because it makes it possible for the design to be understood in terms of the Hyper Sign. We must understand that what we see phenomenologically is controlled by the structure of Ontology, and that only the Quadralectic is complex enough to account for the process of producing the Signs for Sign Engineering that encapsulates the Design. It is also significant to note that the interpretation of those signs is dependent upon fully understanding the Quadralectic, *in the moment*¹⁰²³, which will give us a complete picture of the core of Emergent Engineering and its grounding in Emergent Science. Emergent Science is the generalization of what works to transform emergence into actuality, and Emergent Engineering uses that knowledge to create specific artifacts that have those emergent characteristics. In effect, both Emergent Science and Emergent Engineering are immersed in our engineering practices and are merely called out separately here for analytical clarity. The basis of our practice is in Practical Reason or Metis¹⁰²⁴. But here we are concerned with rooting out the foundations that exist in Pure Reason, which lie in the schemas that relate the ‘categories of the object’ to ‘time and space’ within our experience. Those engineers practicing Systems (or Meta-systems) Engineering do not need this explanation or grounding, although its value is to see that our Engineering, as Emergent Engineering, is a much wider and deeper field than we give it credit for being. Exploring the philosophical scope and depth of this grounding will give us an understanding of what Emergent Engineering and Emergent Science¹⁰²⁵ bring to the academic table as a new discipline. And it also helps us to reflect upon *practice* and how practice would be augmented by a deeper understanding of concepts such as General Schemas Theory and the Quadralectic. Thus, we justify this type of study by the perspective that it gives us in our own practice, which allows us to re-conceptualize it, to comprehend its essence anew, and to understand the central nature of design. *Design is Hyper Design* and that is

¹⁰²³ All the moments of the Quadralectic come to bear on the same traces at nearly the same time or in quick succession.

¹⁰²⁴ Atlan, Henri. Enlightenment to Enlightenment: Intercritique of Science and Myth. (Albany: State University of New York Press, 1993). p. 126.

¹⁰²⁵ See Foundations of Emergent Science and Engineering by the author at <http://holonomic.net>.

fundamentally different than what we might have expected if we were simply operating on the assumption that Pure Being is the only fundamental ontological concept of any consequence.

Integrity

We have managed to justify our pursuit of the esoteric side of Systems Engineering by articulating how the System transforms phenomenologically as we ascend the meta-levels of Being. But in that process we have produced a picture of the differentiation of the Quadralectic, the Kinds of Being, and various other distinctions that make us wonder how we can put these pieces back together and make them work together in the way that the System or Meta-system does. So, here we will advance a radical theory based on Heidegger's Contributions to Philosophy (from Ereignis)¹⁰²⁶ and Mindfulness¹⁰²⁷. Heidegger has a theory for putting "Humpty Dumpty"¹⁰²⁸ back together again" after he has been taken apart. We will use Heidegger's theory to explain how you can actually think within the limits of the Quadralectic and how you can understand what you are doing, in spite of the myriad unbridgeable distinctions that have been made in the course of this study. In a sense, Heidegger reverses the complete unfolding of these distinctions and packs them back in, but in a new way so that they work together without interfering with each other. We will briefly explain this *re-integration of essential differences in terms of Beyng* by referring to Heidegger's works and this will pave the way for our own return to Phenomenology, which is central to this study.

Heidegger posits that there are two separate meanings for Being, one called Being (Sein) and the other called Beyng (Seyn)¹⁰²⁹. We will explain Beyng as the inversion of Being, which exists on the other side of the Singularity of Ultra Being. That Singularity is *the difference that makes a difference*¹⁰³⁰ between Emptiness and Void. The trace inscription of the Foundational Mathematical Categories is found in Emptiness within the Nomos. The dynamic of Existence, as the Emergent Meta-system cycle, is found within the Void. These

¹⁰²⁶ Heidegger, Martin, Contributions to Philosophy (From Enowning) Op. cit.

¹⁰²⁷ Heidegger, Martin, Mindfulness, Op. cit.

¹⁰²⁸ Carroll, Lewis, and Martin Gardner. The Annotated Alice: Alice's Adventures in Wonderland & Through the Looking Glass. (New York: C.N. Potter, 1960). Alice meets Humpty Dumpty beyond the Looking Glass.

¹⁰²⁹ Scott, Charles E. Companion to Heidegger's Contributions to Philosophy. Studies in Continental Thought. (Bloomington: Indiana University Press, 2001). See also Vallega-Neu, Daniela. Heidegger's Contributions to Philosophy: An Introduction. Studies in Continental Thought. (Bloomington, IN: Indiana University Press, 2003). See also Polt, Richard F. H. The Emergency of Being: On Heidegger's Contributions to Philosophy. (Ithaca, N.Y.: Cornell University Press, 2006).

¹⁰³⁰ We take this phrase from G. Bateson, Steps to an Ecology of the Mind Op. cit.

two are duals, yet the Void is more originary¹⁰³¹ than Emptiness. Heidegger posits that a similar duality exists between Being and Beyng. Being is the realm in which the Ontological Difference between *beings* and Being is produced and unfolded into the Meta-levels of Being. But he also posits that it is possible to leap over Ontological Difference completely and avoid its differentiation¹⁰³². When we avoid its differentiation, we get Beyng as a unique and strange onefold, i.e., what Being would be if it were really *one matter* rather than *fragmented* by meta-levels. All the differentiation that we have encountered and applied to the System has surfaced through the various *strands* of Ontological Difference. But what if this was not an option? We would then be left with something unique and singular (although different) from the Singularity of Ultra Being because no Ontological Difference exists in that realm. Heidegger has developed a special vocabulary based on the roots of German, which are similar to the language roots in Old English¹⁰³³. Based on his study of these roots, he says that Beyng *holds sway* over beings, and among those beings there is Da-sein (there-being), which engages in Ereignis¹⁰³⁴ under that Sway of Beyng. Beyng is the inverse of Being, which withdraws from beings. Withdrawing is symbolized by the marking of the Ontological Difference. If we did not mark that difference, then beings would be under the sway of this non-withdrawing matter¹⁰³⁵ that would inundate them. Being is related to Forgetfulness and Beyng is related to Oblivion. Heidegger says that Being moves away from us while Beyng oppressively overwhelms us and pulls us under its sway. Among the myriad beings is Dasein, a special being that projects the schemas as time-space within which all the beings find their place, including Dasein, itself, as part of the Mitsein.¹⁰³⁶ Ereignis¹⁰³⁷ means “opening the open for dis-closing”, and “clearing the clearing for showing”. It means “appropriating what appears”, and “owning what is there within the clearing of the clearing”, as well as an “occurrence within time-space”. Ereignis is not completely translatable, but in the first translation¹⁰³⁸ of Heidegger’s difficult book it has been referred to as “enowning”. The key

¹⁰³¹ Originary means that Void appears prior to Emptiness. Emptiness depends upon Being existing first, which arises out of Void.

¹⁰³² Contributions, p. 177, Section 132.

¹⁰³³ See “Primal Ontology and Archaic Epistemology” by the author at <http://archonic.net>

¹⁰³⁴ Happening, occurrence, appropriation. See Moyle, Tristan. Heidegger's Transcendental Aesthetic: An Interpretation of the Ereignis. Ashgate New Critical Thinking in Philosophy. (Aldershot, Hants, England: Ashgate Pub. Ltd, 2005).

¹⁰³⁵ In the sense that Hilary Lawson uses the term as ‘partially reified openness’, which we think of in terms of positive or negative energy/matter//information/entropy.

¹⁰³⁶ Being-with others.

¹⁰³⁷ Various meanings of the word Ereignis that play into Heidegger’s philosophical use of the word.

¹⁰³⁸ Heidegger, Martin. Contributions to Philosophy: From Enowning. Studies in Continental Thought. (Bloomington, IN: Indiana University Press, 1999).

point is that Beyng holds sway over Dasein and all other beings within the clearing, but Dasein practices Ereignis under that sway as the ‘opening of the opening to beings,’ which is necessary for Beyng.

Now, if we understand this onefold of Beyng as a guiding thread that strings together the moments of the Quadralectic, then we will have a way to understand how the mechanism of the Quadralectic actually works in terms of our human experience within Dasein. We will conceptualize this as Being differentiating itself into meta-levels, which creates emergent differences that are fundamental. Then, within those differences, the Quadralectic appears because it is based on synchronizing with the lifecycle of emergence and the cycle of existence. It then produces the moments of recognition and comprehension that are necessary to embrace Sign Engineering. But there must be some thread that connects these distinct moments together so that they are not merely a mechanism, but part of our consciousness that will operate together effortlessly to produce our understanding of the signs in relation to the emergent essences that come from the various perspectives that we capture in the design process (which embodies the results of our *metis*). Heidegger’s basic idea¹⁰³⁹ is that the connections between the differentiations in Being are actually interconnected and interwoven in Beyng from the very beginning as if they were never distinguished from each other, and that this interweaving is based on a different grounding than that of differentiating¹⁰⁴⁰. The Beyng is a onefold that is never separated and is not representational, unlike the Quadralectic and its moments, and unlike the various signs within the design of the Emergent System. The strands of differentiations are connected in Being but were never disconnected in Beyng. Generalized Dasein¹⁰⁴¹, no matter how it is differentiated as *subject*, or as *pre-subject Dasein*¹⁰⁴², or as *Mitsein*¹⁰⁴³, or as the *query*¹⁰⁴⁴,

¹⁰³⁹ (under this interpretation).

¹⁰⁴⁰ Deleuze in Difference and Repetition (Op. cit.) distinguishes between *differentiation* and *differeciation*. From a review of Difference and Repetition by Alex Scott: “Just as repetition implies a relation between the repeater and the repeated, difference implies a relation between the ‘differenciator’ and the ‘differentiated.’ Deleuze uses the term ‘differentiation’ to refer to the determination of the virtual content of an Idea, while he uses the term ‘differenciation’ to refer to the actualization of the content of an Idea as divergent elements and parts. To actualize something is to ‘differenciate’ it. ‘Differenciation’ is an integration or solution of a problem, which is then integrated into the solution of more complex problems, to form a more global and integrated solution.” Reference in review to page 211 of Difference and Repetition. See <http://www.angelfire.com/md2/timewarp/deleuze.html>. Associated Homepage of Alex Scott is <http://www.angelfire.com/md2/timewarp/index.html>. accessed 090301.

¹⁰⁴¹ The nature of dasein is “a riddle wrapped in a mystery inside an enigma” similar to W. Churchill’s statement about the Russians. Winston Churchill’s quotation, made in a radio broadcast in October 1939: “I cannot forecast to you the action of Russia. It is a riddle, wrapped in a mystery, inside an enigma; but perhaps there is a key. That key is Russian national interest.” <http://www.phrases.org.uk/meanings/31000.html> accessed 081026.

¹⁰⁴² The authentic ‘subject’ at the level of Process Being: which is a riddle.

¹⁰⁴³ The inauthentic ‘subject’ immersed in intersubjectivity and the group-think of the communal.

or the *enigma*¹⁰⁴⁵, never loses this thread because of the Sway (Wesung) of Beyng (Seyn). This means that, within Being this *generalized Dasein* will operate by *opening the opening*, and *clearing the clearing*¹⁰⁴⁶. Furthermore, Dasein will appropriate *as appropriate* those beings whether they are signs, or moments of the Quadralectic, or objects that will appear. Dasein will ‘own up to’ and ‘own over’ those appropriated objects, and that will become a time-space occurrence at the site of the event of Dasein’s Ereignis under the sway of Beyng. So, we have a picture of Dasein weaving together all the differentiated strands from a place where those strands were never separated, and this interweaving is based on an alternative ground of Beyng that underlies the differentiation of Being. This is one possible picture of the Sign Engineer at work. It is a profound vision of the way that meaning is created through designs. He is executing the Quadralectic naturally as part of his practice. He is operating in all the various meta-levels of Being simultaneously and effortlessly, in spite of the fact that it is actually harder and harder to think at the higher meta-levels of Being. Actually, it is a seemingly effortless action because, *as Generalized Dasein*, the engineer is “always already”¹⁰⁴⁷ grounded in Beyng, a separate ground that holds sway over all beings (including Dasein) who engages in the Ereignis that *opens the opening* of comprehensibility and *clears the clearing* of intelligibility, and *appropriates beings*, and *owns them over to their own essences*, as it *owns over itself to its own essence*. And Beyng does this in a way that causes it to appear as specific occurrences in time-space, i.e., as happenings. This ‘happening,’ we will call *non-routine work*¹⁰⁴⁸. In non-routine work, the engineer is mentally skipping from one type of work to another every few seconds as he works out the design solutions to the problems that appear on his project. The solution is brought to him by Beyng as he negotiates the meaning of the differences in Hyper Being. Everything routine can be captured in a linear flow that could someday be automated, *but the non-routine work is the essence of engineering work that can never be routinized*. It is the weaving together of the various moments of the Quadralectic with an appreciation of the meta-levels of the System as a context for the design decisions and construction of specific parts of the System that could

¹⁰⁴⁴ The ‘subject’ at the level of Hyper Being which is a mystery.

¹⁰⁴⁵ The ‘subject’ at the level of Wild Being which is an enigma.

¹⁰⁴⁶ Opening/clearing are an unstriated/striated pair, like Beyng/Being, Void/Emptiness, Oblivion/Forgetfulness.

¹⁰⁴⁷ This is a term used by Heidegger and Derrida for what has always been the case prior to our recognizing it.

¹⁰⁴⁸ Cf. “Advanced Process Architectures” tutorial by the author originally given at SEPG 95 Boston and given again at UCI SEPG CoSPI 97 Irvine. See part 3 slide 48 and 52. See also Robinson, Alan, and Sam Stern. Corporate Creativity: How Innovation and Improvement Actually Happen. (San Francisco: Berrett-Koehler Publishers, 1997). p. 31.

later be used and integrated with other parts of the System that were introduced or built at other times.

This is a relationship between Being and Beyng that is evidenced in the singularity of Ultra Being. What is differentiated in Being, remains undifferentiated in Beyng. The Quadralectic provides the arena for this relationship to be demonstrated at all the levels of Being through the synchronization of the Lifecycle of the Emergent Event on the one hand, with the dynamic of Existence on the other. This is an intriguing and unexpected picture because it suggests that at another level there is an interplay between Emptiness and Void, Being and Beyng, and Forgetfulness and Oblivion around the Singularity of Ultra Being that appears within the upwelling of Manifestation, which is a deeper nondual at the root of all the moments of the meta-Quadralectic¹⁰⁴⁹, and this produces the difference between ‘striated clearings’ and the ‘unstriated open.’ Emptiness and Void both enter this picture because there is no interference of the *self with itself* as Dasein operates within Ereignis as the ‘opener of the opening’ where the truth, reality, identity, and presence of the entities are revealed to us. This provides us with a philosophical picture of the onto-mythological Indo-European Primal Scene¹⁰⁵⁰ of the Weaving of the threads of Fate by the Norns beneath the World Tree at the side of the Three Wells. Worlds and Earth interact, and the Immortals and Mortals intertwine¹⁰⁵¹. All that is Immortal is represented by the *unbroken* threads that are intertwined with the *broken* threads. World and Earth together are the loom. The difference between Being and Beyng is like the System/Meta-system or the Set/Mass distinctions, which is similar to what we see in the distinction between Emptiness/Void. Heidegger uses the example of a hollow medium such as a jug¹⁰⁵². In general, each schema is a hollow medium for the next schema down in the hierarchy of the schemas. The higher schema not only ‘holds sway’, but *encompasses* the lower schema¹⁰⁵³ and this relationship is embodied by the System and Meta-system, i.e., the hollow medium and what it holds in its niches. The Ereignis, on the other hand, is like the “Opening and Closing of materials” that Hillary Lawson talks about in Closure¹⁰⁵⁴. Generalized Dasein,

¹⁰⁴⁹ The dynamic of the striated and unstriated pairs is like a cyclone around the empty/void center. In other writings I have called this the Pleroma. Here it is called the Meta-Quadralectic.

¹⁰⁵⁰ See The Fragmentation of Being and the Path Beyond the Void by the author at http://works.bepress.com/kent_palmer/

¹⁰⁵¹ This is the famous fourfold of Heidegger. See Young, Julian. Heidegger's Later Philosophy. (Cambridge UK: Cambridge University Press, 2002). p. 93.

¹⁰⁵² Heidegger, "The Thing", in Poetry, Language, Thought, pp. 163-82. Heidegger, Martin. Poetry, Language, Thought. (New York: Harper & Row, 1971). See also Malpas, J. E. Heidegger's Topology: Being, Place, World. (Cambridge, Mass: MIT Press, 2006). p. 230.

¹⁰⁵³ ‘Holding sway’ in Heidegger’s German is ‘Wesung’.

¹⁰⁵⁴ Lawson, Hilary, Closure: A Story of Everything Op. cit.

as subject, *closes*, although there is the possibility of *opening back up* so that *things*¹⁰⁵⁵ can be re-closed differently. This opening and closing process handles the differences in Being. Generalized Dasein weaves presences and absences (which are the same,) with identities and differences (that are the same), with realities and illusions, (that are the same), and with truths and fictions, (that are the same). Beyng is the difference between the *aspect* and the *anti-aspect*¹⁰⁵⁶. All of these *belong* together as *aspects* of Being, *but they have always been together in the ground of Beyng*. So, when we pick up a strand of differentiation, it is connected and not cut off by distinctions¹⁰⁵⁷. All the strands connect and can be woven together in a self-organized knot. But if this knot is pushed into the fourth dimension, it unknots effortlessly, just as it went together. The unknotted state is always ‘close at hand’ in the same way that the nondual is ‘close at hand.’ This is the process of combining *necessary* differences in *necessary* ways that will produce the fabric of our designs. There is a necessity to the sameness of Beyng that permeates the choices between the differences of Being.

According to our interpretation, Heidegger’s late period dealt with solving the problems of meaning, sense, significance, and relevance as they track through our thoughts during the design process. In actual practice we attempt to follow golden¹⁰⁵⁸ guiding threads that preserve sense, meaning, significance, and relevance throughout the design process. But those who create the distinctions within our methodologies do not explain how it is possible for us to effectively manipulate those distinctions to produce a design that makes sense, that has meaning for the design team, that is significant, and also relevant. This problem exists not just at the theoretical level of the Quadralectic, which underlies meta-methodologies, but also at the lower level of the minimal methods, as well as at the level of practice. The relationships of perspectives to minimal methods are related through the lattice of methodological distinctions and are an example of this differentiation that allows access to the sameness of the design essence. In our Sign Engineering, how can we know which distinctions will make a design worthwhile or valuable, in relation to our goals? This problem is usually approached in terms of the relationship between syntax and

¹⁰⁵⁵ Lawson calls these closures “materials.” They are generally what has been reified previously, which is turned to a magma and then re-reified in a subsequent closure. Cornelius Castoriadis uses the term ‘magma’ for the non-reified state of social institutions. See Castoriadis, Cornelius, and David Ames Curtis. World in Fragments: Writings on Politics, Society, Psychoanalysis, and the Imagination. (Stanford, Calif: Stanford University Press, 1997).

¹⁰⁵⁶ The aspects of Being are identity, presence, truth, reality, and their opposites.

¹⁰⁵⁷ What distinguishes in one direction connects in a different direction.

¹⁰⁵⁸ We are using the term ‘golden threads’ using the metaphor of golden threads from myth. The threads that the Norms weave are golden threads. Note the use of gold in Grimm’s fairy tales, similar to the concept of the Golden Mean in mathematics. Many times nondual distinctions are expressed as *golden* in traditional stories.

semantics and pragmatics. We have no structure for semantics, and that is because we recognize two things, the ontic level¹⁰⁵⁹ and the ontological level of Pure Being. All our abstractions are at the ontological level of Pure Being. At that level we do not recognize structure so it is perceived as a homogeneous plenum, which contributes to the problem that we do not know how to deal with semantics. The theory advanced in this paper is that there are more meta-levels than just Pure Being and that each meta-level has is a language for talking about the previous level. This means that each level (in this series of meta-levels) is emergent in such a way that there is a deferring of the problem of the shapelessness of semantics. At each level there is a new syntax that is emergent, which is used to talk about the lower level. So, Pure Being is discussed through a meta-language in Process Being, and Process Being is discussed through a meta-language in Hyper Being. But, when we encounter the emergent properties at the level of Hyper Being we find that there *is* a way to talk about Design and the possibilities that did not exist at lower levels. We can continue up this *stairway to the 'no-where'* of meta-languages, until we get to what is non-representable at the level of Ultra Being after we have passed the level of Wild Being. So, this deferring of the problem of semantics is not solved but is merely pushed up the syntax hierarchy in hope that it will be dealt with by the emergent properties of each level where each new meta-language exists. This means that we have introduced more distinctions at the various meta-language levels and pushed the problem of semantics into non-representability. As a result, developing a semantic coherence from one meta-level to the next remains a challenge. Heidegger suggests that we should “jump over”¹⁰⁶⁰ ‘Ontological Difference’ all together and move on to a new basis of Being, i.e., Beyng. This new basis is not manifold and fragmented like Being, but is instead, a onefold¹⁰⁶¹, i.e., realizing Ontological Monism completely, although not as “one”, but in the context of before oneness arises¹⁰⁶². Beyng is strange¹⁰⁶³ and it is unique¹⁰⁶⁴ and it is non-

¹⁰⁵⁹ The ontic level is below the level of abstraction of Pure Being, i.e., it is the level of beings on the other side of Ontological difference. In Beyng this difference between Being and beings does not arise.

¹⁰⁶⁰ Heidegger calls this the “Leap.” See Emad, Parvis. On the Way to Heidegger's Contributions to Philosophy. (Madison, Wis: University of Wisconsin Press, 2007). p. 73. In Contributions. p. 177, Section 132.

¹⁰⁶¹ Onefold suggests a complex topological manifold that is neither a unity nor a totality. See also Deleuze, Gilles. The Fold: Leibniz and the Baroque (Minneapolis: University of Minnesota Press, 1993).

¹⁰⁶² Similar to the “univocal nature of Being” in Deleuze. Cf. Badiou, Alain. Deleuze: The Clamor of Being. Theory Out of Bounds, v. 16. (Minneapolis: University of Minnesota Press, 2000).

¹⁰⁶³ Heidegger likes to use the word uncanny.

¹⁰⁶⁴ Singular in the sense that Hegel uses the term as different from Universal or Particular. For instance, in Kant, Space and Time are both Singulars. This is different from the Singularity, which is a point where the continuum of spacetime is breached and the rules of physics fail. Rather, it is an individual, which is both Universal and Particular at the same time.

representable¹⁰⁶⁵ from the beginning. It is also what was “always already” there before we made any distinctions. And so, the distinctions that we have made were already connected in Beyng even if they were emergently distinguished in Being through the teasing out of the meta-levels of ontological difference. That means that whenever we use distinctions that we have created, we can, in this other mode of Beyng, understand their relationship to additional distinctions that we may wish to create. Thus, sense, meaning, significance, and relevance are generated by the weaving together of the ‘threads of difference’¹⁰⁶⁶ within Being in the counter realm of the ‘belonging together’¹⁰⁶⁷ of Beyng.

Heidegger asked what would happen if we reversed the relationship between beings and Being with respect to ‘withdrawing’¹⁰⁶⁸. His investigation of this question led him to formulate the idea that Beyng holds sway over beings, no matter how they are distinguished among themselves. He then defined the withdrawal of Being as making room for the appearance of beings in their true nature. He then defined that true nature as the Sway (Wesung¹⁰⁶⁹) of Beyng. Beyng comes out of Oblivion as Being recedes into Forgetfulness. Heidegger also noted that one *particular* being, i.e., human Dasein who projects the world and the things in it, has a special relationship to Beyng, which is called Ereignis. Ereignis means “appropriating” and “appropriate happening”¹⁰⁷⁰. This means ‘opening up the open’¹⁰⁷¹ or ‘clearing the clearing’¹⁰⁷² in which beings can be ‘appropriated’, or ‘come into their own’. This ‘happening’ is the very same process in which Dasein ‘comes into its own’ as *Dasein*, which is an occurrence of an event in time-space. Thus, it involves the manifestation of the schemas as a variety of organizations of time-space through human beings. So, if we look at design as an activity of Ereignis, which expresses the sway of Beyng, rather than merely as an arrangement of beings

¹⁰⁶⁵ If there are no differences in the unstriated pair before differences arose, then it is impossible to represent that state because representation assumes the ability to distinguish differences between signs.

¹⁰⁶⁶ Or absence, or illusion, or fiction. Beyng marks the difference between the aspects and anti-aspects.

¹⁰⁶⁷ Heidegger, Martin. Identity and difference. (Chicago, Ill: University of Chicago Press, 2002).

¹⁰⁶⁸ Taminioux, Jacques, and Michael Gendre. Heidegger and the Project of Fundamental Ontology. SUNY Series in Contemporary Continental Philosophy. (Albany, N.Y.: State University of New York Press, 1991). p. 163.

¹⁰⁶⁹ Inwood, M. J. A Heidegger Dictionary. (Oxford: Blackwell Publishers, 1999). See essence, Wesung is sometimes translated as ‘essencing.’ ‘Sway’ is the translation used in Contributions.

¹⁰⁷⁰ Lukacher, Ned. Primal Scenes: Literature, Philosophy, Psychoanalysis. (Ithaca: Cornell University Press, 1988). Compares appropriation of Heidegger to the transference of Freud. p. 22.

¹⁰⁷¹ Boer, Karin de. Thinking in the Light of Time: Heidegger's Encounter with Hegel. SUNY Series in Contemporary Continental Philosophy. (Albany, NY: State University of New York Press, 2000). Discusses the primordial openness of Dasein on p. 49.

¹⁰⁷² Lewis, Michael. Heidegger and the Place of Ethics: Being-with in the Crossing of Heidegger's Thought. Continuum Studies in Continental Philosophy. (London: Continuum, 2005). On p. 81, “clearing and open” are distinguished. See also McNeill, William. The Glimpse of the Eye: Heidegger, Aristotle, and the Ends of Theory. SUNY Series in Contemporary Continental Philosophy. (Albany: State University of New York Press, 1999) p.333 for ‘clearing’ as ‘clearing in a wood.’

through their distinctions, we suddenly have a Phenomenology of Practice¹⁰⁷³ where the understanding of things in Being occurs under the auspices of Beyng¹⁰⁷⁴. One Being is the teasing out of differences from ontological difference while Beyng, is always onefold, never fragmented, and is “always already”¹⁰⁷⁵ singular and non-representable and strange to us, because we discover its “difference that makes a difference”¹⁰⁷⁶. Heidegger asked what would happen if we had *two independent realms* of Being, one of which is the unfolding of Ontological Difference, and the other that leaps over Ontological Difference directly into the unique and the non-representable. Heidegger frames this as a “leap” into Nothing but we understand it as a leap into Existence with its two modes: Emptiness and Void. It is unlikely that anyone would argue that when we *think*, our *thinking processes* that become *thoughts*, are non-representable, i.e., lost in the unconscious. The question becomes: How do our ideas actually make sense, and become meaningful, significant, and relevant for the design project and the design engineering team?

We weave these thoughts together and they become the products of Sign Engineering. But then, there is the question of how we can do semantic work when semantics is actually formless at any meta-linguistic level. Semantics is essentially formless, but Heidegger implies¹⁰⁷⁷ that “semantics is relying on the inherently onefold nature of Beyng”. Semantics switches completely to another equiprimordial ground. Thus, just as ‘present-at-hand’ and ‘ready-to-hand’ in Being and Time are equi-primordial, here too, Heidegger has made the two Beings that are separated by the Singularity of Ultra Being equi-primordial. We can now be very precise in our Phenomenology of Design and analyze what happens when the designer designs by engaging in Sign Engineering. Before, we have always discussed this in terms of *difference*, i.e., the difference between the meta-levels of Being, the difference between the signs, and the difference between the object and the interpretant and the sign. And to this we have added the *difference between perspectives*. These differences that we have created explain how Sign Engineering can work as a basis for the

¹⁰⁷³ Hamrick, William S. Phenomenology in Practice and Theory. Phaenomenologica, 92. (Dordrecht: M. Nijhoff, 1985).

¹⁰⁷⁴ We can think of this strategy as applying the idea of the difference between the present-at-hand and the ready-to-hand at a level where we consider it as a difference between different ‘Beings.’

¹⁰⁷⁵ Always Already means that from the origin of the phenomena something has been the case, which means that this is part of the source of the phenomena.

¹⁰⁷⁶ Nb. Bateson, G. coined this phrase. Bateson says in his Mind and Nature we learn more if we pursue two subjects at the same time. Bateson, Gregory. Mind and Nature: A Necessary Unity. (New York: Dutton, 1979).

¹⁰⁷⁷ (under my interpretation of his work).

meta-method and design approaches¹⁰⁷⁸ to the System and Meta-system. But, this does not explain how these differences can be used by human beings to create sensible designs, whose different views of the signs are significant and meaningful to the design team, as well as being relevant to the context, situation, circumstance, and surroundings. Heidegger has come up with a hypothesis that skips all the differences that we have been talking about in relation to the meta-levels and has posited a different ‘ground’ of Beyng, which is onefold, non-representable, unique, and strange to us, but which ultimately grounds all the *semantics* by creating threads of belonging-together, or sameness, that was “always already” there prior to all our distinctions. The contrast between the ‘Beyng of the threads’ and the differences in ‘Being between the beings’ generates the semantics as sense, meaning, significance, or relevance. *This is an interesting ruse because it allows us to analyze the non-routine work done by Engineers in a whole new way that extends our phenomenological understanding.* Each different sign that the Sign Engineer considers and transforms, either in terms of concept, or essence, or design, or perspective, has a golden thread of connection to the others that he is dealing with. This golden thread of connection weaves the different signs together, and weaves those conglomerations of signs together with the non-design elements of the Quadralectic so that Emergent Design can occur. This occurrence happens in terms of Ereignis on the ‘ground of Beyng’ as it is seen in the light of ‘beings in Being’. When we talk about the ‘clearing and lighting’ of Ereignis, we are talking about producing a clearing between Being and Beyng, termed the Cleavage¹⁰⁷⁹ by Heidegger. We realize from the point of view of Being, that Beyng is Nothing, and this is because it opens up an “abgrund”, or “Abyss”¹⁰⁸⁰, that allows it to be an opening in which things can be what they are. Things are able to be what they are because Being, itself, is withdrawing and making a space for them. But when this withdrawing is seen from the side of Beyng, it is a ‘holding sway of the beings’, and certain beings, such as the designer, can turn that abyss into time-space phases, which are articulated as schemas. The designer uses these time-space schematizations as the basis for his design understanding. The designer is weaving together ‘differences between beings in Being’ based on the ‘onefoldness of Beyng’. Between the two, lighting occurs that Heidegger calls “Aletheia”, i.e., the uncovering of the truth of beings in relation to their fiction, or, their other aspects

¹⁰⁷⁸ See “Application of General Schemas Theory: Design Methods and Meta-methods” by the author at <http://holonomic.net>

¹⁰⁷⁹ *Contributions*, p. 196, Section 156.

¹⁰⁸⁰ *Contributions*, p. 22, Section 13. Translated as “ab-ground.” Normally translated as ‘abyss’ or ‘groundlessness.’

such as their identity in relation to their difference, their reality in relation to illusion, or their presence in relation to their absence.

Deleuze produces a monolith of Being, which he says is univocal behind all the differences that he emphasizes in his philosophy. But Heidegger realizes that there is a radical discontinuity in Being that accounts for its *essential difference* in order for there to *be* a difference that will allow the *clearing* and *lighting* and *opening* to occur *where the differences are seen*. Thus, Heidegger solves the problem that Deleuze brings to the fore, which we see in Badiou's criticism of Deleuze, i.e., that beyond the differences there is a grounding monolith of univocal Being¹⁰⁸¹. Instead, Heidegger says that there are radical discontinuities in Being such that there is another completely different type of 'ground' that we have never seen before, called Beyng. The contrast between Being and Beyng allows a highlighting of sense, meaning, significance, and relevance at all levels of activity, and throughout all differences among beings. There is always a golden thread that we try to follow in our Sign Engineering practice that will insure that the Signs will make sense, that the meaning will remain clear between the team members, that the significance will be distinct, and that the design will be relevant. We can check whether we have lost this thread or not, and sometimes we do. In that case we are alerted to the possibility that our design efforts have gone astray and that we need to find a way to pick up the thread again. As long as we have that onefold thread *in hand* we can weave the design so that the sense, meaning, significance, and relevance are clearly present. That is the meaning of Being, the truth of Being, the reality of Being, and the identity of Being, which comes out of the Otherness of Nothing as exemplified in Beyng.

With this concept of the difference between Being and Beyng from Heidegger's Contributions and Mindfulness, we end our phenomenological account of the System. We have visited Dialectics, Hermeneutics, and Ontology as sister disciplines that need to be taken into account. We have attempted to display the panoply of fundamental differences of ontology that transform the System and its context within the Meta-system, because these differences affect our phenomenological understanding of the System and Meta-system. The fact that most of these distinctions do not play a role in our current understanding of the System, means that we are operating blindly in many respects, and this means we cannot see what is right before our eyes when we are trying to design the System. If we reduce everything to Presence, Constancy, and Pure Being, we will not

¹⁰⁸¹ Badiou, Alain. Deleuze: The Clamor of Being. Theory out of bounds, v. 16. (Minneapolis: University of Minnesota Press, 2000).

understand the nature of the System whose essence as a schema exists in its meta-levels in contrast to other schemas. Introducing the different kinds of schemas allows us to retrieve the meaning of the System from its nihilistic overuse. When we see that the System is one schema among many, and that the schemas themselves have their roots in Beyng (in the onefold and other grounding), then we can appreciate the differences that appear in Being because the schemas will allow us to organize the beings that become part of our designs based on their pre-ordained organizations that we exploit in our production of the artificial aspects of our culture. It is strange that this artificiality is a natural unfolding out of our inherent organization of time-space. That organization bubbles up in the projecting 'open' that we create in the process of Ereignis out of the 'ground of Beyng' that holds sway over all beings. By studying two matters at one time, i.e., Being and Beyng, we will attain a higher grade of information, i.e., information that has become knowledge of the 'always already belonging together of the differences'¹⁰⁸² that makes a difference in our designs.

¹⁰⁸² "always already" means that what is now together was together in its origin and in its source. For Heidegger, the source that is omnipresent but lost in oblivion is Beyng, which holds sway in spite of the differences inscribed in Being.

The Design Field and the Synchronization of the Cycles of Existence with the Quadralectic

Philosophical Categories, Foundational Mathematical Categories, Meta-levels of Being, Quadralectic, Lifecycle of Emergence, and Emergent Meta-system

In this chapter a theory for the structure of the Design Field is presented. Our theory accounts for all the possible design entities that are produced by crossing (intersecting) the meta-levels of Being with the trans-Peircean categories. We then distinguish the semiotic Design Object from the implementation of the Object of Design. These two types of "object" as a semiotic representing and represented embodied design are related to the Immediate and Dynamic Objects defined by Peirce. The possibility of embedding design knowledge in the designed artifact is also briefly considered. Then, the synchronization of the Quadralectic in Hyper Being is related to the Emergent Meta-system Cycle in Existence and the Lifecycle of the Emergent Event. This synchronization of Being and Existence is seen as the route to the full actualization and realization of the Emergent Design as an implemented actuality. An image of the cycle of the sub-schemas is then produced in which the Quadralectical moments are the operators that move between the operands of the sub-schemas of form. Various images of the Quadralectic are depicted and the reason for the complexity of the overall theory is given. The given theory is articulated sufficiently to lend itself to possible future refutation and therefore is considered scientifically based in the broadest sense.

Duality of the Design Field and the Cycle of Design

In this chapter we will explore the duality that exists between the Design Field and the Cycle of the Quadralectic. This duality is based on the difference between the Philosophical Categories and the meta-levels of Being. Normally, the Philosophical Categories and the meta-levels of Being are interleaved, and in that case the Foundational Mathematical Categories are an elaboration of the Philosophical Categories. The Foundational Mathematical Categories determine the Lifecycle of the Emergent Event. The unfolding of order in the Foundational Mathematical Categories underwrites the Quadralectic as it is being simultaneously underwritten by the Emergent Meta-system Cycle. It is the conjunction of the Lifecycle of the Emergent Event and the cycle of the Emergent Meta-system that forms the basis of the cycle of the Quadralectic. This *conjunction* happens at the level of Hyper Being. Pure and Process Being exist *prior* to it, while Wild and Ultra Being come into existence *after* it in the sequential arising of the

kinds of Being. However, if we decline from interleaving the Philosophical Categories with the meta-levels of Being, and instead examine the meta-levels of those Categories according to their *differentiation*, we derive a completely different picture of the Design Field, which stipulates the limits of the Design Object. The semiotic *Design Object* is the product of Sign Engineering, which is a semiotic structure that indicates the structure of the emergent *Object of Design*. The semiotic *Design Object* is built from the conceptual materials of the Design Field. The Design Object is related to the Universal Algebra, which is the highest abstraction of any type of representation. It is related to what Peirce calls the Immediate Object¹⁰⁸³, which is a semiotic representation of something that we have access to through appearances. But the actual creation of the emergent *Object of Design* relies on establishing a relationship between Existence and Being, especially Hyper Being. The Object of Design is related to the Co-Algebra¹⁰⁸⁴ of the Universal Algebra. It is an example of what Peirce calls the Dynamic Object¹⁰⁸⁵, which is the reality behind appearances that we can see as the implementation of actuality in the design. This relationship can be achieved because there is synchronization between the Cycles of Emptiness and Void and the cycle produced by the Quadralectic. It is due to this synchronization of the cycles of Being and Existence that makes it possible for the semiotic *Design Object* (built from the conceptual materials found in the Design Field) to become an ‘object with actual Emergent Effects’, *which is the Object of Design*. A summary of these two structures will be given in this chapter.

Meta-levels of the Philosophical Categories

In order to better understand Design, it is necessary to provide a vision of the nature of the Design Field. The Design Field is the articulation of the Philosophical Categories in terms of the meta-levels of Being. In general, we have seen that the Philosophical Categories are separated from each other by the meta-levels of Being. And we have noted that the Philosophical Categories are aligned with the Foundational Mathematical Categories. But let us pose the question: What happens when the two series that are interleaved are crossed with each other? We propose that this crossing is the nature of the Design Field. In effect,

¹⁰⁸³ Design Object = Immediate Object of Peirce. See Freadman, Anne [The Machinery of Talk](#) (Stanford CA: Stanford U.P. 2004). See Peirce Collected Papers Volume 4 p. 536.

¹⁰⁸⁴ Rutten, J. J. M. M. "Universal Coalgebra: a Theory of Systems" (1996)
<http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.34.1958>

¹⁰⁸⁵ Object of Design = Dynamic Object of Peirce. See Freadman, Anne [The Machinery of Talk](#) (Stanford CA: Stanford U.P. 2004). See Peirce Collected Papers Volume 4 p. 536.

we are following the lead of N-Category Theory¹⁰⁸⁶ that proposes that the meta-levels of the Relations are an expansion of Mathematical Category Theory. This series of meta-levels are as follows:

Relation⁵ = Perturbation – mapping⁵ between the modifications
 Relation⁴ = Modification – mapping⁴ between the Natural Transformations
 Relation³ = Natural Transformation – mapping³ between mappings between categories
 Relation² = Functor – mapping² between mathematical categories
 Relation¹ = Arrow – mapping¹ between the elements
 Relation⁰ = Element – node

This series of N-categories¹⁰⁸⁷ constitutes the meta-levels of the Relation. A key point concerning this sequence of meta-levels is that it expands up to meta-level three and then contracts to meta-level five. After meta-level five, it is unclear that there is any further type of Relation given the contractions. The names of the various meta-levels in N-category Theory given here are the same as those used in Category Theory literature. This series of the meta-levels of the Relation is still being worked out since N-category theory is a new discipline. However, in this case it is quite clear how this expansion and contraction process occurs as we move up the meta-levels of the categories. We start with an element, which can be any type of element in any mathematical category. We take the set of those elements together as a node. Then we describe the arrows that map one node to another by using category theory mappings that are signified by arrows. The second meta-level of this Relation is an ‘arrow between arrows,’ and those meta-arrows are called *functors*, and they are normally used to show that the transformational arrow mappings in one category are mappable to another category. This is used to allow proofs in one category to ‘stand in’ for a proof in another category. Sometimes, something is already proved in one category, but once we establish a mapping *between* the categories by using functors, we can assume that the same proof holds true for the new category. This is a way to understand the similarities and differences between categories. However, when we move up to the *third* meta-level

¹⁰⁸⁶ Baez, John C. [An Introduction to n-Category Theory](#) (Lecture Notes in Computer Science - Springer, 1997). Baez, John C., Dolan, James. “Categorification” ([arXiv:math/9802029v1](#) [math.QA] accessed 081231). Leinster, Tom “A Survey of Definitions of n-Category” ([arXiv:math/0107188v1](#) [math.CT] accessed 081231). See also *The N-category Cafe* blog at <http://golem.ph.utexas.edu/category/> accessed 081231. Workshop on Higher Category Theory and Physics, Ezra Getzler, and M. M. Kapranov. [Higher Category Theory: Workshop on Higher Category Theory, March 28-30, 1997, Northwestern University, Evanston, IL](#). (Providence, R.I.: American Mathematical Society, 1998). Leinster, Tom. [Higher Operads, Higher Categories](#). London Mathematical Society Lecture Note Series, 298. (Cambridge: Cambridge University Press, 2003).

¹⁰⁸⁷ E Cheng, N Gurski – “The Periodic Table of N-Categories for Low Dimensions I And II: Degenerate Categories and Degenerate Bicategories and Degenerate Tricategories” (Contemporary Mathematics, 2007) – at arxiv.org: 0708.1178 (2007-08-17) and 0706.2307 (2007-08-17) accessed 081231.

mapping, then we have mappings *between* functors. These are used to describe the *differences*, rather than the *similarities* between categories. In other words, if there is a mapping between two *category arrow formations*, we can map that to *another mapping* between two *other* category arrow formations. This indicates that there is an essential difference between the two. That difference is called a Natural Transformation, i.e., it is a path through which *one type* of mappings between categories is turned into *another type* of mapping between categories. If the mappings were the same, then this would be merely another example of ‘meta-level two mapping.’ So, at *meta-level three*, essential difference is introduced. As an example, we can take the organism as the element. Organisms have many relationships with each other and those exist at meta-level two. But when we talk about relationships *between* relationships with regard to organisms, then we must start thinking about *communities* of organisms and how one community of organisms relates to another. Yet, when we go to meta-level three, it is the essential differences between the community of organisms that becomes the key *and it is at this point that species appear*, because it is at this point that the different kinds of organisms become apparent. Species differences are the *sine quo non* of Essence differentiation. Now the question becomes: What is the fourth meta-level of a Relation? This is where this series becomes really interesting, because at the fourth meta-level *modifications* occur. With regard to organisms, such a modification is gender. Gender is not really a ‘kind of a kind’ as has been thought previously¹⁰⁸⁸. Rather, gender is a ‘modification of a kind.’ All modifications are, in fact, adumbrations of an essential kind, rather than a ‘higher type of kind.’ This is a shrinking of difference. In the series, the greatest difference occurs at the level of Natural Transformation. After that, at the fourth and fifth meta-levels, the differences progressively shrink to modifications, such as gender, or to perturbations, such as personality differences. There is probably no appreciable sixth meta-level because these higher order differences become vanishingly small. *Until* we start looking at *how* a particular Philosophical Category is *transformed as it undergoes emergence* through the meta-levels of Being, and what actually happens as we traverse the series of meta-levels is not completely clear. But when we do examine this transformation we can see that there is an *expansion of difference*, and then a *contraction of difference*. Previously we claimed that Hyper Being is an expansion of being-in-the-world and Wild Being is a contraction of being-in-the-world, but now we see that this is true when we conceptualize it in terms of the meta-levels of Relations. There is an expansion of essential difference and then a

¹⁰⁸⁸ Smith, Steven G. Gender Thinking. (Philadelphia: Temple University Press, 1992).

contraction of essential difference with the greatest contraction of difference occurring at the fifth meta-level of Being, which we recognize as singular differences, called Singularities.

This expansion and contraction that occurs as we traverse the series of meta-levels is an important phenomenon that can give us insight into the Design Field if we continue to expand this same way of thinking to the other Philosophical Categories such as the Neganary, Zeroth, First, Third, Fourth, Fifth, and Sixth. The Following Design Field Table illustrates the Philosophical Categories and their qualifying properties.

being⁰	Pure¹	Process²	Hyper³	Wild⁴	Ultra⁵	
lacunae (hole)	privation	absence	erasure	defects	flaws	Negatory
spot	place	register	matrix	attenuation	nuance	Zeroth
individual	property	spectra (structure)	qualia (stuff)	refinements	subtleties	First
element	map	category	Kind (essence, species)	inflection	affinity	Second
array	continuity	manifold	topology	malleable	mutable	Third
component (part)	inter-dependence	lattice	synergy	ensemble	simultaneity	Fourth
holon (moment)	alignment	holarchy	integrity	symbiosis	union	Fifth
nexus	correlate	constellation (juxtaposition)	poise	reflections	fusions	Sixth
singular	disconnects	heterarchies	independences	impenetrable	singularities	Seventh

Table 13.1. Design Field Table

This table is an attempt to produce a facsimile of the projection of differentiation that we find in the N-category Theory as it relates to Seconds across all the other Philosophical Categories. This is a difficult task because it seems that these relationships have never been worked out previously. It is very difficult to create appropriate terms to describe each emergent jump in characteristics as we go up the meta-levels of the each Philosophical Category. This is a vertical differentiation of each Philosophical Category that is illustrating the emergent differences that are roughly equivalent to the differentiation of the meta-levels. At the same time we are also moving horizontally to include each new emergent philosophical category. This is an emergent array of the greatest differences that can produce a field in which individual elements can be compared to their adjacent cells in both the horizontal and vertical dimensions so that we may to gauge whether the emergent change is correct in both directions. Unfortunately, language cannot always provide the exact terms that are needed to express the differences that we would ideally wish to conceptually express. Many of the higher level transformations of these concepts have not yet been worked out in the various disciplines that we are working with, so we have produced rough approximations. In order to help, we have also extended the table by producing intermediary concepts that will bridge between the meta-levels, because there are times that a term can be the *summary* of an effect, as well as times that a term can be a *characteristic that leads* to an effect. So, in the second table we have created intermediate lines that have ‘HAVE/GIVE’ relationships¹⁰⁸⁹ between the meta-level markers. The intermediate concept at the lower level initiates movement into the next higher meta-level. This allows us to refine what is added in the jump between the meta-levels and makes our intention clearer as to what we are approximating as we develop the Design Field as a complete semantic matrix.

¹⁰⁸⁹ If a meta-level HAS a certain additional characteristic then it GIVES the next emergent meta-level.

Process²	interspace	Hyper³	interspace	Wild⁴	interspace	Ultra⁵	
ABSENCE	destroy, destruct	ERASURE, EXPUNGE	dehiscence	DEFECTS, FAULT	contamination, taint	FLAWS	Negatory
REGISTER	iteration	MATRIX	recursion	ATTENUATION	derivative	NUANCE, delta	Zerorth
SPECTRA (structure) range	distinction	QUALIA (stuff)	modulation	REFINEMENTS	sublimate	SUBTLETIES	First
CATEGORY	natural transformation	KIND (ESSENCE, SPECIES)	modification	INFLECTION	perturbation	AFFINITY	Second
MANIFOLD	homeomorphism	TOPOLOGY	plasticity	MALLEABLE	resilience	MUTABLE	Third
LATTICE	reuse	SYNERGY	cohesion	ENSEMBLE	coherence	SIMULTANEITY	Fourth
HOLARCHY	balance	INTEGRITY	complementary	SYMBIOSIS	confluence	UNION, marriage	Fifth
CONSTELLATION	commutation	POISE	association	REFLECTIONS	division	FUSIONS	Sixth
HETERARCHIES	Anti-commutative, antisymmetric	INDEPENDENCES, orthogonal	non-association	INPENETRABLE, obscurity, inscrutable	indivisible, uncutable	SINGULARITIES	Seventh

being⁰	interspace	Pure¹	interspace	
LACUNAE (HOLE)	limit, sanction	PRIVATION	deletion, excision	Negatory
SPOT	distinction	PLACE	demarcation	Zeroth
INDIVIDUAL	differentiation	PROPERTY	variation	First
ELEMENT	arrow	MAP	functor	Second
ARRAY	arrangement	CONTINUITY	extent	Third
COMPONENT (part)	connection	INTERDEPENDENCE	Summation (min, max)	Fourth
HOLON (moment)	position	ALIGNMENT	tensegrity	Fifth
NEXUS	conjunction	CORRELATE	juxtaposition	Sixth
SINGULAR	disjunction	DISCONNECTS	separation	Seventh

Table 13.2. Large Expanded Design Field Table.

Second
AFFINITY
perturbation
INFLECTION
modification
KIND (ESSENCE, SPECIES)
natural transformation
CATEGORY ¹⁰⁹⁰
functor ¹⁰⁹¹
MAP
arrow
ELEMENT

In the representation of the meta-levels of Secondness we see that the various transformations of the arrows at the various meta-levels appear more naturally in terms of the intermediary characteristics. Category Theory drops the elements and concentrates on the Relations. If an Element has an *arrow* then it gives a Map. If a Map has a *functor* then it gives a Category. If a Category has a *natural transformation* then it gives a Kind, or species. If a Kind has a *modification* then it gives an Inflection, and if an Inflection has a *perturbation* then it gives an Affinity. We have created the terms Inflection and Affinity to try and capture what modifications and perturbations give as results as we move to the next higher emergent level. These words are not perfect for the expression of the concept, but are the best approximations that could be found. The goal is to remain in the Philosophical Category of Second, and express the result of higher level modifications and perturbations. Category Theory defines the Maps and Categories but does not really define the higher level results that we call *Kinds*, *Inflections*, and *Affinities*. However, we are keeping in mind the examples of Species, Gender, and Persona. Species are Kinds, Gender is an Inflection of a Species, and Personalities are Affinities, which are less different than the inflections of the species. This extension of Category Theory gives us a vocabulary for discussing the emergent levels of Secondness (in Category Theory), which is very useful. It is useful because Designs are full of relationships of different types. Much of the essence of a design is contained in the various types of relationships that are represented. But one weakness of our Design Theory is that we do not really understand higher order relationships and how to differentiate them within our designs. Higher order relationships that exist at higher meta-levels are essentially different from lower order relationships. For the most part we use lower order relationships and note the arbitrary differences between them while failing to understand higher order relationships that may exist between the

¹⁰⁹⁰ [http://en.wikipedia.org/wiki/Category_\(mathematics\)](http://en.wikipedia.org/wiki/Category_(mathematics)) accessed 081214

¹⁰⁹¹ <http://en.wikipedia.org/wiki/Functor> accessed 081214

lower relationships that we specify, although, occasionally we are forced to look at higher order relationships when we do a domain analysis for *reuse across a product line*. Having a vocabulary for expressing these higher order relationships and knowing that we can use Mathematical Category Theory to express them, considerably deepens our Design Theory. Understanding the Design Field is essential to understanding the nature of design more deeply.

Up to this point, this chapter has been mainly focused on the relationships that are encountered and/or created in the design process. But designs are not all about relationships, designs are also about the ideas and concepts involved in taking the Design Object into its actualized state as the Object of Design. Here we find that mathematics and philosophy fail us because a mathematics of concepts, as Firsts¹⁰⁹², does not exist in the same way that a mathematics of relationships exist. However, there are some hints¹⁰⁹³ as to how to understand the nature of the meta-levels of Firsts and we need to follow out those hints in order to approximate a vocabulary for expressing the meta-levels of the Firsts.

First
SUBTLETIES
sublimate
REFINEMENTS
modulation
QUALIA (stuff)
distinction
SPECTRA (structure) range
variation
PROPERTY
differentiation
INDIVIDUAL

If we move to Firsts, we note that there has been a lack of focus in establishing the identity of the meta-levels of entities. In this case the *Zeroth* level is the *individual* instead of the *element*, because individuals are what exist. It has been suggested that the *meta-level* of the individual is its *properties*¹⁰⁹⁴. Note that in Category Theory the *element* is forgotten and turned into *nodes* in the associative diagram, whereas with the *individual*, the element is what is being interrogated. Properties are interesting because they are Mass-like rather than

¹⁰⁹² Mathematics deals with relations between mathematical elements not the elements themselves, which exist as undefined individuals for the most part.
¹⁰⁹³ Westerhoff, Jan. *Ontological Categories: Their Nature and Significance*. (Oxford, UK: Oxford University Press, 2005).
¹⁰⁹⁴ This is not very well attested in the tradition, but it makes sense of a great deal of the literature on forms and properties in the philosophical tradition. We can point to the work of John Baez on Cohomology and N-Category Theory as a basis for what we are proposing here. See Baez, John. "Lectures On N-Categories And Cohomology" Notes by Shulman, M. <http://math.ucr.edu/home/baez/cohomology.pdf/> accessed 091106; Also see Westerhoff, Jan. *Ontological Categories* Op. cit.

Set-like, although this Mass-like nature of the properties causes difficulty because philosophy generally tries to maintain its Set orientation. When we look at the difference between individuals in terms of properties, we find that a given Property has a Spectra (or a range) that appears among all the Individuals. For instance, one example of a standard Property is color. When we look at a cross-section of Individuals in terms of Property, then we see all the various colors in the spectrum. There will be a Spectra for any Property that we are looking at. The Spectra expresses the *variation* of the Property as it appears when we look across Individuals. When we go up to the third meta-level with respect to the Spectra, then we find that there are *various types* of Properties that may be specified and we call these Qualia. Traditionally, Qualia have been divided into primary and secondary qualities, with the primary qualities being those studied by Science, such as mass, velocity, hardness, etc. Secondary qualities are those that do not figure prominently in physical scientific descriptions. There are many different kinds of primary physical properties and the discontinuous differences that we *distinguish* between those properties appear at the third meta-level. When we move to the fourth meta-level, there is a Refinement of our appreciation for the qualities, while the fifth meta-level may be described in terms of Subtleties. For example, color has hue, but beyond hue there is also saturation. So the meta-levels higher than three have to do with the internal adumbration of the Qualia rather than the introduction of radical differences beyond the types of Qualia. The range of values within the Spectra has *distinctions* that allow us to identify Qualia, which are the different types of Spectra that are given.

John Baez talks about these meta-levels in his lectures¹⁰⁹⁵ on Cohomology¹⁰⁹⁶ and N-Category Theory¹⁰⁹⁷. In those lectures he proposes that there are three levels of the individual, which are *properties*, *structure*, and *stuff*, and *what exists above* that he calls *eka-stuff* and *eka²-stuff*¹⁰⁹⁸. This shows that the higher meta-levels of Firsts have not been named as yet. Individuals that were the elements that have been dropped in Category Theory have their own meta-level properties, but there are *ranges* of the *values* of the *properties* that we will call Spectra and it must be noted that Spectra have *structure*. Then, at the next level there is the *differentiation* of the *types* of *possible ranges* and this

¹⁰⁹⁵ Baez, John. "Lectures On N-Categories and Cohomology" Notes by Shulman, M. <http://math.ucr.edu/home/baez/cohomology.pdf> accessed 081226

¹⁰⁹⁶ <http://en.wikipedia.org/wiki/Cohomology> accessed 081231

¹⁰⁹⁷ Cheng, Eugenia and Lauda, Aaron. [Higher-Dimensional Categories: An Illustrated Guide Book](#). Draft Version, Prepared For Ima Workshop, Revised afterwards: August 2004, 182 pages. See also Cornfield, David. "N-category Theory as a Catalyst for Change in Philosophy", IMA, University of Minnesota, Friday 11 June 2004. <http://www.ima.umn.edu/talks/workshops/SP6.7-18.04/cornfield/cornfield.pdf> accessed 082426

¹⁰⁹⁸ Note Baez, J. "Lectures On N-Categories and Cohomology", p. 15 Section 2.4.

differentiates the *stuff* of different kinds, which we will refer to as the Qualia. It is the Qualia that are needed for the Category Theory to differentiate the *kinds of categories* and this is what is needed for us to specify *essences*, which are the *constraints on attributes* through which the things can express their Qualia. We see that *essence* ties *kind* to Qualia by constraining the attributes that express the Qualia in the individual. We will venture to go further in our explanation and go on to designate *eka-stuff* as Refinements and *eka²-stuff* as Subtleties.

We will begin our development of the meta-levels related to the First Philosophical Category by defining the transitional (or interstitial) elements as well as the meta-levels. The Individual has *differentiation*, which allows us to distinguish Properties. Properties have *variation* that allow us to identify their Spectra, which has its own *structure*. Qualia has *modulation* that gives Refinements, such as the way hue influences the ‘Qualia of color’. Refinements are *sublimated* to give Subtleties such as the ‘subtlety of color’ saturation. We have names for the Refinements and Subtleties of color but most Qualia do not have specific names for these higher meta-levels of differentiation within the individual qualities.

It is interesting that Secondness moves *outward from the element* while Firstness moves *into the individual* to explore the realm of properties, their ranges, and qualitative types. In other words, we see that when the individual is considered as a Form, its higher meta-levels have content that are contemplated schematically as patterns of contents. Actually, individuals can be at any schematic level and do not have to refer to forms. However, due to our tradition, we tend to think of individuals as forms. And we notice that the *kind* of the form is specified at the level of Hyper Being and that the *content* of the form (as its various interpenetrated Qualia) are also seen at that same meta-level. Qualia are fitted to the *kind* via the *essence*, which constrains the attributes of the form. Essence can then be thought of as a trace that exists between the Qualia and the Kind, i.e., between the First and Second. In addition, we notice that this essence, as a constraint on the Qualia of the attributes within the ‘essence of the kind,’ appears as a *trace* between the two Philosophical Categories and *not* as a *differentiation* of the categories in relation to the meta-levels. This *constraint* (or *essence*) appears at the level of Hyper Being, which connects significantly to the theory of the Quadralectic.

In terms of design we need to specify the individuals and know what the general structures of the elements are. From Object-oriented Design¹⁰⁹⁹ we know that an important part of any object is its data type, although it is important to understand that we are particularly interested in the *types of objects* because *the type is the meta-level of the object*. Variables within an object can have different ranges of values depending on their type. And when we distinguish the ranges we are really distinguishing the attributes of the object. The object itself is defined by the various types of attributes that it contains and these determine its kind. But we can further differentiate the object based on the *inheritance scheme* that we have constructed so that we may add and subtract attributes from the object. When we define the inheritance hierarchy we are determining the kind of object. Wisse suggested that rather than assigning *arbitrary* category schemes as a basis of inheritance, we should *assign inheritance that is based on how behavior changes in different contexts*. Notice that the category is *one down* from the *kind* at the level of Second. So, one way to think about the relationship between objects and inheritance is to think about the *link* between First and Second where Data Types (properties with spectra) become the Qualia of attributes that are constrained as *kinds within categories*. The categories are *mapped elements* that are used to differentiate kinds within an inheritance hierarchy. The kinds organize the attributes' qualities, which, in turn, controls the data types and their spectra. Notice that it is an inverted U that moves from First to Second.

This makes us wonder what the non-inverted 'U' might be between the First and Second. There are Subtleties and Refinements to Qualia, which then relate to Inflections and Affinities. This connects the higher meta-levels of Firsts and Seconds. It reminds us that there is an alternative to Object-oriented Design in Software and Systems Engineering that is called Aspect-oriented Programming. Aspect-oriented Programming¹¹⁰⁰ seeks to separate out some aspect that would be scattered across the System if we followed a purely Object-oriented approach. We can think of Aspect-oriented Programming as dealing with the Subtleties and Refinements in relation to the Inflections and Affinities by centralizing their expression within the System. For example, there is also Service-oriented Programming (or system safety, or error handling), which needs to cut across the normal programming lines of objects. If we start out from these Subtle Affinities and build ways of working with Refined Inflections, i.e., if we organize from the top down rather than from the bottom up, then we could impose a completely different kind of organization on

¹⁰⁹⁹ Gunter, Carl A., and John C. Mitchell. Theoretical Aspects of Object-Oriented Programming: Types, Semantics, and Language Design. Foundations of Computing (Cambridge, Mass: MIT Press, 1994).

¹¹⁰⁰ Filman, Robert E. Aspect-Oriented Software Development. (Harlow: Addison-Wesley, 2005).

the System, which would centralize what is marginal, and marginalize what is central. The development of programming techniques shows us that both ways of organizing the System need to be considered together rather than just having an object centric view. The system becomes more like a hologram¹¹⁰¹ when both of these types of techniques are applied together. In other words, the objects with inheritance tend to fragment the System Design process, so it is necessary to have other views where things that are marginal in Object-oriented Design to become centralized so that they may be treated together systematically. The important thing that we learn from this is that it is necessary to consider the relationship of Firsts and Seconds to each other, and that *working down* from the higher meta-levels is just as significant as the *view* from the lower meta-levels. Object-orientation needs the complement of Aspect-oriented Programming in order to produce efficient designs. We can explain this difference by recognizing that when the higher meta-levels work together between Philosophical Categories, we can attain a completely different view than that of lower meta-levels working together as happens when Object-oriented Design is applied without taking these significant relationships into consideration.

Third
MUTABLE
resilience
MALLEABLE
plasticity
TOPOLOGY
homeomorphism
MANIFOLD ¹¹⁰²
extent
CONTINUITY
arrangement
ARRAY

We can most easily extend this argument to the Third Philosophical Category. This category has to do with Continuity. Continuity is a characteristic of the arrayed field of elements. The next level up from Continuity is the Manifold, where multiple continuities are related to each other. Kant uses the term manifold for the ‘generalized thing’¹¹⁰³. From

¹¹⁰¹ Hariharan, P. Basics of Holography. (Cambridge, UK: Cambridge University Press, 2002). See also Draaisma, D. Metaphors of Memory: A History of Ideas About the Mind. (Cambridge, U.K.: Cambridge University Press, 2000). p. 167 Chapter 7. See also Johnston, Sean. Holographic Visions: A History of New Science. (Oxford: Oxford University Press, 2006).

¹¹⁰² <http://en.wikipedia.org/wiki/Manifold> accessed 081231.

¹¹⁰³ “Manifold: [*Mannigfaltige*] The field of as-yet-unsynthesised presentations. Thus, the 'manifold of intuition' is a notion that looks a little like the idea of 'sense data'. Also, Kant sometimes speaks of a manifold of concepts or thoughts.” See Burnham, D. Kant Glossary, 2004, version 1.93 http://www.staffs.ac.uk/schools/humanities_and_soc_sciences/philosophy/.resource/modules/Level%20Two/HS689-2/glossary.htm accessed 081226

mathematics we know that the study of manifolds comes under the rubric of topology¹¹⁰⁴. There are many different kinds of topologies, as well as a set number of topologies for a given dimension, *except* for the fourth dimension, which has an uncountable number of possible fake topologies. In other words, topologies are not fundamental to the fourth dimension like they are for other dimensions. With regard to continuity, the greatest possible difference between topologies appears at the third meta-level. Beyond the third meta-level, the degrees of freedom are successively reduced. Meta-level four could be described as *plasticity*, and meta-level five could be described as *resilient*. *Plasticity* recalls the means through which one topology becomes another. *Resilience* has to do with how these transformations can take place.

The examples of the Third are really Geometry¹¹⁰⁵ and Topology¹¹⁰⁶. Thus, the parallels that J. Baez draws between Cohomology Theory¹¹⁰⁷ and N-Category Theory¹¹⁰⁸ are of interest here. But our contribution is to try to give names to the intervening steps by which we traverse the meta-levels. We begin with an Array of elements. When they form an *arrangement*, we then achieve Continuity. When we take different continuities (such as continuities in different dimensions) and connect their various *extents*, we have a Manifold. When Manifolds have *homeomorphisms*, we are given Topologies. When Topologies have *plasticity*, then they give us Malleability, and when the Malleability is *resilient*, it becomes Mutable. When we are speaking of Malleability here, we are thinking in terms of Morse Theory¹¹⁰⁹ and the way that different topological forms may transform across space or time. In relation to Mutability we are thinking about Ricci Flow¹¹¹⁰ where the intensity within ‘topologically malleable topological structures’ flows in a way that *mutates* one topological structure into another. Mutability is *changeable*. Resilience is the *ability* to change. Malleability is the property inherited by the plasticity of the topological

¹¹⁰⁴ Lee, John M. [Introduction to Topological Manifolds](#). Graduate Texts in Mathematics, 202. (New York: Springer, 2000).

¹¹⁰⁵ Flegg, Graham. [From Geometry to Topology](#). (Mineola, N.Y.: Dover Publications, 2001). See also Mendelson, Bert. [Introduction to Topology](#). (New York: Dover Publications, 1990).

¹¹⁰⁶ See also Homology theory http://en.wikipedia.org/wiki/Homological_algebra accessed 081231.

¹¹⁰⁷ <http://en.wikipedia.org/wiki/Cohomology> accessed 081231. See Kōno, Akira, and Dai Tamaki. [Generalized cohomology](#). Translations of Mathematical Monographs, v. 230. (Providence, R.I.: American Mathematical Society, 2006).

¹¹⁰⁸ Leinster, Tom. [Higher Operads, Higher Categories](#). London Mathematical Society Lecture Note Series, 298. (Cambridge: Cambridge University Press, 2003).

¹¹⁰⁹ http://en.wikipedia.org/wiki/Morse_theory accessed 081231. See Matsumoto, Y. [An Introduction to Morse Theory](#). Translations of Mathematical Monographs, v. 208. (Providence, R.I.: American Mathematical Society, 2002).

¹¹¹⁰ http://en.wikipedia.org/wiki/Ricci_flow accessed 081231. See Morgan, John W., and G. Tian. [Ricci Flow and the Poincaré Conjecture](#). Clay Mathematics Monographs, v. 3. (Providence, RI: American Mathematical Society, 2007). See also Chow, Bennett, and Dan Knopf. [The Ricci Flow: An Introduction](#). (Providence, R.I.: American Mathematical Society, 2004).

structures. Normally we go from one topological structure to another via Surgery¹¹¹¹. If we do surgery, we need to cut and glue the surfaces together again in a different way, but this assumes that the surface itself has the plasticity necessary to express its malleability. It is the different malleabilities of topological surfaces that make their surgery possible and this allows us to discover new topologies. If the surfaces were not pliant and ductile in *our imaginations*, then we could not transform them to discover new topologies. The surfaces that we deform have a certain tension within them, which we must allow to propagate within that surface because it is through that relaxation of the surface tension that it is possible to discover the resilience that the surface has.

Notice that the main thing that must be added to get the Third of Topology from the Second of Kind is dimensionality¹¹¹². We assume that there are dimensionalities that allow continuities to extend and produce the various topologies that are associated with the various dimensional spaces. What is necessary for perspective is also necessary for dimensionality. Thus, we can consider how Perspective might be a way of relating Kinds to Topologies. Topologies constrain the ways that we are able to move in spaces in the same manner that essences constrain Kinds. Topologies constrain the way that elements can be arrayed in the spaces that we view from any given perspective. Perspective is always something that encompasses an object whose image is seen from a standpoint that is positioned to view that image's vanishing point, which is the intentional target that is beyond the object image. We are embodied beings that topology determines and constrains from all possible points of view directed at ourselves and/or at other objects. Topology also constrains our access to other objects that are part of our continuous environment. Yet, if we are to differentiate ourselves from the objects, then they must be different from us and distinctly bounded. Thus, our experience is full of continuities and discontinuities of various kinds.

¹¹¹¹ http://en.wikipedia.org/wiki/Surgery_theory accessed 081231. See also Wall, C. T. C., and Andrew Ranicki. *Surgery on Compact Manifolds*. (Providence, R.I.: American Mathematical Society, 1999). See also Kreck, Matthias. "Surgery and duality" http://www.emis.de/journals/Annals/149_3/kreck.pdf accessed 091106.

¹¹¹² <http://en.wikipedia.org/wiki/Dimension> accessed 081231. See also Nagami, Keiō. *Dimension Theory*. (New York: Academic Press, 1970).

Zeroth
NUANCE, delta
derivative, integration
ATTENUATION, augmentation
recursion
MATRIX
iteration
REGISTER, byte, word
demarcation
PLACE
distinction
SPOT

By extending the analogy of the N-category Theory and by using our knowledge of the nature of the meta-levels of Being, we can better understand the meta-levels of the categories as posited by Peirce and the trans-Peircean extensions of those first three Philosophical Categories. However, after that, everything becomes much more difficult as we attempt to hypothesize the nature of the first few levels of the other trans-Peircean Philosophical Categories. The easiest of these is the Zeroth category because it is the dual of the First. While the First begins with the individual, the Zeroth category must begin with a Spot. The relationship between the Spots can be seen in terms of Places, and the relationship between the Places can be described as a Register. We know that the third meta-level is the Matrix, which is a Cartesian cross¹¹¹³ of registers. As a result, the next higher level is a characterization of the meta-levels in terms of Emptiness and Void. We will describe this as ‘articulations of the Zeroth’ within the context of the Matrix. Void is the Zeroth that surrounds, and Emptiness is the Zeroth that is surrounded. This can be thought of in terms of even and odd zeroness. There is some controversy in mathematics as to whether zero is even or odd¹¹¹⁴. Emptiness is even and Void is odd. Void is *prior* to the appearance of One while Emptiness is *after* the appearance of Multiplicity (some member of which can be missing). Various types of zeroth non-phenomena are articulated by their context as Attenuations. This type of articulation has to do with indirection, i.e., pointing to the context in order to fill in the quality of the Attenuation. Both Emptiness and Void are

¹¹¹³ http://en.wikipedia.org/wiki/Cartesian_product accessed 081226.

¹¹¹⁴ “Zero in Four Dimensions: Historical, Psychological, Cultural, and Logical Perspectives.” Arsham, Hossein. University of Baltimore, Baltimore, Maryland, 21201, USA [harsham at ubmail period ubalt.edu](mailto:harsham@ubmail.period.ubalt.edu) <http://www.pantaneto.co.uk/issue5/arsham.htm> accessed 081226 Note: Odd zero occurs when zero comes before one. Even zero occurs when zero comes after the multiplicity arises from the one. Zero is even when considered in relation to the integers as its place in the number line is related to the even numbers. But zero prior to the arising of one, which falls prior to the Pascal Triangle’s articulation, must be thought odd because it has no double but is unique. One, and negative one, are doubles that cancel, and Odd zero is prior to that arising and cancellation. See also <http://www.newton.dep.anl.gov/askasci/math99/math99196.htm> accessed 081226 See also the difference between ‘nothing’ and ‘zero’ in Martinez, Alberto A. Negative Math: How Mathematical Rules Can Be Positively Bent (Princeton, NJ: Princeton UP, 2006). pp. 112-115.

nondual in as much as they cannot be articulated because nothing is there to build upon to create a representation, but by looking at the context, we can articulate what has been attenuated. Beyond that, we will call the highest meta-level of the Zeroth category a Nuance, because, at that point the attenuations become very subtle.

The Zeroth category makes more sense when we relate it to the interstices that are the characteristics that carry us from one meta-level to another. Given a Spot, we make *distinctions*, which give us Places. Once we have Places, we can form them into Registers by making a series of *demarcations*. Once we have Registers, which are arrayed places for situating things, then we can use *iteration*¹¹¹⁵ to produce Matrices from their various dimensionalities. Pascal's Triangle specifies the minimal arrangement of the information infrastructure. The Cartesian crosses of various dimensionalities specify the matrix within which the variables that hold those Registers are arranged and accessed. The next higher intensity of *iteration* is *recursion*¹¹¹⁶, which we notice is a reentry into itself rather than into another countable. Recursions bestow a higher level on the matrix, which we call attenuations. We assume that *recursions* will be finite if they are to have a result, and the result of the *recursion* is normally some sort of Attenuation, or Augmentation of the data that was recursed upon. For instance, the sieve of Eratosthenes¹¹¹⁷ drops 'non primes' in its recursion. When Attenuations have *derivatives*¹¹¹⁸ then we get Nuances. Derivatives appear in calculus¹¹¹⁹. The Nuance is the 'delta.' Taking the function to its limit (with ever smaller deltas) produces the tangent to the curve, which is a discrete result. There is Attenuation as we take the function to its limit, and that produces the derivative based on the Nuance. In Calculus, the dual of the derivative is integration¹¹²⁰. One finds the *tangent of the curve* and the other finds the *area under the curve*. Both use the measure of the movement toward the limit of infinity as the power that is needed to produce a determinate number out of an infinity. It is interesting in this regard that infinitesimals are banished from normal analysis and only included in discussion in non-standard analysis¹¹²¹. This shows that the Nuances are separated out in higher mathematics. What we can see by these analogies is that Mathematics and Computational Theory combine to give us a treatment of the Zeroth Category when we consider its meta-levels.

¹¹¹⁵ <http://en.wikipedia.org/wiki/Iteration> accessed 081214

¹¹¹⁶ <http://en.wikipedia.org/wiki/Recursion> accessed 081214

¹¹¹⁷ http://en.wikipedia.org/wiki/Sieve_of_Eratosthenes accessed 081214

¹¹¹⁸ <http://en.wikipedia.org/wiki/Derivative> accessed 081214

¹¹¹⁹ <http://en.wikipedia.org/wiki/Calculus> accessed 081214

¹¹²⁰ <http://en.wikipedia.org/wiki/Integral> accessed 081214

¹¹²¹ http://en.wikipedia.org/wiki/Nonstandard_analysis accessed 081214

But we must also consider that the Concept can be defined as a relationship between the Matrix and the Qualia. And we have noted that the Ennead, as an Axiomatic Platform, has the structure of a ‘matrix of related elements’. And we noted that M. Schlick wanted to separate the self-referring concepts from the percepts. Concepts refer to things in experience, which are represented as ‘percepts of Qualia’ that we can distinguish as different kinds of things within the topology of our experience. It is the matrix in the Zeroth Category that makes the possibility of self-referring possible, because, without the places in the Matrix, the concepts could not be distinguished. Concepts within the Matrix can be distinguished even though they are not filled by Qualia through percepts. But normally, concepts are related to percepts and, in fact, it is the emptiness of the Zeroth that allows the concept to *encompass* things as well as to *range over* experience in order to connect names and exemplifications. Thus, we can see that concepts are usually in the interface between Qualia and Matrices. But if we want to construct an Axiomatic Platform, then the minimal structure that makes that possible is the Enneadic Axiomatic Platform in which the empty concepts are merely self-referring through the various levels of mediation, and they are marked by their signature from the information infrastructure.

Neganary
FLAWS
contamination, taint
DEFECTS, fault
dehiscence
ERASURE, EXPUNGE
destroy, destruct
ABSENCE
deletion, excision
PRIVATION
limit, sanction
LACUNAE (HOLE)

We will now provide an exemplification of the above chart related to the meta-levels of the Neganary in relation to the Zeroth and First. Closely related to the Zeroth Philosophical Category is the Neganary, which is the *negative* or ‘anti-First’ Philosophical Category. The element of the Neganary is not the individual but the Lacunae, or Hole, which is the negation of the individual. This category gives rise to the meta-levels of non-existence¹¹²². In this case the relationships between Lacunae are Privations, and the Privations become Absences when they are related to each other. There are different kinds of Absences and *the intensification of an absence* is an Erasure. A Zeroth at the Fourth meta-level is an Attenuation, and a First at the Fourth meta-level is a Refinement. If something is missing,

¹¹²² See [Nondual Science](http://holonomic.net) by the author at <http://holonomic.net>

you can articulate what is missing (or attenuated). If something is present, you can refine it. *But, Erasures are bits of oblivion or forgetfulness.* We can only consider them Defects, which indicates that the highest meta-level of the Neganary must be Flaws.

This process begins with the Lacunae, which imposes a *limit* or sanction upon itself. This limit, or sanction, moves us to the level of a Privation. When there is a *deletion* or excision of a Privation, then there is an Absence. When there is the *destroying*, or destruction of an Absence, then we have an Erasure. When we have a *dehiscence* of an Erasure then we are given a Defect, or fault. If there is a *contamination*, or taint to a Defect, then we have a Flaw. In other words, we can climb deeper and deeper into the Neganary by transitioning from one Meta-level to the next via some interstitial medium. In general, when there is an Erasure, then there is either forgetfulness or oblivion. Erasure has to obliterate the Qualia within the Matrix for this oblivion to occur. If the Erasure is incomplete and a trace is left, then we have forgetfulness instead. Because concepts are merely traces, it is easy to lose them through Erasure. In fact, the selective Erasure of our short term memory is very important. We would not be able to function without a fresh memory pad for new thoughts and percepts to be experienced and stored. The relationship between the Matrix and the Erasure is the nameless housekeeping of the unconscious.

Fourth
SIMULTANIETY, coincidence
coherence
ENSEMBLE
cohesion
SYNERGY
reuse
LATTICE ¹¹²³
Summation (min, max)
INTER-DEPENDENCE
connection
COMPONENT (part)

If we go in the other direction, which would be *forward* from the Third to the Fourth, and apply the categorical interpretations of B. Fuller¹¹²⁴, we know that the first meta-level is Interdependence, which is the reuse of parts as we see in higher dimensional Platonic polyhedra. The second meta-level is the Lattice where parts hang together in a ‘fitting fashion’, which is the basic structure of the minimal solid derived from the Pascal

¹¹²³ [http://en.wikipedia.org/wiki/Lattice_\(order\)](http://en.wikipedia.org/wiki/Lattice_(order)) accessed 081231.
¹¹²⁴ Fuller, B. *Synergetics*. Op. cit.

Triangle. The third meta-level would be Synergy. Beyond Synergy there is Ensemble. The fifth meta-level of Synergy is Simultaneity, or coincidence.

To further explicate the meta-levels of the Fourth Philosophical Category we can propose starting with a Component that has a *connection* because then we are given the possibility of Interdependence. If we have Inter-Dependence and there is *summation* with minimum and maximum combinations, then there is a Lattice. If, within that Lattice there is a *reuse* of parts to make different wholes, then there is Synergy such as we see in higher dimensional Platonic polytopes. For example, the pentahedron contains five tetrahedrons made out of five points and ten lines and ten triangles. If we have Synergy with *cohesion*, then we get an Ensemble, and if we have an Ensemble with *coherence*, then we are given Simultaneity in time that coincides in space. An Ensemble is like the various minimal solids (or simplex polytopes) in various dimensions. For instance, in the third dimension the Euler characteristic is two, but in the fourth dimension the Euler characteristic is zero¹¹²⁵. This shows that there is a coordination of the Platonic polytopes across a dimension as an Ensemble. In a dimension, Platonic solids, or polytopes, can produce many different Lattices and these Lattices interleave¹¹²⁶. Thus, we can see that there is a deep *coherence* to the minimal solids that informs their structure.

Between Topology and Synergy there is a relationship of constraint that we call Design. Design takes advantage of Synergies under the constraint of Topology. Synergy means that things are working together. They are working together within the constraints of the possible topologies within spacetime. We often express designs in even higher dimensional configurations, which can be represented by configurations of Synergies within spacetime. In this way we are able to create very complex systems whose elements are reused in many different ways for various purposes within the design. These synergetic configurations are also expressions of the emergent properties that are part of the design process.

¹¹²⁵ http://en.wikipedia.org/wiki/Euler_characteristic accessed 081214

¹¹²⁶ See the work of Russell Chu <http://www.verbchu.com/> accessed 081214

Fifth
UNION, meld, amalgamation, marriage
confluence
SYMBIOSIS
complementary
INTEGRITY, centeredness,
balance, cancellation of forces
HOLARCHY ¹¹²⁷
tensegrity ¹¹²⁸
ALIGNMENT
position
HOLON ¹¹²⁹ (moment)

From the Fourth we can go on to explore the Fifth, which we will characterize as *syzygy*. *Syzygy*¹¹³⁰ means Alignment. The nature of the Alignment is a Moment in *time* and a Holonomic configuration in *space*. It depends on one thing to take a *position* in relation to something else in the total context of interrelation. Alignment only occurs for a Moment. In order to have Alignments there must be various forces operating in different directions, which is a *tensegrity* that produces a Holarchy. Tensegrity implies centeredness or Integrity. When Integrity exists between different *complementary* things that are adapted to each other, we call it Symbiosis. The fifth meta-level is a *confluence* that produces a Union, which is an Amalgamation, or melding, like an ideal *marriage*¹¹³¹. A Holon is *positioned* to give an Alignment. The Alignment can be held in place by the *tensegrity* structure that produces a Holarchy. The Holarchy has an inherent balance of forces that gives Integrity. Integrity occurs when all the forces *always balance* and cancel to zero at the center of the *tensegrity* structure. This produces *complementarities* in the elements that are related to each other through the integra of the Holons. Integrities that have *complementarities* will produce a Symbiosis. When Symbiosis has *confluence*, then a Union, or amalgamation, or merger is produced such as we see in our ideal of marriage.

Between Synergy and Integrity there is a moment that goes beyond the Quadralectic to a higher moment, which we call **Insight**. In that moment the interface between the dual and the nondual is realized as a relation between the third and fourth dimension. We will add this moment to the Quadralectic to produce the Pentalectic.

¹¹²⁷ <http://en.wikipedia.org/wiki/Holarchy> accessed 081214

¹¹²⁸ <http://en.wikipedia.org/wiki/Tensegrity> accessed 081214

¹¹²⁹ [http://en.wikipedia.org/wiki/Holon_\(philosophy\)](http://en.wikipedia.org/wiki/Holon_(philosophy)) accessed 081214

¹¹³⁰ <http://en.wikipedia.org/wiki/Syzygy> accessed 081214

¹¹³¹ In the alchemical sense of 'sacred marriage' or *Mysterium Coniunctionis*, Cf. Jung, C. G. *Mysterium Coniunctionis: An Inquiry into the Separation and Synthesis of Psychic Opposites in Alchemy*. Bollingen Series, 20. (Princeton, N.J.: Princeton University Press, 1970).

Sixth		
FUSIONS	Sedenion r+fifteen imaginaries	Meta-system
Division lost		
REFLECTIONS	Octonion r+i+j+k+l+j+E	Reflexive Social Special System
Association lost		
POISE	Quaternion r + i + j + k	Autopoietic Symbiotic Special System
Commutation lost		
CONSTELLATION	Complexnion real + imaginary	Dissipative Ordering Special System
Juxtaposition (conjugate lost)		
CORRELATE	real + real	System
Conjunction		
NEXUS	real	Entity

Table 13.3. Comparison of the Meta-levels of the Sixth Category with the Special Systems and their Algebras

Next there is the Sixth Philosophical Category to consider. That principle can be characterized as the *holoidal* and defined as *interpenetration* and *intra-inclusion*¹¹³². The Hua Yen Buddhists¹¹³³ maintain that it is in the *differences* that *interpenetration* is seen. They give the example of a house. The different parts of the house all fit together in order to make it a *whole* house. Interpenetration suggests *fusion*, while intra-inclusion suggests that each thing is *embedded* in the other. Thus, from this point of view Existence is like a Hologram¹¹³⁴ where the information of the whole is in all the parts. Interpenetration and Intra-inclusion are duals of each other, the actual state of the holoidal¹¹³⁵ must be something *other* than these two dualities. We clearly do not have a vocabulary to talk about this type of state. That is why it is called Nondual¹¹³⁶. The actual state is interpenetration (fusion), as well as intra-inclusion (embeddedness). They are *both* and *neither* at the same time as posited by the Tetralemma¹¹³⁷. However, we have a model for that nondual state in the hypercomplex algebras where interpenetrated nexes are

¹¹³² Verdú, Alfonso. The Philosophy of Buddhism: A "Totalistic" Synthesis. (The Hague: M. Nijhoff, 1981). See also Verdú, Alfonso. Dialectical Aspects in Buddhist Thought: Studies in Sino-Japanese Mahāyāna Idealism. International Studies, East Asian Series Research Publication, no. 8. (Lawrence KS: Center for East Asian Studies, University of Kansas, 1974).

¹¹³³ Cleary, Thomas F. Entry into the Inconceivable: An Introduction to Hua-Yen Buddhism. (Honolulu: University of Hawaii Press, 1984).

¹¹³⁴ Smolin, Lee. Three Roads to Quantum Gravity. (New York, N.Y.: Basic Books, 2002). See also Susskind, Leonard, and James Lindesay. An Introduction to Black Holes, Information, and the String Theory Revolution The Holographic Universe. (Hackensack, NJ: World Scientific, 2005). See also Talbot, Michael. The Holographic Universe. (New York, NY: HarperCollins Publishers, 1991).

¹¹³⁵ Leonard, George Burr. The Silent Pulse: A Search for the Perfect Rhythm That Exists in Each of Us. (Layton, Utah: Gibbs Smith, 2006). p. 78.

¹¹³⁶ See Nondual Science by the author at <http://holonomic.net>

¹¹³⁷ Sutton, Florin Giripescu. Existence and Enlightenment in the Lañkāvatāra-Sūtra: A Study in the Ontology and Epistemology of the Yogācāra School of Mahāyāna Buddhism. SUNY Series in Buddhist Studies. (Albany: State University of New York Press, 1991) p. 29ff. See also Priest, Graham. Beyond the Limits of Thought. (Oxford: Clarendon Press, 2002). p. 263. See also Tachikawa, Musashi. An Introduction to the Philosophy of Nāgārjuna. (Delhi: Motilal Banarsidass Publishers, 1997). See also Horn, Laurence R. A Natural History of Negation. The David Hume Series. (Stanford, Calif: CSLI, 2001). p. 79.

conjoined with each other. The most sophisticated holoidal theories are those of the Hua Yen Buddhists¹¹³⁸. Fa Tsang¹¹³⁹ made the case that there are ten different ways or modes in which interpenetration can manifest itself. We can call these the *adamantine modes*¹¹⁴⁰ of interpenetration. They are compared to the fusion of a jewel or crystal¹¹⁴¹. Fa Tsang called them the ten mysteries¹¹⁴². In Buddhist theory these *adamantine modes* are all part of the Alayavijana¹¹⁴³ and within that storehouse there are the *traces (bija or seeds)* that are the basis of karmic transmission. We can think of the traces (*bija*) as hints or spores. This storehouse is where all the *adamantine modes* of interpenetration are intra-included in each other. The Hua Yen Buddhists refer to the reflections in the jewels as being the simile for the interpenetration that expresses these hints (or traces) of one thing within another, as in a hologram. Ultimately, there is inter-embeddedness *and* interpenetration that we envision as fusion.

We can express this in terms of the hierarchy of the Special Systems. There are Nexes that have *conjunctions*, which give us Correlates. When we *juxtapose* the Correlate conjunctions of Nexes with each other, then we get Constellations. When we lose *commutation* in Constellations, then we are given Poise. When there is a loss of *association* in relation to Poise, then we have Reflection. And when we lose the *division* property in relation to Reflections, then we have Fusion. This closely follows the structure

¹¹³⁸ Cook, Francis Harold. Hua-Yen Buddhism: The Jewel Net of Indra. (University Park: Pennsylvania State University Press, 1977).

¹¹³⁹ Chang, Garma C. C. The Buddhist Teaching of Totality: The Philosophy of Hwa Yen Buddhism. (University Park: Pennsylvania State Univ. Pr, 1971; Routledge 2008).

¹¹⁴⁰ We describe the jewels or crystals of the interpenetration as “adamantine”, which was the name for what was hardest of stones amongst the Greeks. <http://en.wikipedia.org/wiki/Adamant> accessed 081231.

¹¹⁴¹ http://en.wikipedia.org/wiki/Net_of_Indra accessed 081231. See also Cook, Francis Harold. Hua-Yen Buddhism: The Jewel Net of Indra. (University Park: Pennsylvania State University Press, 1977).

¹¹⁴² <http://www.shantideva.net/fatsang.htm> accessed 091106

Fa-Tsang 643-712 Third Patriarch of the Hua-yen Tradition

“The Ten Mysteries are:

1. Simultaneous completion and mutual correspondence . . .
2. Unimpeded freedom of all things in spatial inter-relatedness . . .
3. Mutual compatibility and difference between the one and the many . . .
4. Mutual identification and self-sufficiency of all factors of Existence . . .
5. Mutual complementarity of the hidden and the manifest . . .
8. One must rely on phenomena to reveal the principle . . .
9. Distinct Existence and mutual inclusion of separate factors of Existence in time . . .
10. Harmonious interchangeability of principle and phenomena . . .”

This part of this footnote was excised see hardcopy of dissertation for details.

¹¹⁴³ Storehouse consciousness See Waldron, William S. The Alayavijñāna in the Context of Indian Buddhist Thought the Yogacara Conception of an Unconscious (Thesis, Ph.D. -- University of Wisconsin, Madison, 1990). See also Brown, Brian Edward. The Buddha Nature: A Study of the Tathagatagarbha and Alayavijñāna. Buddhist Traditions, 11. (Delhi: Motilal Banarsidass Publishers, 1991).

of the Special Systems, which is aligned with the Hyper Complex Numbers¹¹⁴⁴. The entire ‘set of systems’, together with the Special Systems, give us a model of the Emergent Meta-system Cycle. That cycle is the structure through which material configurations cancel with each other to maintain the optima in Existence. Real numbers are their own conjugates. But Complex numbers have split conjugates. Thus, Correlates are merely real numbers *conjoined*. But they go through a ‘symmetry breaking’ to produce a complexnion¹¹⁴⁵ causing the conjugate to lose unification. In the next symmetry breaking the two constellations lose the *commutative* property to produce the Quaternion, which has the quality of Poise. By Poise we mean perfect and entropy-less cycling that allows things to remain stable in four-dimensional space. Then, if we take two quaternions and conjoin them they will go through a symmetry breaking to produce the octonion, which is the level of the Reflexive Social Special System containing Reflections. Finally, that goes through a symmetry breaking that loses the division property and ultimately produces Fusion.

Synergy leads to Integrity, which leads to Poise. This may seem counter intuitive but this actually is the progression. This is confirmed by Reiser and Umemoto in Atlas of Novel Tectonics¹¹⁴⁶. Poise suggests embodiment. It suggests one standing in the center of the Meta-system in tune with the environment. Poise is a dynamic off-centeredness that is in anticipation of the need to respond to the environment. It is like being ready with a Judo¹¹⁴⁷ move in relation to what is coming from the environment. But, if we accept Poise as the quality produced by Interpenetration, then we will be able to see that there is a relation between interpenetration and integrity, which is the cancellation of all forces around a mean. This is a moment beyond the Pentalectic. All we can do is call it **Realization**. This moment relates to the relationship of the 16 cell¹¹⁴⁸/8 cell¹¹⁴⁹ lattices and the 24 cell¹¹⁵⁰ lattice in four-dimensional space. This is the deepest synergy of higher dimensional spaces that appears uniquely in four-dimensional space and relates to laminar flow within the 24 cell.

¹¹⁴⁴ Fraenkel, Abraham Adolf. Extension of the Number-Concept: Groups and Fields, Rational, Real, Complex, Hypercomplex Numbers. Problems and Methods In Modern Mathematics, 2. (New York: Scripta Mathematica, Yeshiva University, 1964).

¹¹⁴⁵ Complexnion is a ‘complex number’, given this spelling to align with Quaternion, Octonion and Sedenion.

¹¹⁴⁶ Reiser, Jesse, and Nanako Umemoto. Atlas of Novel Tectonics. (New York: Princeton Architectural Press, 2006). p. 83.

¹¹⁴⁷ <http://en.wikipedia.org/wiki/Judo> accessed 081231. See also Yoffie, David B., and Mary Kwak. Judo Strategy: Turning Your Competitors' Strength to Your Advantage. (Boston, Mass: Harvard Business School Press, 2003).

¹¹⁴⁸ <http://en.wikipedia.org/wiki/16-cell> accessed 081231.

¹¹⁴⁹ <http://en.wikipedia.org/wiki/Tesseract> accessed 081231.

¹¹⁵⁰ <http://en.wikipedia.org/wiki/24-cell> accessed 081231.

Eventually we return to the Neganary, which is the *negative* or ‘anti-First’ Philosophical Category. Yet, we can also think of it as the Seventh Philosophical Category. The element of the Seventh is not the individual but the *singular individual*. This category, as we have said, gives rise to the meta-levels of non-existence. In this case, the relationships between Singulars are Disconnects, and the Disconnects become Heterarchies¹¹⁵¹ (or rhizomes¹¹⁵²) when they are related to each other. There are different kinds of Disconnects. They are absences of Qualia where both the matrix and what it contains are missing. They are Independences although we can only consider them Impenetrables, which become completely unrelated when they appear as Singularities.

	Neganary	Seventh
Ultra ⁵	flaws	singularities
Wild ⁴	defects	impenetrable
Hyper ³	erasure	independences
Process ²	absence	heterarchies
Pure ¹	privation	disconnects
being ⁰	lacunae (hole)	singular

Table 13.4. Comparison of the Meta-levels of the Neganary and Seventh Categories

When we say that the Neganary and the Seventh are the same, what we mean is that they are two ways of looking at what is beyond experience. Singularities express themselves as the Flaws that we encounter and they are inflicted upon our experience. The Impenetrability of the Singularity that appears as folds in the phase-space, or in the “control space” of Catastrophe Theory of Rene Thom¹¹⁵³, is impenetrable and we experience them as discontinuities, or Defects. The ‘invisible control space’ or phase-space of the Singularity is independent of the realm of experience, and the only way to portray that independence is by what J. Derrida calls “writing under Erasure”¹¹⁵⁴. There are myriad pointers to the warps in experience caused by the virtuality of the singularities and their effect on experience. This appears in experience as Heterarchies, or ‘rhizomes of differences’, which are spread out across the field or plateaus¹¹⁵⁵ of experience. The effects

¹¹⁵¹ <http://en.wikipedia.org/wiki/Heterarchy> accessed 081231.

¹¹⁵² <http://en.wikipedia.org/wiki/Rhizomes> accessed 081231. See Deleuze, Gilles, and Félix Guattari. *Anti-Oedipus: Capitalism and Schizophrenia*. (Minneapolis: University of Minnesota Press, 1983). See also Deleuze, Gilles, and Félix Guattari. *A Thousand Plateaus: Capitalism and Schizophrenia*. (Minneapolis: University of Minnesota Press, 1987).

¹¹⁵³ Thom, René. *Structural Stability and Morphogenesis; An Outline of a General Theory of Models*. Reading, (Mass: W.A. Benjamin, 1975). See also Woodcock, A. E. R., and Monte Davis. *Catastrophe Theory*. (New York: E.P. Dutton, 1978). Castrigiano, Domenico P. L., and Sandra A. Hayes. *Catastrophe Theory*. (Reading, Mass: Addison-Wesley Pub. Co., Advanced Book Program, 1993).

¹¹⁵⁴ Derrida, Jacques. *Of Grammatology*. Baltimore: Johns Hopkins University Press, 1998 p. ixiii ff Spivak’s introduction; p. 60ff Derrida’s text. ‘Under erasure’ in French is ‘sous rature’. But this goes back to Heidegger’s crossing out of ~~Being~~.

¹¹⁵⁵ Deleuze and Guattari use this word in *A Thousand Plateaus*, Op. cit.

on experience are felt as Absences that never appear as presences, and are thus *present everywhere* as well as *nowhere* as moods. Many times these effects appear as Disconnects in experience or as Privations. At the lowest level, the Neganary can appear as Lacunae, or Holes¹¹⁵⁶, in experience. Because they are spread out everywhere without appearing explicitly anywhere, we can think of them as part of the Singularity of spacetime, although ultimately, spacetime is a Void. Lacunae, or Holes, are empty spots within the material that is surrounded by the Void of spacetime. The difference between Emptiness and Void shows up here. The Void is the universal Singular, which contains the universe. Emptiness can be described as contained spots where there is nothing material within that universe. Thus, the Seventh and the Neganary begin as the difference between Emptiness and Void, but in the end, they transform into singularities that are related *and* virtual to actual experience. These singularities are expressed as flaws and defects within the range of experience. Ultimately, singularities are powerful because they are not only independent of experience, but they can affect experience and thus act as absences that can never be made present.

Notice that in contrast to the Neganary and the Seventh, the Sixth is a universal interpenetration in the form of the Special Systems and the Emergent Meta-system. Thus, the Sixth is a positive and monolithic view of Existence while the Neganary and Seventh are a negative and dualistic view of Existence. The actual nature of existence is nondual and therefore is something other than both of these images of Existence. On the other hand, the Zeroth is a positive view of spacetime. It can be visualized as a container and articulated in terms of the Nomos, which is understood via various forms of Mathesis. What we recognize is that the Neganary, Zeroth, Sixth, and Seventh are really visions of the *limits* of experience. In terms of the expression of these limits the Neganary and the Sevens are essentially the same, while the Zeroth and Sixth are essentially different. This means that out of these nine categories, two collapse into each other, and thus only eight can be maintained as separate. These eight Philosophical Categories become the basis for the Foundational Mathematical Categories, which are the articulation of the basis of the description of *order* that appears in Euclid's Elements, in the Definitions, Axioms, and Common Notions¹¹⁵⁷.

¹¹⁵⁶ Casati, Roberto and Varzi, Achille C. Holes and Other Superficialities (Cambridge, MA: MIT Press, 1994).

¹¹⁵⁷ Indications of the Foundational Mathematical Categories are found in the First part of Euclid's Elements.

This is an experimental elaboration of the Field of the Philosophical Categories as articulated at the various meta-levels of Being. It is experimental because this is probably the first time that the field has been articulated as a whole. Finding the appropriate term for each Philosophical Category at each meta-level is difficult. Making sure that the words express the essence of each level is also difficult. This attempt can be thought of as a rough approximation that can be refined in the future, although it adequately serves our purpose of presenting a Design Field that will function as an arena for describing and developing the emergent properties of the semiotic Design Object. The semiotic Design Object pictures, plans, and models the constructed Object of Design that will exhibit these emergent properties once it is implemented.

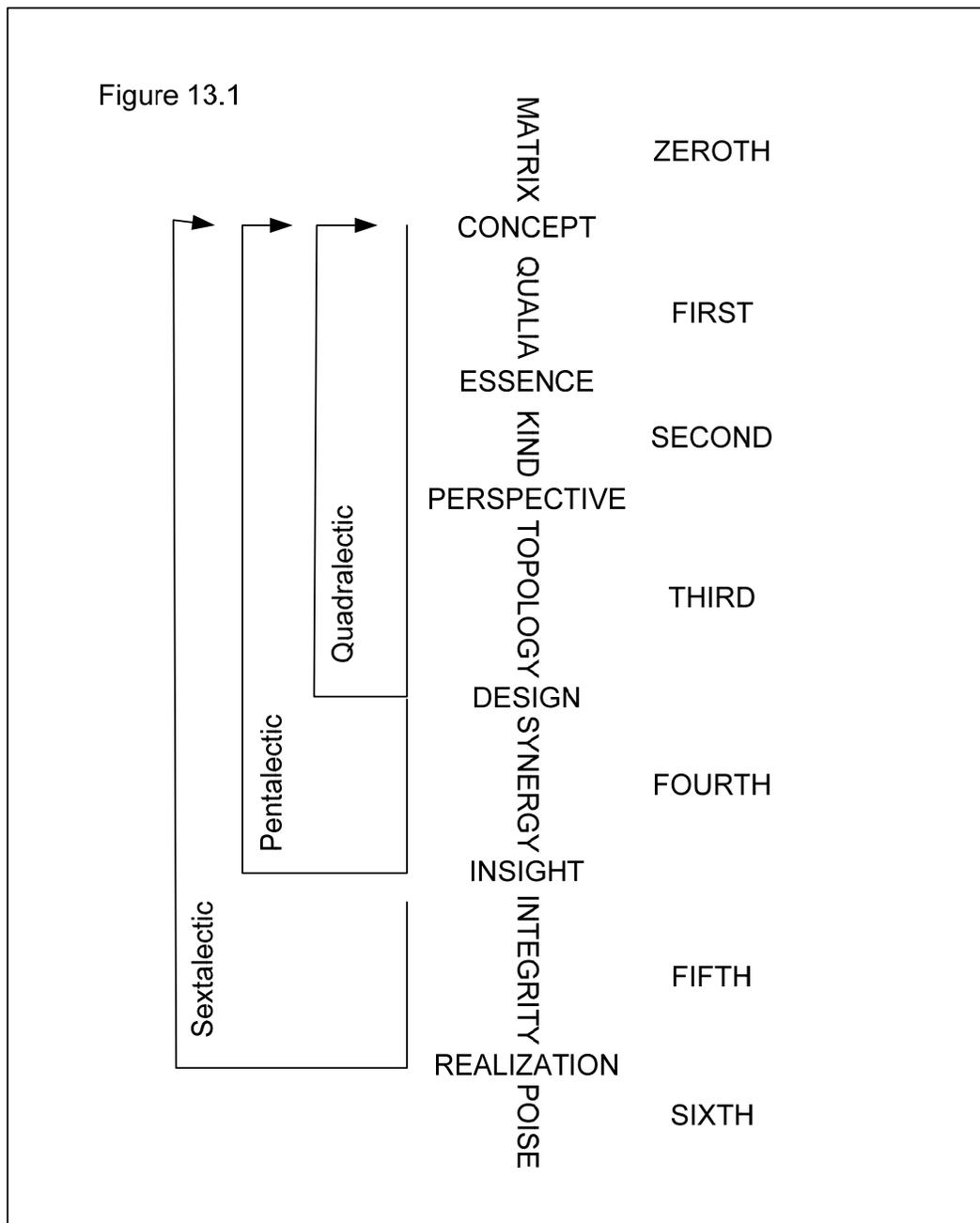


Figure 13.1. Relation between the Third Meta-level of the Design Field and the Moments of the Quadralectic.

Design Field

The previous discussion pertains to our theme because this is the field where Design operates. And we are particularly trying to express that the degrees of difference *within* the meta-levels *expand* to meta-level three, and then begin to *contract* at meta-levels four and five, and then *vanish* all together after meta-level five. This is similar to the points we have made in relation to the expansion and contraction of the hyperspheres in higher

dimensions, which we have also associated with the concept of the “Clearing” or “Open” of Heidegger¹¹⁵⁸. We are now talking about what appears within the clearing, which is an *interference* between the meta-levels of Being and the Philosophical Categories. Normally these are treated as two orthogonal but interleaved series. But here we violate that normal configuration as we attempt to explain what would happen if the meta-levels of Being *crossed* and *interfered* with the Philosophical Categories. Recall that the Philosophical Categories are aligned with the Foundational Mathematical Categories. However, we are now talking about *all* categories, not just the Axiomatic Mathematical Categories. Category Theory is seen as one of the ways to describe *all* possible categories and recently it has been discovered that there are various meta-levels of categories that are covered in N-Category Theory. We are basically extending this idea across all the possible Philosophical Categories including the trans-Peircean ones. The key idea here is that the meta-levels of the Philosophical Categories are most expansive in Hyper Being where the Quadralectic is defined. This is no accident. In fact, Hyper Being is the level where the space for design is most expansive because it is where *possibilities* exist that are indicated by semiotic *Design Objects*. So, the greatest potential for design variation is at the level of the Hyper Categories. It is there that the greatest difference appears, which can be leveraged to produce something new. And, it is also at that level where the greatest essential difference appears for each category. Design is affected by the entire field, but the tendency is to cover categories First, Second, and Third, and the central meta-levels of Two, Three, and Four while omitting the rest of the field. At the center of the field is the Natural Transformation, which produces different kinds of relationships. Highlighting and producing existing relationships as well as new relationships between things takes place in the realm of Emergence. When those new relationships emerge they give us new Qualia, and occasionally there are new topologies associated with the production of something new, but that is rare. Topologies occur when a new existent comes into Being as part of the emergence. Moving toward synergies, or integrity, or *poise* of interpenetration, is the mark of ingenious design. The use of matrices or lacunae as part of the design is rare, and would generally be appropriate only in Meta-system design. However the matrices are used when we construct the Axiomatic Platform. Lacunae appear when we need freespace within our

¹¹⁵⁸ Fynsk, Christopher. Heidegger: Thought and Historicity. (Ithaca: Cornell University Press, 1993). Open, p. 42ff and Clearing, p. 101ff. See p. 147 for both mentioned together. See also Heidegger, Martin, and Eugen Fink. Heraclitus Seminar. (Evanston, Ill: Northwestern University Press, 1993). p. 130 for discussion of clearing and open between Martin Heidegger and Eugene Fink. See also Stambaugh, Joan. The Finitude of Being. SUNY Series in Contemporary Continental Philosophy. (Albany, NY: State University of New York Press, 1992). p. 35ff chapter 7; p. 43ff chapter 8; and p. 93 chapter 16 on Heidegger’s interpretation of Rilke.

design, which becomes useful to make way for movement, or interchange, or transformation within the design.

The Design Field illustrates how the relationships between the Philosophical Categories describe the nature of the moments of the Quadralectic at the Hyper Being level. We have noted that Matrix and Qualia indicate Concept. Qualia and Kind indicate Essence. Kind and Topology indicate Perspective. Topology and Synergy indicate Design. Synergy and Integrity indicate Insight, and Integrity and Poise indicate Realization. These Quadralectical moments appear as the interstices between the Philosophical Categories at the Level of Hyper Being. This is why they are described as traces or hinges. The order of the moments is dictated by the unfolding of the Philosophical Categories. And from that unfolding, at the level of Hyper Being, we discover that there are other moments that overflow from the Quadralectic into the Pentalectic and perhaps beyond. Here we will only treat what occurs when we expand the Quadralectic into the Pentalectic. Understanding the moment that would expand this into a Sextalectic must be left for future work. However, we speculate that besides the sextrahedron of fifth-dimensional space, this moment is also related to the relationship between the 8 cell and 16 cell polytopes and the 24 cell polytope in four-dimensional space. Design appears in the transition from Topology to Synergy. What is design but things working together within a topology to produce Emergent characteristics? A worthwhile Design aims at Integrity and that is increased when we transform the Quadralectic into the Pentalectic by adding the moment of *Insight*. Insight has to do with realizing how the integrity of the forces within a configuration cancel at a particular schematic level. Poise goes beyond Integrity to introduce an asymmetry that has to do with the relationship of that configuration to its Meta-system as a whole as it appears in terms of interpenetration. Poise is a dynamic relationship with the environment that exhibits resilience and other self-* properties. Integrity is a relationship of the ‘thing within-itself’, while Poise is the relationship of the ‘thing for-another’. When something has Poise it is completely integrated into its environment such that it reflects all aspects of its environment in itself and in its behavior. Poise is the perfect *fittingness* of the constructed Object of Design and its Meta-systemic environment. Poise is the end result of System/Meta-system co-design. It is actually a moment of completion, rather than a dynamic moment like those of the Quadralectic and its expansion into the Pentalectic. The Sextalectic is really the moment of the *realization* of Design rather than a moment of the design process itself. Six is a perfect number, all its parts add up exactly to the Whole, and thus it is holonomic and lacks the dynamism of the design process through which we move

toward the end state, which is described by the Quadralectic and its expansion into the Pentalectic.

Of all the meta-levels of the Philosophical Categories, the level of Hyper Being is the widest and therefore has the most leverage for making a difference. Thus, design is focused primarily on this meta-level. The Quadralectic plays across the whole field of design, but it concentrates its effort at Hyper Being because that is where the greatest leverage occurs for initiating new ideas. This initiation of new ideas may be a ‘happening’ related to Ereignis. This is the place in the Design Field where the greatest amount of *difference* occurs, and it is also at this same meta-level where *possibility* appears among the kinds of Being. That is where the most essential differences appear among the things that are being designed. For the most part, the core of the design effort is expended around the natural transformation, which is the center of the Design Field because design tries to produce emergent transformations by producing new things. Design, which appears in the interstices between topology and synergy attempts to reach back to Kinds, Qualia, and Matrices via the use of perspective, essence, and concept moments in order to produce the synergies that will successfully integrate these qualities. Thus, all the moments of the Quadralectic are necessary for the execution of Design. But we must reach back into lower Philosophical Categories in order to push into the Pentalectic so that we may gain the insights necessary to produce artifacts that are integrally based on the synergies that are produced within given topologies. Design pulls the elements of the Design Field together in the production of Emergent artifacts.

Order within the Design Field

We have emphasized that the Philosophical Categories are aligned with the Foundational Mathematical Categories. Those categories form the basis of mathematics and act as the Axiomatic Platform for the whole of mathematics. The Design Field applies to all mathematical categories, but the Foundational Mathematical Categories have a special place because, as a series, they define the Lifecycle of the Emergent Event. When we undertake the design of emergent artifacts, then it is the *order* that is our focus, and in imposing that order, the Foundational Mathematical Categories have a unique role because they give us a model for the evolution of a new order within a particular arena of concern. The Foundational Mathematical Categories are aligned with both the Quadralectic, (in relation to the Sub-schemas) and the Emergent Meta-system Cycle. The next step is to explore the synchronizing of cycles as it occurs in the process of emergent artifact design. In this way we will have described the field of design and the process of the design itself.

The process of design is aligned with the Philosophical Categories and as we have noted these are separated from each other by the Meta-levels of Being and the other standings such as Existence, Manifestation, and the Amanifest. So, the *process* of Emergent Design is different from the *field* of Design. The field of Design is characterized by the *interference* between the Philosophical Categories and the Meta-levels of Being, while the Design Process that leads to Emergent Artifacts is *not* related to this interference. *The interference creates the area of greatest difference that is exploited by design in order to pull things into actuality from the adjacent possible.* Emergent Design sets off a cascade of Emergent Events and this drives the designer through the Lifecycle of the Emergent Eventity, which can only be seen purely when it is inscribed in the Nomos. But Emergent Eventities that are actualized do not only exist in Being, but also have a basis in Existence. Existence is Interpenetration and is described by the Hyper-complex Algebras, and particularly by the Emergent Meta-system Cycle through which things arise from nothing. The Neganary is the doorway (via the square root) into this imaginary realm in which interpenetration is realized as pure isolation.

Quadralectical Development

Notice that in the development of the Quadralectic we began with the Ennead, which was defined as the second order mediation, which indicates that it performs as a functor between various mediations within the Axiomatic Platform. We expanded the Ennead by adding a perspectival moment to the three moments identified by Wisse. We then compared the four moments of the Quadralectic to the geometrical embodiments of the minimal System as a model of the sub-schemas, which developed the Quadralectic in terms of the manifold. We have concentrated on understanding the interdependence between the various moments by using a phenomenological approach and this allowed us to understand it as an orbit for the cycle of transformations between the sub-schemas, where the operators are separated from the sub-schemas. Finally we compared the Quadralectical Cycle to the Lifecycle of the Emergent Event and the Cycle of the Emergent Meta-system, which are interpretations of Existence based on the difference between Emptiness and Void. The Foundational Mathematical Categories that define the stages of the Emergent Event give us a way to define the cycle of the orbit even more precisely than is possible through the Quadralectic and sub-schemas alone. The Emergent Meta-system is composed of the Special Systems, which are based on the Hyper Complex Algebras whose nature is based on conjunction. The Special Systems and the Emergent Meta-system are models of the dynamics of Existence as Interpenetration. When we

specify the way that the Quadralectic Cycle synchronizes with the Lifecycle of the Emergent Event and the Emergent Meta-system, we are producing a conjunction of two complementary interpretations of Existence and the dynamic within Being at the Hyper Being level. That dynamic concerns the traces within Hyper Being, which are the basis for the exploration of the design possibilities. Those traces spring from the possibilities that provide a basis for the formation of the Design Object that is conditioned by the Design Field, which we have specified in terms of the orthogonality between the Kinds of Being and the Philosophical Categories. Normally we consider these two as interleaved rather than crossing each other as in a Cartesian cross. It is of profound interest that the Design Field is the *dual* of the Cycles in *time* composed of the Quadralectic, Emergent Lifecycle, and the Emergent Meta-system, which will be the next subject in this chapter. By interleaving the Philosophical Categories and the related Foundational Mathematical Categories with the Standings, we desire a temporal view of the synchronized cycles, *but by crossing the two*, we have, instead, a *compositional view* of the field from which the Design arises.

Our path through the Design Field with respect to the Quadralectic follows a progression from the Second through the Sixth Philosophical Categories at the level of Process Being. We have neglected Spectra, Registers, and Privations because contemporary Design does not consider them important except for setting limits for what is possible to express in a design. This prepares the way for us to understand the Quadralectic in the context of the entire Design Field. We are particularly interested in developing the next higher level within the Design Field in light of the relationship of the Quadralectic to Natural Transformation, Topology, Synergy, Integrity, and Poise. We have noted that the Quadralectic is staged at the level of Hyper Being where possibilities open up to produce the vast region of the design landscape. In the process of design exploration we walk through the design landscape and transform the design through the use of Natural Transformations, but when we consider the continuities that underlie that landscape, then we must use *topology* as the basis for understanding those transformations. However, it should be noted that the fourth dimension is unique because topologies are not fundamental to that dimension as they are in all other dimensions. S. Donaldson discovered that there were infinite fake topologies in four-dimensional space rather than a set number

of actualized topologies¹¹⁵⁹. This means that with respect to the fourth dimension, the integrity of our design needs to be different than what is sufficient for other dimensions. We propose that concepts, essences, perspectives, and designs exist at the level of the higher dimensions within the open clearing of the schemas although they are represented by lower dimensional descriptions in our design documentation. In all but the fourth dimension, it is topologies that ultimately control the distribution of these concepts along various illusory continuities or ideal planes of articulation. *It is the fact that such topologies do not exist in the fourth dimension that brings the reality of nonduality to our attention and makes it necessary to understand the relationship between Being, Existence, Manifestation, and the Amanifest.* There is an ultra-efficiency in the fourth dimension that we should be able to bring into play in our design activities. Ideally, our designs must have integrity, but the *nature* of that integrity changes in the fourth dimension. This integrity that is particular to the fourth dimension is expressed in terms of the Special Systems, the Emergent Meta-system, and the ideal of Interpenetration. Our Designs need to be expressed in terms of their axes and the asymmetries that are related to those axes, which lead us to consider the differentiation of the modes of interpenetration. The fundamental work of Design is to deal with the Third Meta-level of the Philosophical Categories, i.e., the level of maximal difference that we have identified and leveraged in order to bring new things into Existence. It is not just *possibility* that comes into being at the Hyper Being level, but the *maximal essential difference* comes into being as well. This means that in Hyper Being there is room for the maximal expansion of concepts, essences, perspectives, and designs. Our goal here is to lay the foundations for actual design work and to specify the underlying Design Process by plotting a trajectory through Process Being. In doing this, we are producing a blueprint for the actual design work that happens at the Hyper Being level. Beyond this it is also necessary to understand the *expansion of difference* that occurs when we move from Process Being to Hyper Being as well as to understand the impacts of the *contraction of differences* that appear in Wild Being and Ultra Being. Eventually the impact of the entire Design Field on the Quadralectic needs to be considered, but at this stage it is important to have a vision of the Design Field.

It should be noted that the Design Field shows us that the movement of design is orthogonal to the articulation of the Sixth¹¹⁶⁰, which represents the Emergent Meta-system

¹¹⁵⁹ Donaldson, S. K., and P. B. Kronheimer. The Geometry of Four-Manifolds. Oxford Mathematical Monographs. (Oxford: Clarendon Press, 1997). See also Scorpan, Alexandru. The Wild World of 4-Manifolds. (Providence, R.I.: American Mathematical Society, 2005).

¹¹⁶⁰ The Philosophical Category of Interpenetration.

and its articulation into the Special Systems. The movement of Design goes down through the Design Field at the level of Hyper Being following the appearance of the moments of the Quadralectic. This translates into a movement through the Foundational Mathematical Categories that describe the Lifecycle of the Emergent Event. Thus, we can see here how the various cycles that we are describing relate to each other. The Quadralectic is the series of interstices in the unfolding of the Philosophical Categories. These are aligned with the Foundational Mathematical Categories that express the Lifecycle of the Emergent Event. As a result, these various cycles that are interleaved and synchronized are all different parts of the Design Field that are operating together *to produce the Emergent Event out of the Design Process.*

The Design Object

The Design Field gives us a view of the possibilities that condition the semiotic Design Object. The semiotic Design Object is fabricated by Sign Engineering. It should not be confused with the Object of Design, i.e., the constructed *end product* of design. The possibilities outlined in the Design Field are expressed in terms of the Philosophical Categories and the Meta-levels of Being. Design is an activity that brings those materials into order, and in the case we are considering, into an *emergent order*. This ordering is done via the Foundational Mathematical Categories associated with the Philosophical Categories. We are assuming that the Design Object will indicate an Emergent Eventuality that will go through the Lifecycle of the Emergent Event. The Foundational Mathematical Categories function as a tool box for imposing order onto the semiotic Design Object. If we succeed in setting off an Emergent Event, that *order* becomes a *cascade* that is imposed upon the structure of our worldview. We assume that the semiotic Design Object will be composed of pictures, plans, and models in on the various levels of the Philosophical Categories and will be operating primarily at the level of Hyper Being, while dealing with the *traces* and *hinges* between lacunae, matrices, qualia, kinds, topologies, synergies, integrities, and poise of interpenetration. *In other words, design work examines and manipulates maximal differences in order to leverage emergent properties into actuality from the realm of possibility that has been described by the Design Landscape.* The semiotic Design Object is the System within the Meta-system of the Design Landscape. As a result, we need a method (such as the Quadralectic) that mediates between the environment and the System at each stage of the design development. Because the fourth dimension is the interface between the System and the Meta-system, it is also necessary to take nonduality (in the guise of Emptiness and Void) into account. Therefore, it is

important to develop a deep understanding of the synchronization of the cycles of the Quadralectic with those in Existence in order to successfully execute the Design Process. This has been our goal, to understand the Design Process and how that is conditioned by the Schemas and how it can only be understood if we extend Hegelian Dialectics and Trialectics to the level of the complexity expressed in the Quadralectic, and beyond.

Embedded Knowledge

The ultimate ideal is for the fabricated semiotic Design Object and the constructed Object of Design to become the same thing. *The Design Object is the result of Sign Engineering, while the Object of Design is the product of implementation based on the blueprint of the Design Object.* The **Designed Object**¹¹⁶¹ (a fusion of the two) must have reflective knowledge of its *own design structure* because this knowledge may be used to adapt it to the environment and provide resilience. The Designed Object is simultaneously both the Immediate Object (semiotic representational appearance) and Dynamic Object (implemented represented *dis*-appearing, i.e. quasi-noumenal with introjected hyle), which Peirce distinguished. The Designed Object has ontological showing and hiding embedded in it. In the future, *lost* product design knowledge must be revived and reincorporated into the designed product as *embedded* knowledge. Understanding the Design Field will help create ontologies that are capable of representing the type of knowledge about the product that is normally encoded *outside* the designed product. Making the *results* of Sign Engineering *part of the product* that is being designed (so that the product *knows* its own design), must become a significant goal for Sign Engineering. Once Sign Engineering becomes *ontological engineering* that can produce *ontological knowledge*, then the product will be able to have self-* properties, such as self-maintenance, self-repair, self-control, and self-configuration, etc.

¹¹⁶¹ The ‘Designed Object’ is the *fusion* of the implemented Object of Design and the semiotic Design Object, which gives knowledge of its own structure to the artifact. See Figure 13.2.

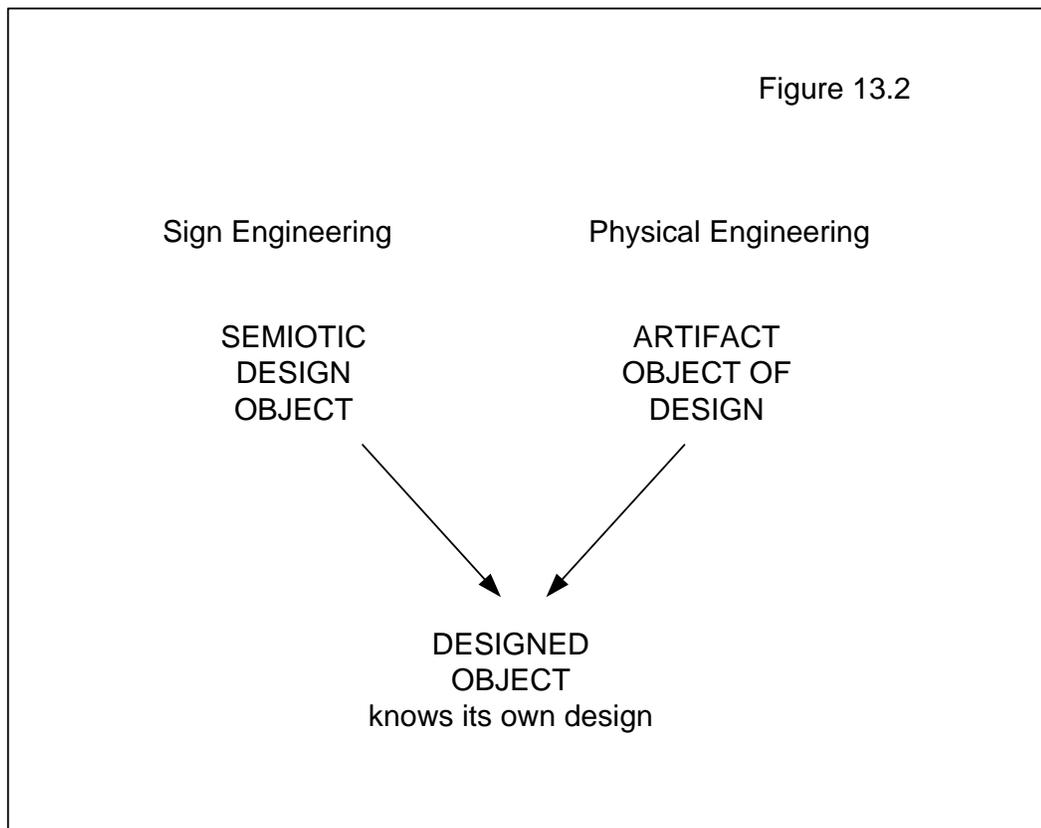


Figure 13.2. Relation of the Design Object, the Object of Design, and the Designed Object.

Transition between Design Field and Emergent Design Cycle

Now we transition from the description of the Design Field to the Lifecycle of the Emergent Event. We will examine how that interlaces with the Emergent Meta-system and how the two synchronize with the Quadralectic as it moves through the moments defined by the sub-schemas. While the Design Field is born out of the crossing of the Meta-levels of Being with the Philosophical Categories, it is assumed here that the Meta-levels of Being are interleaved with the Philosophical Categories. Those categories unfold into the Foundational Mathematical Categories, which, in turn, are an image of the Lifecycle of the Emergent Event. The Emergent Event intertwines with the Emergent Meta-system and their conjunction underwrites the cycle of the Quadralectic through the stages of the sub-schemas, which brings about the arising of the *emergent whole* as the Object of Design. This mediation is based on the Design Object, which is shaped by Sign Engineering.

System and Meta-system Meta-levels of Being and the Dynamic of Existence

Both Systems and Meta-systems have images at the various meta-levels of Being, which have been explored in the foregoing chapters. The differences between these two central

schemas are seen in the complementarities between their images at the various meta-levels. There is also a complementarity between Being and Existence, such that the meta-levels of Being are separated from each other by the Special Systems, which signify the ‘differentiation of Existence’ between the System and Meta-system.

Models of the Interpenetration of Existence	<u>System meta-levels</u>	<u>Meta-system meta-levels</u>
	ultra	>>>>>>>>>
Meta-system (sedenion and beyond non- division algebras)	De-emergent Meta-system	Emergent META-SYSTEM
	wild	Pure
Reflexive Social (octonion hyper-complex algebra)	-----	-----
	hyper	Process
Autopoietic Symbiotic (quaternion hyper-complex algebra)	=====	=====
	process	Hyper
Dissipative Ordering (complexion algebra)	-----	-----
	pure	Wild
System (real algebra)	Emergent SYSTEM	De-emergent Meta-system
	<<<<<<<<<<	Ultra

Table 13.5. Complementarity between Meta-levels of System and Meta-system.

This complementarity between the striations of the two schemas at their meta-levels are not only *dual* from the meta-level of one schema to the same meta-level of the other, but they are also *inverted* so that the *chiasms* of Wild-Pure and Hyper-Process as well as Pure-Process and Hyper-Wild become duals. There is a cycle in Existence considered Void where the Normal System in conjunction with the Special Systems produce an image of the Emergent Meta-system. Systems and Meta-systems can be considered either emergent or de-emergent. It is normal for Emergence to be associated with the System and De-emergence to be associated with the Meta-system. So, the Emergent Meta-system and the De-emergent System are anomalies. When a System becomes de-emergent, then it turns into a Meta-system by revealing its meta-systemic order as *niches* of its sub-systems. Similarly, when a Meta-system becomes emergent, then it may transform into an emergent

Super-system. An Emergent Meta-system exemplifies the special ordering of the Meta-system, which is dis-unified and de-totalized over and against the ordering of a unified and totalized System. Notice that there is a complete cycle of the four kinds of Being on *either side* of the Autopoietic Special System *dividing line* where the two series of meta-levels are juxtaposed as they emanate from each schema separately and then intermingle.

We have also noticed that the kinds of Being separate the Philosophical Categories and the Foundational Mathematical Categories such that an image of the Emergent Lifecycle appears in the Emptiness of the nondual Nomos. The lifecycle tracks the advent of the Emergent Eventuality and the stages of its transformation in the face of the utterly new. Thus, the kinds of Being (as part of the standings along with Existence, Manifestation, and the Amanifest, which are successively deeper nonduals) allow us to trace the successive stages of emergence of the new eventuality as it comes into Existence and into Being. These two cycles seem to be at odds, but, in fact, they are synchronized in Existence as twin dynamics of two nondual interpretations that interact and interpenetrate with each other based on the deeper nondual of Manifestation. One dynamic is seeking the simplest possible *material*¹¹⁶² state (energy¹¹⁶³ /matter¹¹⁶⁴// information¹¹⁶⁵/ entropy¹¹⁶⁶) or *optimal equilibrium* in the cycle of the Emergent Meta-system. This cycle is based on the relaxation of the algebraic properties of the System as it naturally seeks the simplest possible optimal *material* state. Creating a *material* change that moves toward the simplest state causes a ‘far from equilibrium’ local dynamic that supports a local complexifying order (negative entropy) that emerges from the conjunctive order of the Special Systems. This transformative ordering drives the local System through transitions that are governed by the meta-levels of Being (or non-existence in the absence of Being) and that produces local emergent events. These local emergent events exhibit the phase transitions of the Philosophical Categories, which are also associated with the Foundational Mathematical Categories. Thus, Emergent Eventualities have a specific transformational structure within the Western Worldview and perhaps other worldviews as well. But since the Western Worldview is unique in its concept of Being, the nature of the Emergent Event is different,

¹¹⁶² We use the term *material* here in the sense that Hilary Lawson uses it in *Closure* as a partial closure with some openness within it. These *closures* can be complex material systems that combine energy, matter, entropy, and information in their positive and negative states.

¹¹⁶³ Negative energy exists but is a very weak phenomenon in nature.

¹¹⁶⁴ Negative matter is anti-matter, which is an anomalous state of matter in our universe locally.

¹¹⁶⁵ Negative information is what is kept hidden or secret, i.e., the surprises not sent on the communication channel.

¹¹⁶⁶ Negative entropy is the organization of matter, which is a rare event in far from equilibrium systems but locally ubiquitous in a universe whose expansion is accelerating, so that the entire universe is, in fact, a far from equilibrium environment. given the injection of dark energy into the universe.

and this is of special interest because of its global domination. This balance between the dynamics of seeking the simplest possible material state (which produces local ordering) and an upsurge of Emergence (as a by-product) is an extremely interesting phenomena from the point of view of our Phenomenology of Systems in the context of the Meta-system. These two cycles found in Existence are associated with Emptiness and Void and provide a Meta-systemic context for the Quadralectic in Hyper Being. Hyper Being is the central kind of Being. It is the point where possibilities burst forth into actuality. *It is in Hyper Being that the Quadralectic allows the moments of concept, essence, perspective, and design to be a reflection of the traces so that they will articulate the adjacent possible and transform it from the possible into the actual.* This is the articulation that transforms the possible into the actual. The other kinds of Being, i.e., Ultra-Wild and Pure-Process Being, as well as Ultra-Pure and Wild-Process Being, form the successive pairs that form the center of Hyper Being and *contribute* to this process of articulation from the possible into the actual. Pure Being is the most transparent and Ultra Being is the most opaque and obscure. Process Being and Wild Being exhibit external and internal dynamics between the opacity of the forgetfulness, oblivion, recognition, and remembrance of the open clearing. Hyper Being is the interface between the System and Meta-system. In Hyper Being the dynamic between Set/Mass, Emergence/De-emergence, and System/Meta-system occurs as the trace of the nondual Existence within the projection of Being. The Quadralectic reveals that there is a place for human beings in the dynamic between the emergent ordering of the Foundational Mathematical Categories in Emptiness and the de-emergent cycle of the Emergent Meta-system. This leads to the arising of the order of the Meta-system that balances the de-emergence of the System in its anomalous transitory state. Human beings use the Quadralectic to pull Emergent Eventities into Existence and into Being as they grasp the ordering of the Emergent Lifecycle. The simplification of the material state provided by the Emergent Meta-system creates natural material optima at the same time that it prepares the order of the Meta-system, which precurses the advent of the new Emergent System. This ‘fitting’ of the two cycles of Existence together and their ‘cross over’, which supports the Quadralectic in Hyper Being, is a very peculiar structure that explains how the interchange between Existence and Being allows new things to come into Existence and into Being. This merging of cycles is at the heart of our Emergent Worldview. It is this central dynamic that we want to take advantage of as we pursue the advent of new things through Emergent Design Engineering. In this chapter we will weave together these various series to show how the *thread of Beyng* is produced within the *dynamics of difference in Being*. When human beings practice design in the context of the

Quadralectic, they play a key role in this unfolding process. This theory proposes that Emergent Design is central to the human innovative process.

General Schemas Theory and Sub-schemas

In the Design Field the individual is schematized in terms of a spacetime envelope and differentiated in terms of the sub-schemas. General Schemas Theory is the next level of abstraction up from Systems Theory. It covers all the various schemas such as Pattern, Form, System, Meta-system, Open-Scape, Domain, World, etc. In other words, it covers all the things that are like the System Schema, even though they may have a different structure. The question for General Schemas Theory is: “What are the similarities and differences between all possible schemas?” *Schemas are templates of pre-understanding of spacetime organizations that are projected onto things.* This leaves the question open as to how many schemas exist, or how they are related to each other, or how one may compare and contrast them. We begin with S-Prime¹¹⁶⁷ that hypothesizes about the nature of the schemas by stating that there are two dimensions per schema and two schemas per dimension. Subsequent hypotheses that have been developed expand the number of dimensions that can apply to a single schema, while exploring the constraints that it produces. S-double-prime theory¹¹⁶⁸ states that there are three possible dimensions per schema, and S-triple-prime¹¹⁶⁹ states that there are five possible dimensions per schema. The development of these hypotheses helps us to explore the implications of the relationship between schemas and dimensions. It is this relationship between schemas and dimensions that allows the schemas to be specified with formal accuracy and accountability. This relationship also allows us to posit the concept of the sub-schema. The sub-schema expands the schemas orthogonality and allows us to hypothesize that there is a 'route of ascent' and a 'route of descent' between the dimensional levels, rather than a two-way route¹¹⁷⁰. We identify these two routes in terms of the difference between Representation and Repetition as posited by G. Deleuze¹¹⁷¹. The canonical examples are the sub-schemas of form. Form can have schemas that are two and three-dimensional. If

¹¹⁶⁷ Theory of the author with respect to General Schemas Theory that there are two dimensions per schema and two schemas per dimension.

¹¹⁶⁸ Theory of the author that there may be more than two schemas per dimension. The example of a three-dimensional pattern comes to mind.

¹¹⁶⁹ Theory of the author that there may be up to five dimensions per schema.

¹¹⁷⁰ In other words, we hypothesize that the route up the dimensions is different from the route down the dimensions with respect to the hierarchy of the schemas, which generates the difference between the sub-schemas in terms of repetition and representation. Repetition is always a move toward a higher dimension and Representation is always a move toward a lower dimension.

¹¹⁷¹ Deleuze, Gilles. Difference and Repetition. (New York: Columbia University Press, 1994).

we break these into two routes that go up and down the hierarchy of the independent schemas, we get four sub-schemas. We associate these with the Whole Form, Picture, Plan, and Model and posit that there are sub-schemas at each schematic level. We posit that the Whole Form Construct is a three-dimensional representation that is collapsed into the picture, which is a two-dimensional representation. The plan is a generating kernel of the Form, which is a two-dimensional repetition and orthogonal in its nature. The three-dimensional repetition is the model. A key challenge is that there is no way to get back from the model to the Whole Form. Myriad repetitions do not make a representation whole again. There is no *direct* way to put Humpty Dumpty¹¹⁷² back together again. If we do attempt to move from the model stage to the Whole Form, it is necessary to develop a super-schema that is a *new* whole that encompasses all the sub-schemas that are related to an individual. We can achieve this by conjuncting them. From the super-schema it is possible to collapse back into the whole schema as a *conjuncted part* of the super-schematic whole. In this way it is possible to complete the cycle of the sub-schemas where the Quadralectic moments are the transformations between the sub-schemas and the moments because the sub-schemas are the super-schematic whole.

Once we have the sub-schemas as the elements of our design vocabulary, then we can begin to consider their relationship to the Quadralectic. We hypothesize that the *transitions* between the sub-schemas are the *moments* of the Quadralectic. For example, we take the Whole Form and make a *representation* of it from a conceptual moment of the Quadralectic at a lower dimension. This produces the *picture*. We then take the *picture* and produce the *plan* through the ‘essence moment’ of the Quadralectic, which is related to *behavior*. We then take the *plan* and transform it with the ‘perspective moment’ of the Quadralectic that is related to the *stance* and this produces the Model. Finally, we take the model and produce an approximation to the Whole Form based on the ‘design moment’ of the Quadralectic related to *content*. Here we want to examine in detail how the moments of the Quadralectic are, in fact, the transformations between the sub-schemas. This applies to all the sub-schemas of every schema in the hierarchy. In this case we are using Form as our example because it is what everyone is most familiar with. This idea is generally applicable to the entire series of the schemas and all their sub-schemas. Thus far we have concentrated on the sub-schemas of Form without mentioning the sub-schemas of the System or Meta-system because they are not as well known or as well explored as the sub-

¹¹⁷² Carroll, Lewis, and Martin Gardner. The Annotated Alice: Alice's Adventures in Wonderland & Through the Looking Glass. (Cleveland: World Pub. Co, 1968). See also Deleuze, Gilles. The Logic of Sense. European Perspectives. (New York: Columbia University Press, 1990).

schemas of Form. However, we postulate that the same analysis could be done with those sub-schemas, indeed, with *any* sub-schemas from the series of the schemas. This is an area open to research that needs to be done¹¹⁷³.

Earlier, when we discussed the sub-schemas, we talked as if the sub-schemas were the same as the moments of the Quadralectic. Now we will undergo a symmetry breaking and we will reify the difference between the sub-schemas in order to go to the next level of detail in exposition. In this transformation, the moments of the Quadralectic will take on a different and transposed order than what was presented earlier. This ‘symmetry breaking’ is related to what we saw in the Axiomatic Platform, which swapped *point* and *extent* to reveal the second-order mediation. Here the swap is between the moments of the Quadralectic: *perspective* and *design*, which is a consequence of the *divergence* of the sub-schemas and the moments of the Quadralectic.

From Whole Form to Picture via the Concept

The process of producing a picture is the creation of a lower dimensional representation of a three-dimensional form. In this case, we are moving from the three-dimensional to the two-dimensional. Via the *focus*, we can consider the outward *circumstance* of the picture but also ‘fine tune’ the picture to its actual representation. But when we use the focus to compare and contrast the representation to the circumstance, we can project *sense* (or rationality and coherence) onto the representation. When we observe the various circumstances in which a representation can occur, then we see the significance of the representation. A representation is something that recaptures what was already present. This is related to synecdoche, the master trope proposed by G. Vico¹¹⁷⁴ and indicated by K. Burke¹¹⁷⁵. Metaphorically speaking, the Whole Form is all the collection of sentences (a paragraph) that can be written about a subject, while the picture is one sentence. The *concept* is the significance of the sentence beyond its representability.

From Picture to Plan via the Essence

Once we have a two-dimensional picture of the Whole Form, we may move forward toward constructing a plan. *A picture can be viewed from any angle and is a summary of the Whole Form from a particular angle. But the plan is different, its diagrams are*

¹¹⁷³ By the author at <http://holonomic.net>

¹¹⁷⁴ Vico, Giambattista. *The New Science of Giambattista Vico*. (Ithaca, N.Y.: Cornell University Press, 1968).

¹¹⁷⁵ Burke, Kenneth. *A Grammar of Motives*. (Berkeley: University of California Press, 1969). See Appendix.

orthogonal and through repetition it can generate the model. To move toward the plan we need to discern the *essence* of the Whole Form, i.e., how it would look from orthogonal angles. Determining this essence of the whole form requires that we either shift *ourselves*, or shift the *object*, which implies that there is *behavior* involved in perceiving the essence. Based on the essence, we can generate the object through its coordinated *appearances*. The object appears as it is undergoing a rotation or some other behavioral sequence, which produces the orthogonal views of the plan that captures its essence. This behavior has the goal of exercising the object completely so that the generating plan can be produced. This is related to the master trope Metonymy as proposed by G. Vico and reiterated by K. Burke. If we define the relationship of the plan and the model in rhetorical terms, then all possible sentences about a subject define a sub-language model and the plan compares to the syntax of that sub-language. The essence consists of all the possible sentences (appearances) that the subject has in common. These sentences can articulate beyond the differences that can be codified in syntax.

From Plan to Model via the Perspectives

Once we have a plan, which is based on orthogonal viewpoints, then we have a *generator*, which, through repetition, can create a model. A model is the repetition of the orthogonal views of the plans that modulate each other to fill in the outward circumstantial aspects of the picture as well as the inner representational aspects. There are multiple orthogonal perspectives from which the plan can be viewed and they can serve as the basis for the repetitions, although *once those repetitions occur* then the model *cannot be seen from orthogonal perspectives*. Thus, we take an orthogonal stance toward the plan slices, and that gives us an *image*. We repeat that image by filling out the surroundings until we fill in the perspective. As we repeat different images that are generated from the orthogonal views of the plan, then we create a view from that particular perspective and fill in the details that allow it to be a model that can stand on its own as a simulacrum of the Whole Form. The movement through the surroundings toward the intentional target, or vanishing point, gives the necessary repetitions. All the possible perspectives of the model are filled in with their possible images from the generator of the plan. This is related to the master trope Metaphor as proposed by G. Vico and reiterated by K. Burke. All possible sub-language syntaxes describe the deep grammar or syntax generator, and by knowing that generator, we can iteratively produce sentences about a subject. Different sub-languages appear from different perspectives. The perspective *differences* can reveal the *sameness* of

the deep structural grammar, although these possible perspectives cannot be captured by the *multi-perspective views* of a single subject.

From Model to Whole Form via the Design

Once we have a model, then there is mimesis between the model and the Whole Form, just as there is mimesis between the picture and the plan. A picture can be converted into a plan by constructing it from an orthogonal viewpoint as long as we keep to the discipline of scale, and leave aside the illusion of depth. If we want to move from the model to the Whole Form, then there are detailed contents that need to be filled in that the model does not have. The contents bring with them a certain context that are supported by pragmata, i.e., practicalities that need to be satisfied before the Whole Form can be made to function like the model. In general, this is a very difficult transition to make. The Design is the way that the ‘content *within* its context’ is brought into a proper signature such that the model can become the Whole Form. In this case, the pragmatic practices or performances overflow from the ‘content-signature-context’ as a projection that realizes the design of the Whole Form. If the design is fulfilled, then the discontinuity between the model and the Whole Form is breached and the emergent characteristics of the design are created. This is related to the master trope Irony as proposed by G. Vico and reiterated by K. Burke. When we collect all generated sentences about a subject, then this becomes a sub-language model, but perhaps *not* the *same* sub-language as the one we started with because this sub-language is based on the ‘discovered deep grammar’. The difference between the original sub-language and the artificial sub-language is a question of idiosyncratic content. This is the problem that Plato confronts in the *Cratylus*¹¹⁷⁶, which is the difference between conventional language and the true names. Actual emergent wholes have characteristics that are not captured by deep grammar and that is what makes language creative (in the Chomskian sense). It is pragmata, which allow this chasm to be crossed between original and artificial languages. The anomalies and heterogeneous differences that are the differences between the real and artificial languages are non-representable, even by the deeper structural levels of language.

From Whole Form to Super-Form via Insight of the Pentalectic

The Quadralectic can be seen in terms of moments of transformation within this complex of the sub-schemas of the schema. In this case we are focusing on the Form Schema. We

¹¹⁷⁶ See author’s commentary at <http://holonomic.net>

now know more about the structure of the moments of the Quadralectic and because we have filled in those details we have a better understanding of how this transition works. Yet, there is a structure beyond the Quadralectic that is necessary for closing the gap between *repetition* and *representation*. This is the Pentalectic. The Pentalectical moment projects a wholeness to all sub-schemas. It brings them together in a Minimal System as a juncture that leads to an *insight*. The various mediations form a *nexus*, which produce an *ambience* that overflows as an *opacity*, i.e., a noumena. At this point, the proclivities, tendencies, dispositions, inclinations, and propensities of the material (that the moments are working with) become clear by unifying the moments of the Quadralectic. The Pentalectic produces a greater whole than the Whole Form Construct, which is the synergy that combines all the sub-schemas via the super-synthesis of the moments. We are positing that the moments of the Quadralectic produce the transformations between the sub-schemas, but the moment of the Pentalectic produces a super-synthesis of all the sub-schemas, which then gives rise to the Whole Form. Thus, by going beyond the ‘Whole Form construct’ and then by collapsing back into it, the gap between repetition and representation can be breached. We now have a very precise model of Design by combining the sub-schemas and the moments of the Quadralectic into a single process. Because the moments have now been filled in, we have a much more precise and detailed model of the entire process.

In effect, we hypothesize that we need a super-schema that is composed of all the sub-schemas *including* the Whole Schema, with the understanding that when we leap to the level of the Super-Schema, we can then fall back into the Whole Schema from there. We cannot directly produce the whole schema from the picture, plan, or model. The Super-schema combines all of these into a super-synthesis, which can separate to reveal the Whole Schema as one of its conjuncted parts. The fact that there is a Super-Schema implies that there may be another moment beyond the Quadralectic that produces the Pentalectic. This new moment leverages the conjunction between the Foundational Mathematical Categories and the Emergent Meta-system, but in Being, (and more specifically, Wild Being) it appears as a line of flight. The Pentalectic will be introduced after a review of the Quadralectic in the following chapter.

Foundational Mathematical Categories and Quadralectics

We have said that there is a relationship between the Quadralectic and the Foundational Mathematical Categories that is presented as a representation in the Nomos of the Lifecycle of the Emergent Event. We have also said that this is coordinated with the

Emergent Meta-system Cycle. The table that follows shows how these two models are coordinated with each other and related to the Philosophical Categories. In the table we will weave together the Philosophical Categories, the Quadralectic moments operating within the Sub-schemas, the Foundational Mathematical Categories, and the Emergent Meta-system nodes and operators. All these series are developed in detail elsewhere¹¹⁷⁷ and mentioned throughout this dissertation. Here we will weave together the various elements in order to show how the relationship between Being and Beyng is the focus of each one. This table attempts to show that the relationship between the Quadralectic and the Sub-schemas as a cycle is founded on the Emergent Lifecycle of the Fundamental Mathematical Categories, the Philosophical Principles, and the Emergent Meta-system Cycle. Our focus is to constrain the Quadralectic as much as possible in order to delimit its possible meanings. In other words, we have noted how the sub-schemas and the Quadralectical moments are interlaced, and we have noted that these are synchronized with the Foundational Mathematical Categories and the Cycle of the Emergent Meta-system. So the question becomes: “What happens when we apply all these constraints at the same time?” It is clear that this multiplicity of constraints will extremely restrict the cycle of the Quadralectic moments and the sub-schemas, which will give us a deeper insight into the meaning of the moments and the sub-schemas and how they inter-relate. As a result, we intend to examine the various over-determined steps of the sequence and try to understand what we do not already know about the Quadralectic and the Sub-Schemas.

<u>Being</u>	<u>Existence as Emptiness</u>	<u>Existence as Void</u>	<u>Commentary</u>
Phil. Category and Quadralectic with Sub-Schemas	Math. Category; either Axiom or Model Rep.	Emergent Meta-System model of the dynamic of Existence	The interaction of the Quadralectic with the sub-schemas of each schema is synchronized with the Lifecycle of the Emergent Event and the Emergent Meta-system cycle.
Seventh Moment: concept, representation, focus, circumstance, sense	Singularity Model (Catastrophe Theory)	Seed in pod (ipsities in conglomerate)	In the Void there are seeds in a pod, which are a form of ipsities in a conglomerate. These seeds are singularities in a virtual realm. They are non-representational but they form a basis for representations that point to concepts, which attempt to impose identity onto heterogeneous differences that are singular.
Zeroth Sub-schema: Picture	SiteEvent Axiom	Creation Operator	At the level of Existence (as Void) there is a creation operator that actualizes the seeds into monads ex nihilo. This is the advent of the event at a site, which appears out of nothing. This act of creation has the structure of Quantum Measurement with its associated logic. Multiple measures form a picture, which is a

¹¹⁷⁷ See working papers at <http://holonomic.net>

<u>Being</u>	<u>Existence as Emptiness</u>	<u>Existence as Void</u>	<u>Commentary</u>
			reduction of the multi-dimensional whole to something graspable by human finitude. It imposes dualism (probabilistically) on the nondual substrate of Existence. The production of ‘something out of nothing’ is the ultimate existential of the nature of the Void of space, or the Emptiness of consciousness.
First Moment: essence, behavior, object, situation, goal	Multiple Model (GA)	Monads in swarm (ipsities in conglomerate)	The Monads appear in a swarm as the next stage of the unfolding of the ipsities in the conglomerate. It is a model of the Multiple prior to the appearance of the Ultra-one. From the behavior of these monads, their essence is apprehended (understood) and the idea of the monadic object is formed within a given situation. Here, the monad schema stands in for any of the possible schemas. The appearance of the monads is a First, as they initially have no relationship to each other.
Second Sub-schema: Plan	Set Axiom	Mutual Action Operator	Through the mutual interaction of the monads it is possible to discover the nature of the monads interiority as described by Leibniz in <u>Monadology</u> ¹¹⁷⁸ . The characteristics that are internal to the monads form a set, and that set can be seen as a plan of relationships between monads. The sets of characteristics have relationships to each other that cut across the swarm of monads.
Third Moment: Perspective, stance, image, surroundings, intentional target	Mass Model (CA)	Views in constellation (ipsities in conglomerate)	Each monad has a view of all the other monads in their region, so, we get various views of a constellation as ipsities within a conglomerate. The individual monads form a mass, and <i>see</i> the mass (of which they are part) from a limited perspective. The production of the perspectives gives rise to the Domain, which coordinates perspectives. The views produce an illusory continuity that creates the background of the views of the various monads as figures.
Fourth Sub-schema: Model	Whole Axiom Mereology	Schema Operator	The monads, given their viewpoints of each other, schematize the group and thus cause the schema operator to form a <i>whole</i> made up of <i>parts</i> . This projection of a schematization forms a model of the swarm and that model has synergy.
Fifth Moment: design, content, signature, context, pragmata	Holon/ Integra Model (Category Theory)	Candidates in slate (ipsities in conglomerate)	The projection of the schema creates candidates as modalities in a slate of candidates for the ipsities that have formed a conglomerate. This projection appears as a Category Theory model of relational meta-levels. The fifth moment attempts to discern the internal coherence of this projection as its design. All the candidates are holons within the integrity of the slate, which appears as the inner design of the swarm.
Sixth Sub-schema: Whole Form	Holoid Axiom Common Notions	Annihilation	Ben Goertzel ¹¹⁷⁹ has noted that the candidates in the swarm cancelled each other out, which, in turn, produced the traces for the next round of the cycle. The traces are planted in the substrate of the Emptiness or Void. This annihilation is the same as interpenetration, and the hyper-complex algebras are a

¹¹⁷⁸ Leibniz, Gottfried Wilhelm. Discourse on Metaphysics. Correspondence with Arnauld, and Monadology. (La Salle: Open Court Pub. Co, 1962). See also Stewart, Matthew. The Courtier and the Heretic: Leibniz, Spinoza, and the Fate of God in the Modern World. (New York: Norton, 2006).

¹¹⁷⁹ Goertzel, Ben. Chaotic Logic: Language, Thought, and Reality from the Perspective of Complex Systems Science. (New York: Plenum Press, 1994). See <http://Goertzel.org>. accessed 081231.

<u>Being</u>	<u>Existence as Emptiness</u>	<u>Existence as Void</u>	<u>Commentary</u>
			model of this interpenetration, which appears in Geometry as the Common Notions ¹¹⁸⁰ . This holoidal interpenetrating sheaf is the ultimate supra-whole schema, from which the limited finite whole schema appears through a collapse in the conjunction of Whole, Picture, Plan, and Model such that only the Whole Form is left after the catharsis.
Seventh (repeated) Moment: concept, representation, focus, circumstance, sense	Singularity Model (Catastrophe Theory)	Seed in pod (ipsities in conglomerate)	After the annihilation, only the seeds are left in the pod. These are the zero divisors that appear as hyper-complex algebras that collapse into the Sedenion from the higher algebras. These zero divisors are singularities that are naturally produced as flaws in the interpenetration. It is from <i>these</i> that the concept uses the creation operator to produce a new swarm of monads. Then the cycle starts all over again.

Table 13.6. Synchronization between Cycles of Existence and the Moments of the Quadralectic.

When annihilation occurs, the cycle begins again as it fructifies from the seeds that are left over from the last Emergent Meta-system cycle. This cycle is also the Lifecycle of the Emergent Event as seen in the Foundational Mathematical Categories. The moments of the Quadralectic result in the sub-schemas, and the whole cycle produces a Super-Synthesis from which the Whole Schema collapses. The Quadralectic is able to bridge between repetition and representation, but not without the production of an over abundance of emergent effects. Thus, we posit that the two cycles combine with the Quadralectic and the sub-schemas to give a highly constrained view of the process that occurs in the interplay between Emptiness and Void, as well as in Being and Beyng. This highly constrained view allows us to understand the nature of the Quadralectic more precisely. We already said that the entire sequence of the Foundational Mathematical Categories must have a source from which it arises, and it must have the *Conglomerate ipsities*, which provide the non-nihilistic middle way between the extremes of the difference of Set particulars and the identity of Mass instances. Thus, we are satisfied that all these interlocked and over-determined cycles are multiple representations of the same process that occurs between Being and Beyng and Emptiness and Void.

In each Foundational Mathematical Category there is an interaction and juxtaposition between Being and Beyng. That interaction makes sense of the order that is created in each stage of the Emergent Lifecycle. In each Foundational Mathematical Category there is some element that appears and continues to relate to Beyng in the context of the

¹¹⁸⁰ Equality in the common notions are the image of interpenetration or the Holoidal Foundational Mathematical Category.

differences produced by Being. When the gap between Being and Beyng is embodied, a spark of meaning can leap between the two. For example:

- The Singularity appears from out of the virtual to affect spacetime.
- An event of quantum measurement appears at a local site on the background of the conjuncted probabilities.
- The ‘ultra-one’ appears out of the Multiple.
- The Set element appears on the background of the empty Set.
- The outer boundary of the Mass appears in relation to the parts of the Whole.
- The Holon appears in relation to the Integra.
- The zero divisor, as a new Singularity, appears in relation to interpenetration.

At each stage of the Foundational Mathematical Categories’ unfolding there is a Cleavage to be leapt over. The Cleavage is the embodied space where meaning is created from the orthogonal ground of Beyng within the context of the differences in Being.

Design Field and Synchronized Cycles

Two very different views of the context of the Quadralectic have been presented. The Design Field presents the Quadralectic as the interstices between the Philosophical Categories as articulated by the Meta-levels of Being with emphasis on the level of Hyper Being. The synchronized cycles present the Quadralectic and the sub-schemas in relation to the Foundational Mathematical Categories and the Emergent Meta-system. It behooves us to show how these two representations relate to each other. Meta-levels of Being are interleaved with Special Systems, Philosophical Categories, and the Roots of Being. The Roots of Being are the reflection of Being in the Proto-Indo-European language and this is how Being appears fragmented in logos. We will use the roots in Old English as our model. The various roots ([sien/syn]/Es/Er//Bheu//Wes/Wer)¹¹⁸¹ are differentiated from each other by the meta-levels of Being. Notice that Sein and Seyn (Being/Beyng) appear as the most superficial differentiation of the roots in this pattern. This is the way that Being cuts across itself and thus fragments itself in the most ancient strata of our language. This is a *pre-conceptual* fragmentation. The Philosophical Categories show us a *conceptual* fragmentation in which Being is fragmenting the realm of all concepts into Philosophical

¹¹⁸¹ See “Primordial Being and Archaic Existentiality” by the author at <http://archonic.net>.

Principles based on the differentiation of geometry and number. Percepts and concepts are either Firsts, which appear out of nowhere (Zeroth), or they are related to other concepts, or they are converted into ideas, which have illusory continuity. Higher trans-Peircean categories show how these internal relationships among concepts and precepts ramify. On the other hand, Special Systems are related to Existence and provide a model of existence as *interpenetrating*. This model is fully articulated when we produce the meta-levels of the Sixth Category. Being is a projection and thus all Being (percepts and concepts) are an imaginary elaboration that emanate from this model of interpenetration. The various articulations of the Roots of Being, Special Systems, and Philosophical Categories are all parallel to each other but are completely different fields that are cut up by the meta-levels of Being. The Meta-levels divide Being into a linguistic entity, existence, and into the complete field of *possible* existences as subsumed under the Peircean categories. The Emergent Meta-system unfolds out of the Special Systems and the Foundational Mathematical Categories unfold from the Philosophical Categories. The Emergent Meta-system is the cycle of the optimization of existence that appears in nature as the continual seeking a material optima. The Foundational Mathematical Categories are a description of the Nomos as discovered by Mathesis. This is a model of Existence. We *differentiate* this model of existence as Nomos by calling it Emptiness whereas we *associate* the Emergent Meta-system model of Existence by calling it Void. Emptiness and Void are a distinction like that between Set and Mass, or between Differentiation and the Undifferentiated. The Philosophical Categories are a description of the fundamental differentiation of the conceptual foundations of Existence and the Meta-levels of Being fragment these conceptual foundations into the Design Field. It turns out that the linguistic sources of Being in Old English happen to have a structure similar to the meta-levels of Being. Thus, we say that the roots of Being are also a fundamental differentiation within Indo-European languages that reflect the many roots of Being. Being is the most fragmented root word within the Indo-European languages followed closely by the root word ‘have’. We take the structure of the roots of Being in Old English as paradigmatic¹¹⁸² of the structure of Being within the Indo-European worldview, because of the dominance that the English language has gained, but also because the structure seems to be more well preserved than in Old

¹¹⁸² Old English Roots of Being: (sein/seyn) es* / er* //bheu*// wes* / wer* where ‘*’ indicates proto-Indo-European roots. What we notice here is that the difference that Heidegger takes as so fundamental which is the difference between Being and Beyng is merely the tip of the iceberg of the differentiations of the roots of Being. The differences between the roots of Being in Old English align with the meta-levels or kinds of Being. We call this the ‘kindness’ of Being. In other words this differentiation which is anti-ontotheological is the kindness of Being toward us as well as a revelation of its own essence through its differentiation into kinds. See “Primal Ontology and Archaic Existentiality” by the author at <http://archonic.net>

High German, which was the source of the inspiration for Heidegger's ontology. These roots of Being that appear in Old English are not all clearly represented in Old High German. We capture this relationship between Existence and Being by saying that these fields (Emptiness, Void) interleave with the Meta-levels of Being. The meta-levels of Being specify the greatest possible emergent difference between the elements of these fields. When we take Philosophical Categories and cross them with the Meta-levels of Being we get the Design Field. The Design Field gives us all possible entities that may be contained in any given semiotic Design Object. In that field the widest level is that of Hyper Being.

As we have seen, the moments of the Quadralectic (and Pentalectic) are defined by the interstices between the Philosophical Category elements at the Hyper Being level that cuts across the Design Field. The Quadralectical moments (in different permutations) give rise to various differences such as Temporal/Atemporal, Set/Mass, and System/Meta-system. The Quadralectic, as a system, operates on a meta-systemic background made up of the permutations of these structural opposites. The Temporal/Atemporal split can be differentiated as time and space, which each have their meta-systemic models based on geometry and algebra. Non-Euclidean geometries and non-standard algebras represent these meta-systems. The dimensional unfoldings of algebras and geometries are correlated to the unfolding of the Schemas. Schemas are both temporal and spatial as they represent spacetime intervals with different types of organization. What cuts across all the schemas are the Quadralectical Moments and the sub-schemas produced by repetition and representation. Thus, we can think of the Quadralectic, plus this action that transforms the sub-schemas at an operational core, as a process that operates across all the schemas. The Quadralectic is placed at the third meta-level of Being but it is synchronized with both 'Existence as Void' in the form of the Emergent Meta-system, and 'Existence as Emptiness' in the form of the Foundational Mathematical Categories. The meta-levels of Being arise from the logical typing that is necessary to avoid absurdity, paradox, and contradiction. This absurdity, paradox, and contradiction arise in which Sets are not well-founded, which means that they can be members of themselves. Interpenetration is a model in which sets are *not* well founded but are members of themselves via intermediaries. There is a fundamental difference between 'self-non-well-founded Sets', i.e., those that try to found themselves by being their own elements, and those that are non-well-founded via the mediation of the Other. This is one of Hegel's fundamental insights. Thus, when we contrast the Emergent Meta-system and Foundational Mathematical Categories views of Existence, we are basically contrasting Well Founded and Not Well Founded models of

Existence. In this model, Being is an absurdity, a paradox, or at the very least, a contradiction. It is a contradiction because, since ancient times, all *movement*¹¹⁸³ was recognized to be a contradiction. Hegel recognized this and embraced it, but most of Philosophy is in denial of the contradictory nature of Being as a *Process* and therefore cling to Pure Being. Heidegger tried to reconcile these two views of Being that originate from Heraclitus¹¹⁸⁴ and Parmenides¹¹⁸⁵ by saying that Being encompasses *both views* with different modalities for each. But as soon as the two kinds of Being are accepted, then we open up Pandora's box and unleash the specter of *infinite modes of Being*. Heidegger developed the notion of *Beyng* in order to prevent this from being necessary. But we have embraced the higher meta-levels of Being and we have posited that there are only five of them because there is a transition of Existence at the fifth meta-level of Being. Thus, when we discuss Existence, we are discussing different views of the Fifth meta-level of Being, which can be seen as Emptiness, Void, or as Ultra Being. When we talk about the Special Systems becoming Emergent Meta-systems or Foundational Mathematical Categories, we are talking about articulations of the fifth Meta-level of Being, which are *not* something *outside* of Being, but something *at the heart of Being itself*, where Being turns into Existence. After Being turns into Existence (at its higher meta-levels) it turns into Manifestation, the nondual between Emptiness and Void and the Amanifest, the deepest known nondual. Being is a paradox because everything is seen as having Being. Thus, it is a sub-stratum that supports everything. Through the use of this substratum anything can be identified with anything else via metaphor. So, Being is at once the most full *and* the most empty concept. It describes things that are static and also things that are dynamic. Parmenides¹¹⁸⁶ attempted to stem this problem by saying that Being is distinguished from Appearance and Non-Being. Appearance is the illusion of change and Non-Being is Existence. But if you isolate only those things that are utterly unchanging, you see that it is an empty set, because everything *is* changing. Being then becomes apparent as an illusion.

Being is Absurd because it has been interpreted in myriad ways throughout the history of our worldview, and thus it is everything to everybody and seems to have no essence of its own, yet it is supposed to give everything its essence, and guarantee each thing identity,

¹¹⁸³ Zeno, Cleanthes, and A. C. Pearson. The Fragments of Zeno and Cleanthes. Philosophy of Plato and Aristotle. (New York: Arno Press, 1973). See also Grünbaum, Adolf. Modern Science and Zeno's Paradoxes. (Middletown, Conn: Wesleyan University Press, 1967).

¹¹⁸⁴ Heraclitus, and Brooks Haxton. Fragments: The Collected Wisdom of Heraclitus. (New York: Viking, 2001). See also Wheelwright, Philip Ellis. Heraclitus. (Princeton, N.J.: Princeton University Press, 1959).

¹¹⁸⁵ Parmenides. Fragments: A Text and Translation. (Toronto: University of Toronto Press, 1984). See also Plato, and Reginald E. Allen. Plato's Parmenides. (Minneapolis: University of Minnesota Press, 1983).

¹¹⁸⁶ Geldard, Richard G. Parmenides and the Way of Truth. (Rhinebeck, N.Y.: Monkfish Book Pub, 2007).

truth, reality, and presence. So, we can see that Being is the Unfounded, although it is supposed to be the Foundation of everything in experience. That is why it is called the Abgrund, the Abyss, because it is a 'foundationless foundation'. Essentially, Meta-levels of Being open up the way to discover Existence within Being at its higher meta-levels. That existence is split by the distinction of Ultra Being into Emptiness and Void. These give rise to the Special Systems and the Philosophical Categories, which, in turn, give rise to the Emergent Meta-system and the Foundational Mathematical Categories. In general, it is at the level of Hyper Being that possibilities are introduced, and so, it is to that level we turn in order to understand the basis on which Emergent artifacts are designed. In order to understand the nature of design we cross the Meta-levels of Being with the Philosophical Categories to discover what is constituted at the Hyper Being meta-level for each Philosophical Category. In laying out the Design Field we discover that the moments of the Quadralectic are the relationships between the Philosophical Categories at the Hyper Being level, and that these moments are traces or hinges that appear as the interstices between these Philosophical Categories at the Hyper Being meta-level. But, in order to become embodied, the Quadralectical moments operate through the transformation of the schemas between their sub-schemas as established by repetition and representation. As the moments of the Quadralectic transform, the sub-schemas form a cycle, which is then synchronized with the Emergent Meta-system Cycle and the Foundational Mathematical Categories, which form the Lifecycle of the Emergent Event. If we keep in mind that the Quadralectic is operating at the Hyper Being meta-level and articulating the separation between the Philosophical Categories at that level, and that the Cycles of Emptiness and Void are occurring at the fifth meta-level where the phase transition between Being and Existence occurs, then we can see the *Quadralectic is an outward cycle within Being*, and that *it expresses a synchronization with Existence* that appears at the fifth meta-level. So, the two cycles that are being synchronized are *internal* to the differentiation of Being and *not extrinsic* to it. These cycles in Existence are an internal dynamic of existence within Being, which are then expressed externally in Being at the Hyper Being level. The Quadralectic operates with the sub-schemas across the range of all the schemas. In this sense we can see the dynamic of Process Being as merely a reflection of this more basic dynamic within Hyper Being. Only Pure Being is static. All higher kinds of Being are dynamic. While Hyper Being is associated with the Quadralectic, we can go on to speculate that Wild Being is associated with the Pentalectic and that Ultra Being is associated with the

Sextalectic¹¹⁸⁷. However, because Ultra Being is a singularity and because the Sextalectic is a perfected state that appears as a Holoïd, the only *experienceable dynamic* is at the Quadralectical and Pentalectical levels. If the meta-levels of Being were opened up, then this would be the structure that appears at these higher meta-levels.

Once this is understood, we can go on to note similes between the moments of the Quadralectic and other phenomena such as the points of view on the Novel, Aristotle's Causes, and the Master Tropes of Rhetoric. The Novel is a vast field of fabrication, elaboration, and imagination within our tradition, and it is of interest because in spite of its variety there are only a limited number of points of view that are represented within that vast field of variety. That is because, as a fantasy, the novel is mimicking the field of consciousness in its production of variety. Phenomenologically, consciousness is constrained to a number of the basic states that appear to represent states similar to the Quadralectical moments. So, instead of studying all of the states of consciousness, we can study the novel as a representation through its repetition of fundamental viewpoints as a mimesis for consciousness. We can also relate these moments of the Quadralectic to the causes of Aristotle in order to see the antiquity of this differentiation within our culture and its finitude because we are unable to think of any other causes than those first proposed by Aristotle. This will give some appreciation for the universality of the Quadralectical moments. And finally, when we consider language in general, we must remember that according to Heidegger, "language is the house of Being"¹¹⁸⁸, and it is of interest to us that the master tropes of Vico are also an image of the Quadralectical moments.

Images of the Quadralectic

Quadralectic in Literature: Points of View of the Novel

One way to test this theory is to see it in the context of the novel. In the novel there are four viewpoints that are possible, these are the, author, character, reader, and narrator. This

¹¹⁸⁷ We do not go on to explore the Sextalectic in this dissertation as the transition between the Quadralectic and the Pentalectic is difficult enough to understand without compounding the difficulty of the argument of the dissertation further. But it is implicit that once you open up the possibility of higher meta-dialectics then there is an endless horizon of possible meta-dialectics. Our position is that this series is finite and limited by the extent of the trans-Peircean philosophical categories. If it turns out there are more trans-Peircean Philosophical Categories than those recognized here then there should be more corresponding higher meta-dialectics of unknown structure. However, since we have noted that there is a close relation between these meta-dialectics and the Platonic Solids of higher dimensions, even if there are infinite meta-dialectics they are not as interesting as those associated with the platonic solids in the third and fourth dimension in terms of the expression of the complexity of ordering relations.

¹¹⁸⁸ From Heidegger's "Letter on Humanism." Heidegger, Martin, and David Farrell Krell. Basic Writings from "Being and Time" (1927) to "The Task of Thinking" (1964). (London: Routledge, 1993). See also Harrison, Robert Pogue. The Dominion of the Dead. (Chicago: University of Chicago Press, 2003). p. 37.

structure is borne out in the Narrative theory of R. Altman¹¹⁸⁹. If we apply the Quadralectic in this context, the author is related to representation because he is the one who has created the representation from the conceptual seed of his insight. The character viewpoint is related to essence. The character reveals its essence as it interacts with other characters and its environment. The reader is related to perspective. As each reader takes a stance toward what he is reading, he derives meaning from what is being read. Finally, the narrator is the one who formulates the design of the novel from an omniscient point of view, which gives him access to certain details that he may impart to the reader. These four positions in the novel correspond to the four moments of the Quadralectic. These four viewpoints are implicit in Hegel's Phenomenology of Spirit as the voices that say "we"¹¹⁹⁰.

Quadralectic as Aristotle's Causes

Another way to look at the Quadralectic is in relation to Aristotle's four causes¹¹⁹¹. Representation is related to Formal Cause, i.e., what it is to become something. Behavior is related to Efficient Cause, which is what produces something. Stance is related to the Final Cause, which is the telos that defines purpose. We project the telos as the intentional target of the *thing*. Telos is what brings the *thing* into the Form of the whole schema, which is what the metaphysics of presence demands. Finally, the content, in its context, is related to the Material Cause, which defines what something is made out of. Thus, Aristotle's four causes can be considered as the first known mention of the four moments of the Quadralectic, although the causes do not operate together or in the sequence that we posit in the Quadralectic.

Quadralectic as Master Tropes

In his New Science¹¹⁹², G. Vico says that there are four master tropes. Trope means 'turn of phrase'. This was picked up by K. Burke in the Grammar of Motives¹¹⁹³. Burke's book is about the analysis of motives in terms of agency. His various terms for agency can be viewed in terms of the differentiation of the moments in the Quadralectic. Burke identifies Agent, Act, Agency, Scene, and Purpose as the fundamental moments of his "grammar of motives". He talks about how the different philosophies of agency have emphasized

¹¹⁸⁹ Altman, Rick. A Theory of Narrative. (New York: Columbia University Press, 2008).

¹¹⁹⁰ Vico, Giambattista. The New Science of Giambattista Vico. (Ithaca, N.Y.: Cornell University Press, 1968).

¹¹⁹¹ Allan, D. J. The Philosophy of Aristotle. London: Oxford U.P., 1970.

¹¹⁹² Vico, Giambattista. The New Science of Giambattista Vico. (Ithaca, N.Y.: Cornell University Press, 1968).

¹¹⁹³ Burke, Kenneth. A Grammar of Motives. (Berkeley: University of California Press, 1969).

different aspects in this field of motives. K. Burke states that Agent is *who*, Act is *what*, Agency is *how*, Scene is *where* and *when*, and Purpose is *why*. We can relate these to the differentiation that exists in the moments of the Quadralectic. We can see that the traces, i.e., concept, essence, perspective, and design are indications of *who* (the invisible identity of the agency), while the System, i.e., the representation, behavior, stance, and content is more akin to the *what*, or act that appears on the background of the scene, which is described by the Meta-system as circumstance, situation, surroundings, and context. Between the scene and the act there is the agency, or mediation, which answers the question *how*, which is associated with focus, object, image, or signature. Finally, there is the purpose or *why*, and that is the projection, which is associated with the sense, goal, intention, and *pragmata*. In Burke's Grammar of Motives, phenomena is differentiated much in the same way that the moments of the Quadralectic are structured. And, in an appendix to his book, K. Burke recalls G. Vico's master tropes as the process by which this grammar of motives is transformed. These are synecdoche, metonymy, metaphor, and irony. We have identified these with the moments of our Quadralectic¹¹⁹⁴. Synecdoche is related to part-whole relations, which indicates how representations can perform as substituting a part for the whole. Metonymy is a transposition of one thing for another (and vice versa), and this transposition is related to behavior. Metaphor changes the meaning of a word from its proper 'literal' meaning to a meaning that can be interpreted as analogous to it. Metaphor indicates that something IS something else, which means we have to derive a particular perspective on that thing. Irony is the act of understanding two different perspectives at the same time, which can generate a perceptual contradiction. It is this type of contradiction that must be overcome for the Whole Form to be generated out of the design model. We need to see the new characteristics in the former situation and how that understanding can transform into a new situation through emergence¹¹⁹⁵. Emergence is, by definition, an arising of a contradictory state of affairs where the old is overcome with the new although there can be a particular moment when both old and new apply to the same thing simultaneously. We need dialectics to overcome this para-consistency. In a sense, all this work has merely rediscovered what G. Vico and K. Burke have already told us about the relationship between the "grammar of motives" and the "master tropes". The Quadralectic makes this theory more precise and puts it in the context of Emergent Design.

¹¹⁹⁴ See Mladenov, Ivan. Conceptualizing Metaphors (Oxford: Routledge, 2006) Chapter 10 The Invisible Self p. 161-162. Mladenov has a concept very similar to my own, which he expresses in this section of his book on discarded concepts and metaphors of Peirce. He talks about the relationship of the Concept to the Metaphor, which can be generalized as a structure of Trace-Trope-Ground.

¹¹⁹⁵ See "The Anamorphic Cycle" by the author at <http://archonic.net>

However, it is surprising that such a closely related theory comes out of the use of Rhetoric¹¹⁹⁶.

Applying the Quadralectic as Design Method

We can line up the design methods developed in Integral Software Engineering Methodology (ISEM) with the Quadralectic. We do that by realizing that in each case the Meta-system schema must have a relationship to the schema of the System. We are familiar with the opposition between form and function, so we can see that a given representational form will have a particular function in a particular circumstance. It is the function that allows us to distinguish the focus that yields the representation. If we apply this same type of discrimination to the other moments of the Quadralectic, then we realize that the behavior of manipulating the object to reveal its essence will generate an event in a given situation. The agent, in his given surroundings, takes a stance and thus perceives an image from that perspective. Finally, in a given context, certain content can be encapsulated as data. That allows the unordered point of view of the data to be related to requirements. Full ordering applies to space and time, and data and event are related to behavior and content. Partial Ordering applies to Function and Agent, which relates to representation and perspectival stances. If this mapping can be affirmed, we can then say that the *minimal methods* are the *bridges* between the Quadralectical moments. It can also be said that the meta-methods can be derived from the Quadralectical moments. The meta-methods are the Gurevich Abstract State Machine and the Wisse Metapattern. This elaboration supports Wisse's Metapattern method. The rules that are the basis of the Gurevich Abstract State Machine are nodes that combine the four perspectives within each rule. The meta-methods produce the unified modes with all four perspectives while the minimal methods produce slices of the Turing machine, which represent a physical architecture that is efficient and effective rather than merely a functional and causal coherence.

¹¹⁹⁶ See Danesi, Marcel Vico, Metaphor and the Origin of Language (Bloomington, IN: Indiana U.P. 1993) pp. 66-80 (Events: Iconicity, Visual Mimesis, Audio-visual Osmosis, Metaphoricity then Conceptualization)

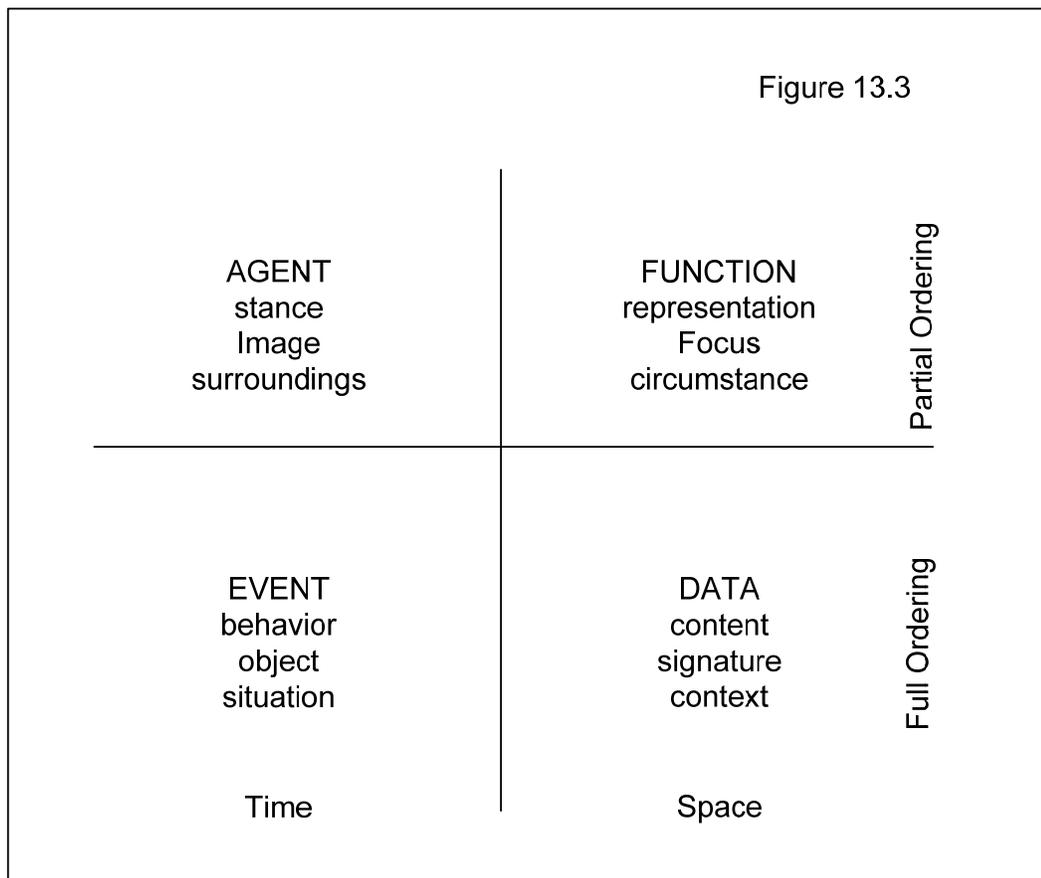


Figure 13.3. Viewpoints on the Real-time System in relation to the Moments of the Quadralectic.

On the Complexity of the Quadralectic Design Theory

As the various over-determining cycles converge, the complexity to this theory arises. We are beginning to find other similar series where we can relate the Quadralectic Cycle's dynamics in action, such as the viewpoints on the novel, or the types of causation in Aristotle, or the Master Tropes of G. Vico and K. Burke. This complexity shows that the structure is over-determined, which gives us reason to affirm its existence. It means that the various elements in the structure take on a more precise meaning as we find other over-determining series that we may fit it into. On the other hand, it also has a 'watering down factor' such as we see in the Philosophical Categories of Peirce, which occurs when you apply the same structure to many different things. In this case the elements become so complex that they lose their meaning and become imprecise. However, rather than conflating the various sequences, we posit that they are synchronized, but independent. The Emptiness Cycle of the Foundational Mathematical Categories within the Lifecycle of the Emergent Event is independent of the Void Cycle of the Emergent Meta-system. These are synchronized with the cycle in Being at the level of Hyper Being where we see the

concept, essence, perspective, and design traces. They are coordinated to show the Open Clearing between Being and Beyng where Emptiness and Void participate within the domain of Forgetfulness and Oblivion. It is important to see how the moments support the Emergent Event, as well as the dynamic of Existence in the form of the Emergent Meta-system. We see these as *moments* of cycles that are *synchronized* rather than as one thing. This cycle must have a bootstrapping mode, which can be understood as the autogenesis¹¹⁹⁷ of the Emergent Meta-system Cycle. This appears to us as the four-dimensional timing of the Emergent Event or as the Quadralectic that supports design. For us, design is evolving to mean more than just *metis*. Only the Whole Schema has the resolution of pragmata, which can allow something to actually produce emergent characteristics that the model pretends to have. The interlocking of the different cycles with different bases allows us to confirm its structure in multiple ways. It has a basis in Emptiness, in Void, and in Being, but at the same time it transforms the unique and strange onefold of Beyng as each Foundational Mathematical Category brings to the fore a different meaning of the onefold. *It is also on the verge of a higher synthesis represented by the relationship of the Quadralectic to the next higher threshold of ultra-synthesis.* This is a boundary that allows us to differentiate the higher synthesis from the lower one, and this becomes important when we understand the Whole Schema as the Holoidal. In other words, it gives us a precise model of *how* the super-synthesis is produced and how it *falls back* into the Whole Schema. The alignment of the cycles gives us more information, rather than just reinforcing our view of the Quadralectic as it stands. It forces us to see the relationship of the Quadralectic and the sub-schemas in the context of the Emergent Event and its lifecycle, while at the same time the cycle of the dynamic of Existence is shown by the Emergent Meta-system. This allows us to state even more emphatically that the Quadralectic, as it relates to the Design Field, is the core structure that underlies Emergent Design. The Synchronization of the cycles of Existence provides a foundation for the Quadralectic and contributes to our knowledge of Emergence. The Design Field gives us the basis from which the semiotic Design Object can be elaborated on in relation to the constructed Object of Design. The meta-Quadralectic¹¹⁹⁸ of meta-design is not just trapped in Being, as a cognitive structure would be, but it appears as a mechanism that *produces* meaning, which is necessary if our designs are going to play a significant role in society,

¹¹⁹⁷ See Reflexive Autopoietic Dissipative Special Systems Theory by the author for a description of Autogenesis. It is the meta-Emergent Meta-system cycle that bootstraps the Emergent Meta-system into Existence.

¹¹⁹⁸ Also called the “pleroma” in other working papers by the author.

be relevant, emergent, and fulfill our needs, as well as the needs of other species, or of the planet as a whole. The combination of the elaboration of the Design Field and the Synchronized Cycles of Existence and Hyper Being has the effect of creating both a structural and a temporal theory of great specificity. But for now, the final question is how this theory can inform our *knowing practice* of Emergent Design.

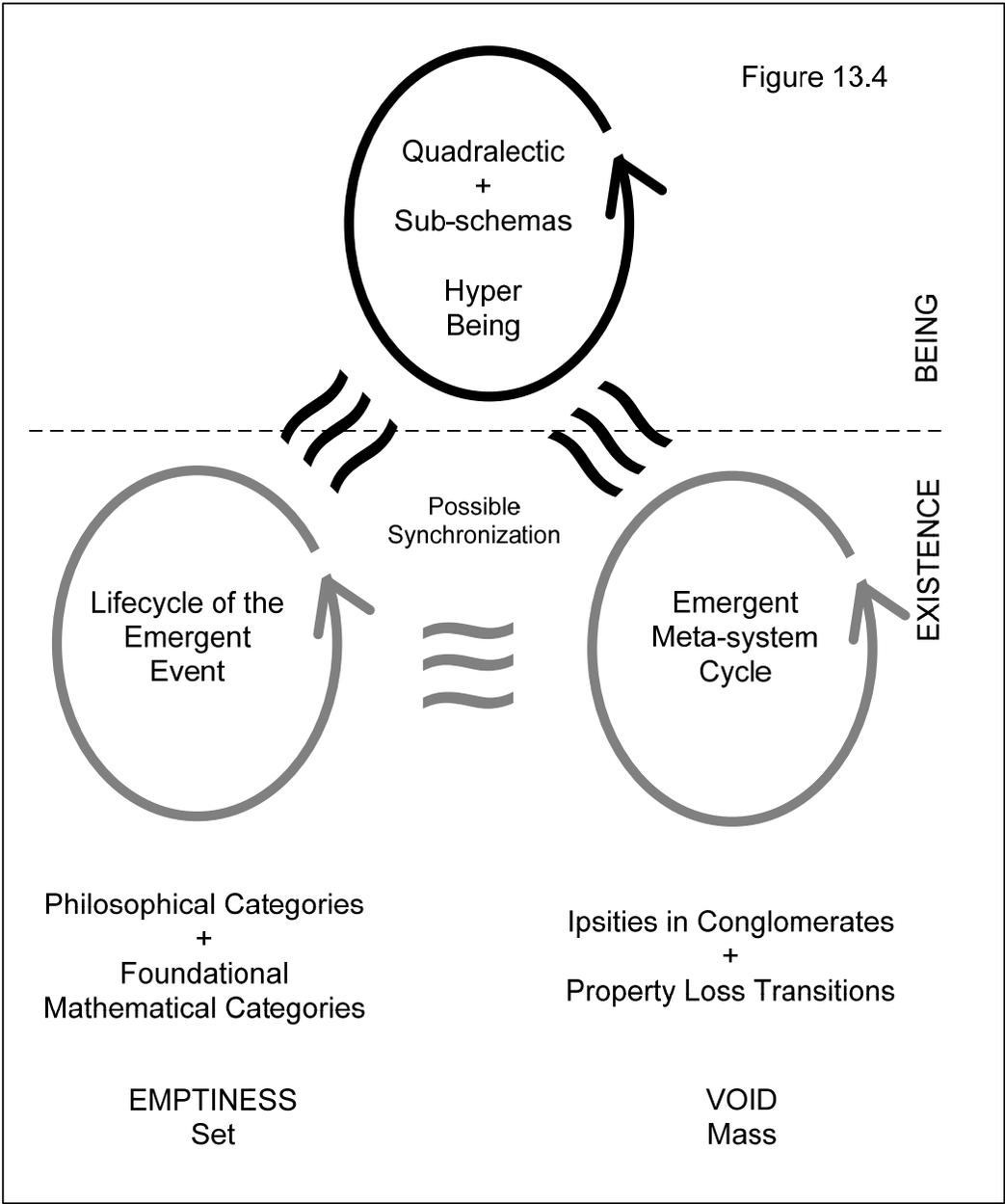


Figure 13.4. Synchronization between the Cycles of Existence and the Quadralectic.

From Quadralectic to Pentalectic

Considering the Relationship of the Monolectic, Dialectic and Trialectic to the Quadralectic and then Going Beyond to the Pentalectic

The Quadralectical structure is again summarized and given a more formal definition for each of its moments. This structure paves the way for the possibility of an extension into the Pentalectic. The manner in which the Quadralectic produces meaning via the Golden Threads of Beyng is revisited. We also demonstrate how each Foundational Mathematical Category is a nexus for the relationship between Being and Beyng. The possibility of meta-design is explored, which gives some insight into the concept of intelligent design. The role of genius in meta-design is also considered.

Quadralectics Formally Defined

On the basis of the work of Pieter Wisse, we have created the Quadralectic to serve as a new basis for Sign Engineering. This chapter will seek to formalize the concept of the Quadralectic and use it to bridge the gaps between it (the Quadralectic), the methods, and the meta-methods that we apply to Systems Design. The Quadralectic can be used as a blueprint for the basic processes of Sign Engineering, which specifies how signs interact with non-signs in a cycle that underlies design. The concept of the Quadralectic began with Monolectics, then moved to Dialectics, then progressed to Trialectics, and finally evolved into our *present concept* and *design blueprint*: the Quadralectic. It must be noted though, that Hegel's philosophical model does not extend beyond Trialectics. Dialectics is a process of *Aufhebung*¹¹⁹⁹: from Thesis and Anti-Thesis to Synthesis. Trialectics assumes that there are three elements in a triangular relationship at the Thesis level, while Quadralectics assumes that there are four elements in a tetrahedral relationship at the Thesis level. The Quadralectic is two dialectical syntheses that is further synthesized at a *super-synthetic* level. Quadralectics is developed directly out of Pieter Wisse's Ennead and we have attempted to preserve his terminology as much as possible. Pieter Wisse used

¹¹⁹⁹ Also called in English "sublation" <http://en.wikipedia.org/wiki/Sublation> accessed 081231. See also Inwood, M. J. *A Hegel Dictionary*. The Blackwell Philosopher Dictionaries (Oxford, UK: Cambridge, MA: Oxford U.P., 1992) pp. 283-285. See also Stirling, James Hutchison. *The Secret of Hegel* (Edinburgh: Oliver & Bond, 1898) See remark p. 243.

Peirce's Philosophy and Theory of Signs as a basis for supporting his Metapattern method. Wisse developed his concept of the Ennead from Peirce's Theory of Signs. The Ennead then became the foundation for his theory of Sign Engineering, which, in turn, became the contextual support for his Metapattern method. We are extending the Ennead in crucial ways to produce the Quadralectic, particularly by adding the dimension of *perspective* and by placing the action of the Quadralectic at the Hyper Being level where possibilities emerge within Being. As a result, we hope to produce a well formed basis for design methods at both the method level and at the meta-method level, which is intermediary between the Quadralectic and the Minimal Methods of Design. Meta-methods span all the schemas while methods are schema specific. Therefore the minimal methods previously developed in Integral Software Engineering Methodology (ISEM) are centered at the System level but actually apply to both the System and the Meta-system. The meta-methods, such as the Gurevich Abstract State Machine and the Wisse Metapattern methods apply equally to all the schemas and are centered at the meta-method level. Meta-methods are one step away from the Enneadic Axiomatic Platform of Sign Engineering, which is meant to be the basis for *all* methods, both minimal methods and meta-methods.

Statements that define Quadralectics:

- Monolectic has a dogmatic thesis only.
- Dialectic has a thesis and an anti-thesis.
- Trialectic has a thesis (foreground), mediation, and non-thesis (background).
- Quadralectic has twin theses and twin anti-theses that are inversely complementary.
- Quadralectic relates foreground to background in the sense of a gestalt or flow.
- Foreground and background have mediation.
- Mediation has a Hyper Being trace or shadow¹²⁰⁰.
- Beyond the background is a projection.
- Foreground is representation (FI), behavior, standpoint, and content (intext).
- Hyper Shadow¹²⁰¹ of traces has concept, essence, perspective, and design.
- Mediation is focus, object, image, and signature.
- Background is circumstance (BI), situation, surroundings, and context.
- Projection is sense, goal, intentional target (vanishing point), and pragmata.

¹²⁰⁰ Plotnitsky, A. In the Shadow of Hegel Op. cit.

¹²⁰¹ Hyper Being can be understood as the trace or shadow of Higher Dimensional objects represented at lower dimensions with information loss.

These various types of elements combine to produce the moments of the Quadralectic which are as follows:

Moment n:: trace: System: MEDIATION: meta-system: **projection**

Moment 1:: concept: Representation(FI): FOCUS circumstance(BI): **sense**

Moment 2:: essence: Behavior: OBJECT: situation: **goal**

Moment 3:: perspective: *Standpoint*: *IMAGE*: *surroundings*: **vanishing point (intentional target)**

Moment 4:: design: Intext: SIGNATURE (signifier): context: **pragmata**

In each case the moments interact as if they were a greater whole produced by the interaction of two syntheses with their component theses and anti-theses intact. But, a particular moment has the structure of the trialectic in as much as it has foreground, mediation, and background. In effect, the form of the trialectic is incorporated into the Quadralectic, although, in each case we can see that (ala Bataille¹²⁰²) there is some surplus and some deficiency with respect to each. The deficiency is a *trace of Hyper Being*, and the surplus is a *projection* that goes beyond the information given¹²⁰³, an act of hubris¹²⁰⁴.

The Quadralectic explains the basis for the methods and meta-methods of Design. Together, the meta-methods for the System and Meta-system combine to become both the

¹²⁰² Bataille, G. Accursed Share Op. cit.

¹²⁰³ Bransford, John D. How People Learn Brain, Mind, Experience, and School (Washington, DC: National Acad. Press, 2001) p. 237. See also Bruner, Jerome S. Beyond the Information Given; Studies in the Psychology of Knowing (New York: Norton, 1973). See also Erneling, Christina E. The Learnability of Language Going Beyond Information Given (Ottawa: National Library of Canada, 1991).

¹²⁰⁴ Payne, Robert. Hubris. A Study of Pride (New York: Harper, 1960).

Gurevich Abstract State Machine method, and the Wisse Metapattern method¹²⁰⁵. Methods are made up of a series of minimal methods that appear in Real-time Systems Design as the bridges¹²⁰⁶ between the four viewpoints¹²⁰⁷, which are Agent, Function, Data, and Event. These minimal methods that are mostly represented in UML¹²⁰⁸ and SysML¹²⁰⁹ are: dataflow, DARTS¹²¹⁰, virtual layered machine, use case mapping, worldview/scenario, state machine, petri-net, and the various possible relationships between data and event as described in Integral Software Engineering Methodology¹²¹¹. Here, we will generalize beyond Software Engineering to System and Meta-system Engineering. We are attempting to describe the *engineering of the Emergent artifact*. We are trying to build directly on the insights highlighted in Pieter Wisse's Sign Engineering, while adding the idea that Sign Engineering must interact with *non-sign elements* in order to affect design.

Because design is based on opening up the realm of possibility in Being, the most significant thing about the Quadralectic is the fact that the deficiencies in Hyper Being are associated with each moment in the Cycle from concept, to essence, to perspective, to design. Design is the third meta-level of the sign, making its representation appear as a *hinge of possibility* with a *signature trace* in the interconnected field of the design landscape. This cycling between possible concepts, possible essences, possible perspectives, and possible designs within the Design Field is the fundamental way in which the landscape of possible designs can be explored. The cycle of the Quadralectic is founded on the twin cycles of Existence, which are the Lifecycle of the Emergent Event and the Cycle of the Emergent Meta-system, and it is this dynamism that drives Emergent Design forward. Without possibilities there would be no Emergent Event, so the Quadralectic is the most definitive anchor for describing design. In addition, other meta-levels of Being can be brought in to support the fundamental notion that design is an interconnected field at the third meta-level of the sign, which is the object of Sign Engineering. The design process explores the whole Design Field but it delves deepest into the third meta-level associated with Hyper Being where the greatest and most essential

¹²⁰⁵ There may be other meta-methods. The fact that we have identified two does not mean that these are the only ones that exist.

¹²⁰⁶ Minimal methods are bridges between viewpoints on the Real-time system. Minimal Methods are enumerated in what follows and have been referenced previously. See Wild Software Meta-systems by the author at http://works.bepress.com/Kent_Palmer

¹¹³⁶ The four viewpoints are Agent, Function, Data and Event.

¹²⁰⁸ Unified Modeling Language see http://en.wikipedia.org/wiki/Unified_Modeling_Language accessed 081231.

¹²⁰⁹ Systems Modeling Language see <http://en.wikipedia.org/wiki/Sysml> accessed 081231.

¹²¹⁰ Design and Analysis for Realtime Systems (DARTS), Gomma, H. Op. cit.

¹²¹¹ See Wild Software Meta-systems by the author at http://works.bepress.com/Kent_Palmer

differences are to be made within the semiotic *Design Object* in order to produce an Emergent *Object of Design* as a new artifact. This gives a fundamental basis for design, which is a possibility that reveals itself at the Hyper Being meta-level. Hyper Being, as a mode of Being, is the “grounds of the possibility”¹²¹² of the possibilities of design. In the context of the Design Field, Hyper Being is also the level where the greatest essential difference exists that could be used to leverage the production of new emergent events. Existentially, Hyper Being is based on the in-hand mode of the being-in-the-world of Dasein. The in-hand mode is an expansion of being-in-the-world that can also be characterized by other equiprimordial modes such as the present-at-hand and ready-to-hand. The *out-of-hand mode* in Wild Being is an expression of the *contraction* of being-in-the-world. Each modality of being-in-the-world is associated with a reified kind of Being, which is a meta-level of Being that starts from the assumption of Ontological Difference. Dasein is a special being that projects schemas, such as the World. We could substitute being-in-the-schema for being-in-the-world and use any of the schemas, but the *World* is the furthest horizon that is still within experience. As a result, the World schema is the one that is normally used when we are speaking philosophically about the global experience of the lifeworld. Dasein, as being-in-the-world, means that the *locus of experience* has merged and become one with the *ultimate projected horizon*, so the *projector* and the *projected screen of beings* are considered to be the same. This results in the absence of the subject-object dichotomy.

There is no subject or object within the Quadralectic except the one that we manufacture in the process. It then becomes reified when we posit the difference between subject and object. The Quadralectic first applies the monolectic by formulating a thesis and representing it. That representation is what Wisse calls a *foreground interpretant*, and it must be considered in relation to its *background interpretant*, which we dub a *circumstance*. All representations can be seen on the background of all *other* representations, both actualized and possible. Representations are understood in relation to the behavior that they entail. So, for instance, if it is a representation of a Form, then the behavior might be the movement or the function of that Form. If we are talking about object-oriented software, then that would be expressed as the relationship between the encapsulation of the data and the methods. But the significance of behavior differs based on the standpoint of the observer. In that case, the differences that occur as significant or relevant must be taken into account. If we look at the Form, or the *schema* that is the *basis*

¹²¹² Kant, Immanuel. Critique of Pure Reason. Bohn's Philosophical Library (London: G. Bell, 1905) p. 237.

of a representation, then there is always some content (or intext) that the Form contains, which would be the *data* of the object-oriented design that represents the *attributes* of the object. When you think about an object as a ‘synthesis of Form’¹²¹³, then the behavior, the stances toward that behavior, and that content of the data exhaust the various ways of dealing with such an object. For a software object, there is really only its hidden data, its encapsulation surface, its name, and its methods. Other features may be added to this but these are the minimal features of the representation of dynamic Forms. Each moment deals with a different aspect of the dynamic Form of the object, but in each moment, the background changes as we shift our emphasis to another part of the dynamic Form. So, we are moving from circumstance, to situation, to surroundings, to context.

Moment1:: Representation(FI)= object encapsulation surface or shape:
circumstance(BI) = significance
Foreground representations are given significance by their background circumstances

Moment2:: Behavior = object method: situation = relevance
Foreground behaviors are given relevance by their background situations

Moment3:: Standpoint = object name: surroundings = recognition
Foreground standpoints are given recognizability by their background surroundings

Moment4:: Content (Intext) = object data or content of attributes: context = fulfillment
Foreground content are given fulfillments by their background context

Significance is expressed in the *circumstance*, which is the background of the encapsulation surface. Relevance is expressed in the *situation*, which serves as the background for the behavior of the object. Recognition is found in the *surroundings*, which are the background of the object designation. Fulfillment is found in the *context*, which is the background of the content. Here one can see how the foreground and background, as two parts of the trialectic, interact to produce significance, relevance, recognizability, and

¹²¹³ Alexander, Christopher. Notes on the Synthesis of Form (Cambridge: Harvard University Press, 1964).

fulfillment. Phenomenologically speaking, fulfillment refers to further exploration that will lead to more *content* being *uncovered*. This, in turn, will bring us closer to a horizon where more and more details or information about the object can be more fully defined and understood.

But there is also *mediation* of the foreground and background in the trialectic. This mediation is seen in:

Moment 1 :: Representation (FI): FOCUS on a schema: circumstance (BI)

Moment 2 :: Behavior: OBJECT in active media, the what: situation

Moment 3 :: Standpoint: IMAGE as appearances to observers: surroundings

Moment 4 :: Intext: SIGNATURE of attributes of individual instances: context

In each case mediation is between the foreground and background of the *gestalt* or *flow*, or the *proto-gestalt* or *proto-flow*. Representations require focus and behavior and are the ‘sine quo non’ of objectification. Standpoints produce images as appearances of an object. The contents of particular instances of objects have their own signature on the values of their attributes. Mediation forms a cycle where we first encounter the representations that are focused upon, and these lead to behaviors that will define the object. Behavior can project a variety of images and appearances to an observer. Different observers can view the behaviors of representations from either a stationary standpoint, or from a position that is moving, or in flux. This will lead to the fulfillment of the attributes so that the *instance* is perceived as having its own *signature*. In our case, we see the level of representations as the positing of the schemas, which allows us to focus on the thing that is being schematized. The schemas are dynamic media that become involved in *action* and *reaction* and this supports *behavior*, which allows for objectification. At this point we can finally derive an *instance* with *specific attributes*. The cycle begins first with representations of the schema. Following that, the *behavior* of the representations within the active media of the schema allows the object to be recognized. From there, this *behavior* may be seen from

different *stances* so that *images* of the representations will appear to particular observers. Finally, as a result of this nuanced process of observation, we can focus on the individual differences that appear when the *signature* of a particular *instance* (with its specific attributes or values) appears. The mediation cycle moves from schematization, to a particular kind of object, to its appearances in images, and then to a particular instance of an object. The particular instance of an object is the *individual* thing (First) in the Design Field, which has relationships (Seconds) and continuities (Thirds). That individual thing, when put into the cascade of the Lifecycle of the Emergent Event, becomes the Emergent Eventivity.

Moment1:: Representation (FI): circumstance (BI): **sense**

Moment2:: Behavior: situation: **goal**

Moment3:: *Standpoint: surroundings:* **vanishing point** or **intentional target**

Moment4:: Intext: context: **pragmata** or **practices** or **performance**

Representations need to make sense according to their circumstances. In a given situation, behaviors must have goals. In surroundings, standpoints have vanishing-points or intentional targets. In its context, content needs pragmata or practices (or performances) that will give the content a particular quality and quantity. Design work is such a practice. These are all surpluses or overflows that are projections that go beyond the Meta-system based on the projective action of the System and its ecstasy in each moment of the Quadralectic. *The Hyper Being trace, as a deficit, is balanced by this surplus of projection beyond the Quadralectic.* And it is this projection that allows the leap to a new emergent level of organization where emergent characteristics appear (especially when the projections overlap each other). This new emergent level is made possible by the nihilistic difference between the trace and the projection, and this opens up the possibility for the essence of the designed artifact to be conceived from multiple perspectives. That is why Hegel associates the Trialectic (that we attribute to each moment of the Quadralectic) with

work. Work, in its highest sense is the production of the *new* and the *emergent* in things. Each moment of the Quadralectic has some incremental projective power, which together allows a free leap to an emergent level over the discontinuity of the difference between supervenience and emergence. Supervenience implies an isomorphic mapping (with no lack or excess) from one level to another.

Notice how we start from the Monothesis of each moment from whatever is in the foreground. Then, through mediation, we add the Trialectic of the foreground to the background. The moments themselves form *two* thesis/anti-thesis *pairs*, which together form a tetrahedral Quadralectic of four moments that produce a cycle. That cycle is synchronized with the Lifecycle of the Emergent Event in Emptiness, and the Cycle of the Emergent Meta-system in the Void. Thus, this cycle in Being, which is driven at the Hyper Being level is synchronized with two cycles in Existence related to Emptiness and Void. One cycle is related to the Foundational Mathematical Categories and with the differentiation of the Lifecycle of Emergence. One cycle is related to the Special Systems and produces a model of the Meta-system as something Emergent, which is actually a model of the relationship between the System and Meta-system. Here, the foreground is the System and the background is the Meta-system. According to B. Fuller, the System is made up of at least four interrelated moments, and those would be the foreground elements in each case.

We have seen how the cycle of the Quadralectic is synchronized with the two cycles of Existence. But what that means is not yet clear. It may mean that seeking material optima would give rise to an upsurge of Emergence. But it also could mean that it is possible to move from the dynamic of existence to an emergent actualization and vice versa. In order to make that shift and to leverage the tandem cycles in Existence, then something beyond the Quadralectic is needed. Another *moment* is needed. An additional moment would allow a *shifting* between these interlocked gears of the cycles of Existence and it would also bring an *essential freedom* into Existence. Adding this moment would bring us to a level *beyond* the Quadralectic that we will designate as the *Penta-lectic*. The Pentalectic is associated with Wild Being. These twin cycles in Existence that are bridged by the Quadralectic in Hyper Being bring forth the *possibility of Freedom* into existence because we are not locked into a downward cycle or chained to *continual* emergence, rather, we are able to intervene and shift back and forth between Emergent Events initiating spurts of emergence between lapses of reification and nihilism. But let us not fool ourselves into thinking that this is completely in our control. Rather, it is a subtle interplay between

Freewill and Determination that is referred to as the Wyrð, or Fate in the Indo-European tradition.

The Quadralectic is a complex theoretical construct. Some of the awkwardness of its terminology comes from the attempt to preserve it with the names that Pieter Wisse uses for his Ennead. It is fitting that we acknowledge and pay tribute to his accomplishment of imagining the first methodological ground for Sign Engineering. Wisse's ideas form the basis for this thesis, but we are extending his work¹²¹⁴ with insights from Alec McHoul's Semiotic Investigations¹²¹⁵, which points out that we need to *relate the sign to other non-sign elements in order to produce meaning*. The Quadralectic is a way of extending Wisse's Ennead in order to explain this interaction with non-sign elements that play a role in the design process. Within Sign Engineering, this interaction produces the sense, goals, intentions, and practices that are necessary to establish design as a practical activity. Wisse makes an important move when he realizes that he must take the Peirce triad and give a background for each foreground element. He also makes a crucial move when he mediates each one of these foreground and background relationships. He points to second order mediation as a basis for Sign Engineering. To this we have added *perspective* as a way to infuse distance into the 'signing process' that is separate from the inward and outward differences between the interpretant and external thing that is indicated. It must always be remembered that *the external thing can be another sign* and that this is a recursive process that is being modeled. We have also added the idea that the design occurs at the level of Hyper Being and that in the realm of possibility the design is a meta-level of the Sign beyond the Ensign (or process sign). All the other traces that appear here are moments that exist at the level of Hyper Being. These traces appear as possible concepts, possible essences, possible perspectives, and possible designs. In addition to this we posit that this deficit, or lack, is accompanied by its nihilistic opposite, which is the surplus or overflowing of the projection, and it is those projections that are the parts of the leap that take us to the emergent level. It is as if the System of moments was turned inside out through the Meta-system of the *background* to be *reconstituted* at another level as the *projection*, which grasps the emergent characteristic of the artificial artifact that is being projected within the context of the Design Field. That artifact must make sense. It must

¹²¹⁴ We are extending Wisse's interpretation of Peirce although, at times, he fell short of truly understanding Peirce's work. By the same token, his unique interpretation of Peirce served as a pragmatic tool and provided a secure foundation for Sign Engineering in the Ennead.

¹²¹⁵ McHoul, A. W. Semiotic Investigations: Towards an Effective Semiotics (Lincoln: University of Nebraska Press, 1996).

have a goal. It must have an intentional target, (or vanishing point), and it must have its performance and its practices (or pragmata, i.e., practical reasons) that sustain it. Goals are related to behavior. Sense is related to meaning. The intentional target, or vanishing point, is related to distancing. The pragmata are related to the practical interlacing of characteristics that produce the emergent effect on a continual basis.

The Quadralectic is a tool through which we can analyze the leap to the emergent artifact (as an *indication*) through Sign Engineering. It opens the way for the production of the emergent artifact, or the Object of Design, as something embodied. For that to happen we need to introduce Wild Being. Wild Being governs embodiment. Possibility plus propensity equals probability, which approximates the determinate¹²¹⁶. This is a model of the idea that G. Bateson puts forth in Mind and Nature¹²¹⁷. He proposes that if you study two subjects at the same time, you can acquire a higher quality of information than would be expected if both subjects were studied separately. We can present this argument metaphorically and pose the two subjects as the two dialectical syntheses in the Quadralectic. The Quadralectic is a greater whole comprised of two syntheses that produce an even greater whole, a higher super-synthesis. It is an overflowingly greater whole with its own higher emergent properties than those that appear in each of the dialectics. This is similar to the relationship of the two tetrahedrons contained in the icosahedron and cube. Likewise, there are two modes for this type of interaction between the two Dialectics within the Quadralectic. These modes are either interpenetration or fusion¹²¹⁸. Dialectics can combine in the same way that two tetrahedrons are able to combine to make up the octahedron and cube¹²¹⁹ as seen in B. Fuller's Synergetics¹²²⁰. Thus, if we consider the Quadralectic to be based on the *Whole* Foundational Mathematical Category, then we see that it reaches *beyond* the *Whole* in an *overflow* toward the *Holon/Integra* or the *Holoidal* Foundational Mathematical Categories.

Golden Threads

We can analyze the Quadralectic in terms of the Foundational Mathematical Categories by stating that the moments in the arising of the Quadralectic as an Emergent Event

¹²¹⁶ Hyper plus Wild equals Process which approaches Pure in terms of Being.

¹²¹⁷ Bateson, Gregory. Mind and Nature: A Necessary Unity (New York: Dutton, 1979).

¹²¹⁸ These are the limits of the Divided Line of Plato.

¹²¹⁹ Both the octahedron and the cube are equal to two tetrahedrons but in two completely different ways, which are expressed in their duality.

¹²²⁰ Fuller, B. Op. cit. See also Applewhite, E. J. Cosmic Fishing: An Account of Writing Synergetics with Buckminster Fuller (New York: Macmillan, 1977).

encompass the stages of the Foundational Mathematical Categories. This implies that we will not only analyze it in terms of the surplus of the fusion and interpenetration of two minimal systems, but we will also look at it in terms of the *lack* that proceeds the arising of the Quadralectic. We could also relate these moments of lack to the Singularity that is modeled in the Catastrophe Theory of Rene Thom as the Site/Event of the Quantum Measurement¹²²¹, or as the Multiple of Badiou, i.e., the uncountable¹²²², or as the Set and the Mass, which are the basic *non-degenerate* and *non-excessive* mathematical categories¹²²³. Note that these are the stages that allow any distinction to come into being. First there is a singularity in virtuality that can be modeled by the *folds in the control surfaces* as well as the movement that discontinuously changes as a fall from those folded surfaces in the virtual control space. Then, the first reality dawns when we obtain a measurement by an observer of some quantum phenomena. That is an event at a local site that gives rise to local time-space, which results in the *unfolding of time and space* (from each other) that become the fundamental background variables through which things are measured. The next background variable is the uncountable plurality of the population. On this ‘background of the uncountable’ arises the ‘ultra one’. Notice that we have the singularity on the background of folded surfaces in virtuality. We have the one observer that causes the probability wave to collapse in our observer mechanics¹²²⁴, and we have the ‘ultra one’¹²²⁵ that takes multiplicity from uncountable to countable, from inconsistent to consistent. Then there is the Set (as a projection of a schema), which is empty and where things can be placed as countable. That whole projection system can be empty, i.e., be made up of the empty Set (\emptyset), or be the Set brackets alone ($\{\}$). The entire hierarchy of the unfilled Set can be erected to create places where differences are sorted. Within this unfilled Set we have the first element, which is placed in the Set to signify existence. After that, we have the Mass, which establishes a boundary around instances. For the Mass we need the first distinction of the boundary to separate the sea of instances. From the Mass,

¹²²¹ Healey, Richard A. Philosophy of Quantum Mechanics: An Interactive Interpretation (Cambridge UK: Cambridge Univ Press, 1990).

¹²²² For Multiple see Badiou, A. Being and Event, p. 8 ff. Op. cit. Gillespie, Sam. The Mathematics of Novelty: Badiou's Minimalist Metaphysics. Anamnesis (Seddon, Vic: re.press, 2007). For uncountability see Umphrey, Stewart. Complexity and Analysis (Lanham, MD: Lexington Books, 2002) p. 126ff. Stillwell, John. Yearning for the Impossible: The Surprising Truths of Mathematics (Wellesley, MA: A K Peters, 2006) p. 201.

¹²²³ Each non-degenerate mathematical category, i.e., Set and Mass, is endowed with its own full logic, either syllogistic logic or pervasion (boundary) logic.

¹²²⁴ Bennett, Bruce M., Donald D. Hoffman, and Chetan Prakash. Observer Mechanics: A Formal Theory of Perception (San Diego: Academic Press, 1989). See <http://www.cogsci.uci.edu/personnel/hoffman/ompref.html> accessed 081231.

¹²²⁵ Badiou, A. Being and Event Op. cit. p. 16ff.

Wholeness comes into existence by adding parts, and this is the *first* part that is distinguished from the Whole. We then have the Holon/Integra, which are the N-category relationships that arise as possibilities between things. At this point we can discard the elements and concentrate on the relationships, although we *must posit* the *first* relationship. Now we also have the Holoidal, which is the interpenetration and intra-inclusion where everything gives rise to everything else as an interdependent co-arising. This finally degenerates into the Singularity, which starts the Emergent Cycle over again. Notice that in each case there is *one thing* (*the ultra one*¹²²⁶) that contrasts to all else in each Foundational Mathematical Category. We will borrow from Heidegger to understand this *one thing* that appears in the Foundational Mathematical Category. Heidegger says that there are two bases in Being, one that is a normal differentiated Being that gives rise to the Meta-levels of Being (Sein) when the Ontological Difference is differentiated out, and the other base is a counter projection that he calls Beyng (Seyn). Beyng is *onefold*, it is *non-representable*, it is *unique* and *strange*. In each case it is the tension between the (*ultra*) *one* that is arrayed against the *other differentiations* in each of the Foundational Mathematical Categories. When the (*ultra*) *one* comes out of the *other* within each of the Foundational Mathematical Categories, it (the *ultra one*) never disconnects or separates from the *other*, but remains connected as a one-fold that is unique and strange. Unique because the unrepresentable one is singular, and strange because it is rarely encountered. So, it is the singularity (or the observer that is observing if we are talking in terms of Quantum Mechanics), or the 'ultra one' that introduces countability. The singularity is the first element placed in a Set. It is the *projection* of the *one original boundary*, as in Laws of Form¹²²⁷. It is the oneness of the part against the boundary of the Whole. It is the first relation. It is the oneness of the interpenetrating and intra-inclusive. In each case, the Foundational Mathematical Categories are the site of the juxtaposition between the Golden Thread of Beyng and the background differentiation of Being, which include the meta-levels of Being. The arising of the (*ultra*) *one*, in each case, is another differentiation, but the Beyng maintains 'sameness' in spite of the instantiated differences, so, the Foundational Mathematical Categories always "belong together in their "family resemblance". The meta-levels of Being are the *emergent difference* within Being that give them the property of having the *greatest differences* within Being. It is through these meta-levels of Being that the essences of the schemas are differentiated. Between the Golden Thread of Beyng and the differentials of Being there is the generation of Meaning. So, the Golden Thread

¹²²⁶ This term 'ultra one' comes from Badiou's Being and Event. Op. cit.

¹²²⁷ Spencer-Brown, G. Op. cit.

continues to connect to the *emergent (ultra) one* to its background even as it differentiates itself.

All of these levels of the Foundational Mathematical Categories come into play within the Quadralectic as the model of the Emergent Event when the Emergent Eventuality sets off a cascade of emergent change. We have equated this with a moment of the arising of four-dimensional time in which we see a ‘face of the world.’¹²²⁸ The ‘face of the world’ is not merely the concatenation of the kinds of Being, but it is also the juxtaposition between Being and Beyng that generates meaning, which we see as sense, goal, intentional target, and pragmatic performance. This brilliantly solves the problem of meaning (or semantics) as distinguished from syntax and pragmatics. Syntax is structured, pragmatics is differentiated as practices, but semantics is a homogeneous plenum that cannot be understood. Yet, if we understand the arising of semantics as the *appearance in the cleavage between the Being and Beyng of meaning*, then we have a model like that of G. Bateson, who proposes that by bringing two unexpected things together one can acquire higher quality information than by studying one topic at a time. In each case Beyng is non-representable. Thus, it is the non-representable *underside* of everything represented. It is the Golden Thread between differences that makes them relevant and significant, as well as giving them meaning and sense. Beyng is also the distinction between the aspect and anti-aspect of Being. Phenomenologically we can observe our attention as it transfers from one thing to another thing as it follows or searches for that Golden Thread. When we actually grasp the Golden Thread, things make sense, our talk is significant, our deeds are relevant, and our existence is meaningful. Otherwise we stray, lose our way, and descend into nihilism. So, at each stage of the unfolding of the Quadralectic through the Foundational Mathematical Categories there is a way to juxtapose the unrepresentability of Beyng with the differentiations and representations of Being that unfold from ontological difference. Thus, at each level there is a *clearing* or *opening* established by Dasein. In that clearing, things that are appropriated come into their own, including Dasein, the one who *clears* and *opens as being-in-the-schema*, and thus *en-owns*¹²²⁹ and *produces an occurrence*. All of these are meanings of Ereignis, which is the counter current of Dasein within the sway of Beyng. *Beyng gives the beings that are always held under its sway the freedom to make distinctions*. One of these beings is Dasein who *projects* Being on beings, but also

¹²²⁸ A ‘face of the world’ is when all the kinds of Being are present simultaneously implicitly in the same phenomena.

¹²²⁹ Emad, Parvis. On the Way to Heidegger's Contributions to Philosophy (Madison, WI: University of Wisconsin Press, 2007) p. 42.

practices Ereignis in *the presence of its being* while under the sway of Beyng. Within this three-part relationship, the meaning of Being is produced, which is the ‘meanings of the beings.’ But, paradoxically, this meaning is always *more*, as well as always *less* than what is strictly necessary. It overflows what is sufficient, but at the same time it is also insufficient. Ironically, this three-part relationship can produce *more* in terms of Beyng, but *less* in terms of Being. It is less because nihilism dogs Being. Beyng produces more meaning because it gives meaning to everything that is differentiated in Being. Beyng accomplishes this by giving Being a counter position to the non-representable onefold that is unique and strange, which is normally not noticed as the ‘counter-flux’ of projection.

In this way the Quadralectic generates significant, relevant, sensible, and meaningful outputs as part of Sign Engineering. And we can watch this occur by tracing the Golden Thread within the differences and how they are used as protocols of design. This is how the Quadralectic can be used as a basis for understanding design. It is a picture of the minimal differences between the design and non-design *moments* that are necessary for creating a design through a *single cycle of cognitive activities* that serve as the basis of Sign Engineering. DeSign engineering is just one part of the overall practice of engineering, but we concentrate on it because it allows *the emergent* to arise, which is the goal of engineering development projects.

We posit that the bridge between the Quadralectic and the minimal methods of the design proper (that we see in UML¹²³⁰ or SysML¹²³¹ or ISEM¹²³²) encompasses twin meta-methods, one from Gurevich and the other from Wisse. The Gurevich Abstract State Machine method represents both the System and Meta-system as a set of rules. Each rule combines all essential viewpoints of the System, except requirements, i.e., data, event, agent, and function. When the essential viewpoints are taken together into nodes they can provide an abstract architecture of the system’s functional and casual structure. But that does not explain how the entities that make up the System or Meta-system come into play. This is when Wisse’s Metapattern method becomes significant, because it organizes the identities within the System or Meta-system based on *context*. When the two methods are used together they allow us to model the entire functional and causal System or Meta-system as a machine at any level of abstraction, which is ‘Turing computable’ within its

¹²³⁰ Unified Modeling Language (UML)

¹²³¹ Systems Modeling Language (SysML)

¹²³² Integral System Engineering Method (ISEM) developed by the author. See [Wild Software Meta-systems at http://works.bepress.com/Kent_Palmer](http://works.bepress.com/Kent_Palmer)

context. Performance requirements are not modeled, they are attached to rules as attributes of the System or Meta-system. The transition from this model to the architectural design comes about if we split up the perspectives on real-time system design and remodel them as slices of Turing machines using the minimal methods that connect the viewpoints. In both the meta-method approaches to the System/Meta-system and the methodologies that are composed of minimal methods, there is the action of the Quadralectic based on the representations given at the two levels. At the meta-method level we have an Abstract State Machine whose elements are contextualized by the Wisse meta-method, which can give us proof of existence and computability once it is applied. When we break up the system into the Turing machine slices, we can adjust for performance issues by producing an efficient architecture that will allow timings and other performances to occur within the time span specified in the requirements. There can be trade-offs between performance parameters and wicked problems that afflict systems that do not meet requirements. But by using the Quadralectic as a ground, we can comprehend how the methods and the meta-methods are manipulated to give results that approximate the requirements that the design demands of the system. Once the System is designed, then it is implemented by the specialist disciplines. Then, Systems Engineering does verification, validation, and integration. Note that the Design is set up as a Formal System that connects presence, identity, and truth. To that we add ‘reality testing’ in the second part of the “V” lifecycle¹²³³, which will generate meaning. Within the Formal System of design we can have completeness, consistency, and clarity¹²³⁴ as fundamental properties. But when we add *reality*, then we have verification, validation, and integration (coherence) processes that assure *fittingness* with the requirements and the ‘end user’ environment¹²³⁵.

The Quadralectic is a means of utilizing the Foundational Mathematical Categories to juxtapose Being and Beyng in order to generate meaning. The Quadralectic is like the combination of two minimal systems that can work together to produce the next higher dual synthesis based on either fusion or interpenetration in the same way the octahedron and the cube relate to the tetrahedron¹²³⁶. Two orthogonal dialectics intersect in the

¹²³³ <http://en.wikipedia.org/wiki/V-Model> accessed 081031.

¹²³⁴ Nb. Well-formedness. See Klir, George J. *Trends in General Systems Theory* (New York: Wiley-Interscience, 1972) p. 395.

¹²³⁵ Adding reality gives three more properties over and above those of the formal system, which are verification, validation, and coherence.

¹²³⁶ As said before, the octahedron and cube are two tetrahedrons either fused or interpenetrated. Cf. Fuller, B. *Synergetics*. Op. cit.

Quadralectic. We can also think of the Quadralectic in terms of the anamorphic cycle¹²³⁷. The intersection of orthogonal dialectics suggests orthogonal timelines, which suggests heterochronicity¹²³⁸ and that takes us beyond the Metaphysical. If we apply this analogy using the Platonic Solids, their interaction suggests that there is another higher threshold related to the Icosahedron/Dodecahedron where five tetrahedrons interact, which is related to the pentahedron of four-dimensional space. *Note that the Pentalectic appears with just one more thesis being added.* It has three and four-dimensional representations. The three-dimensional representation is the icosahedron/dodecahedron duality, while the four-dimensional representation is the pentahedral simplex polytope, which is sometimes called the *pentachoron*¹²³⁹, although we will refer to it as the pentahedron. In terms of Heterochronic modeling, the dialectic represents one timeline, which is not merely directional, but synthetic, and related to the Dissipative Ordering Special System. The Quadralectic is the intersection of two orthogonal timelines, which is related to the Autopoietic Symbiotic Special System. The Pentalectic is the intersection of four orthogonal timelines and is related to the Reflexive Social Special System. If the Quadralectic is the fundamental dynamism underlying design, then the Pentalectic must be the underlying dynamism of human meta-activity, which is actually *meta-design*. This is *beyond* design. Since we have identified the Emergent Event with the manifestation of four-dimensional time, design will set off cascades of emergent change if a genuinely emergent artifact is created. *The Pentalectic would be the equivalent of the meta-design of the Emergent Event itself.* We have noted that for embodiment to occur there must be a synergy between ‘Hyper Being possibilities’ and ‘Wild Being propensities’. This Pentalectical meta-design is a culmination of that type of higher synthesis. In a sense, the Quadralectic is to be understood as what lies between Dialectics and Pentalectics. Dialectics, through *Aufhebung*¹²⁴⁰, produces a synthesis of wholes within the flow of time at the Dissipative Ordering level where there is a one-directional timeline. A Monolectic is static and has no dual anti-thesis to help overcome the monolectic thesis. Quadralectics goes beyond the *whole* of the synthesis and gives us some insight into the fusion and interpenetration of the Holon/Integra and Holoïd Foundational Mathematical Categories. It requires the *collision* of dialectics and anti-dialectics to produce a super-synthesis.

¹²³⁷ See paper on “Anamorphic Cycle” by author at <http://archonic.net>

¹²³⁸ See “Kinds of Being and Orthogonal Temporalities” by the author at <http://holonomic.net>

¹²³⁹ A new official name. <http://en.wikipedia.org/wiki/Pentachoron> accessed 081231.

¹²⁴⁰ Caraher, Brian. *Intimate Conflict: Contradiction in Literary and Philosophical Discourse: a Collection of Essays by Diverse Hands*. SUNY Series, the Margins of Literature (Albany: State University of New York Press, 1992). p. 25.

Pentalectics adds one more thesis, and with that addition, it is pushed from two-dimensional time into four-dimensional time as seen in the Reflexive Social Special System. It has a complex representation of the icosahedron-dodecahedron in three-dimensional space, but can be understood as a much simpler representation of the pentahedron in four-dimensional space as a minimal solid (hunk). We know that these two representations are related through the alternating group A5 of order 60 and we also know that it is due to that group that equations of degree five and higher cannot be solved using normal methods. Thus, A5 is a closed doorway for the mathematical manipulation of equations. But we also know that the Fibonacci Series and the Golden Mean are found throughout nature, which indicates that *the basis for design in nature* is the Pentalectic.

This brings us to the *Intelligent Design*¹²⁴¹ question. There is a question as to whether structures in nature are organized from within by themselves or are organized by some external power. What is interesting in our analysis is that it is clear that the Special Systems are Autopoietic, and that the Reflexive Special System is the source of autogenesis, and so, from our perspective, it is clear that nature has the capacity to self-organize at both the mundane and the meta-levels of self-organization, which still leaves open the question as to whether there is an outside agency that sets off that process. Science attempts to discover the intrinsic design of nature. Intelligent Design posits some intelligence behind that, beyond nature. But we can leave that question open to faith, and still recognize that design is Autopoietic and Autogenetic. The Pentalectic provides a description of the direction and form that a meta-design may take as Dialectics collide from four orthogonal directions at once in the Quadralectic, rather than from two, as in the Dialectic. These four theses and antitheses produce an emergent fifth pair that give us ten pairs in all, although these ten are equivalent to five static theses in four-dimensional space. In each higher dimension of space, the number of elements in a minimal solid is always one more than the dimension of that space, *so the minimal solid always represents*

¹²⁴¹ Dembski, William A. [Intelligent Design: The Bridge between Science & Theology](#) (Downers Grove, Ill: InterVarsity, 1999). Dembski, William A. [The Design Revolution: Answering the Toughest Questions About Intelligent Design](#) (Downers Grove, IL: IVP Books, InterVarsity Press, 2004). Forrest, Barbara, and Paul R. Gross. [Creationism's Trojan Horse: The Wedge of Intelligent Design](#) (Oxford: Oxford University Press, 2007). Young, Matt, and Taner Edis. [Why Intelligent Design Fails: A Scientific Critique of the New Creationism](#) (New Brunswick, N.J.: Rutgers University Press, 2004). Pennock, Robert T. [Intelligent Design Creationism and Its Critics Philosophical, Theological, and Scientific Perspectives](#) (Cambridge, Mass: MIT Press, 2001). Shermer, Michael. [Why Darwin Matters: The Case Against Intelligent Design](#) (New York: Times Books, 2006). We are not taking position on the continuing controversy between religious orthodoxy and science. From the point of Ontotheology these two nihilistic opposites are essentially the same. Rather, we are trying to point out that from the point of view of Design, 'intelligence' is invested at the meta-design level. Thus the answer to the question of 'intelligent design' is deeper than the antagonists in this battle understand. There is intelligent meta-design as seen in the Pentalectic.

an emergent feature within that given space. The elements within the minimal solid are more than the sum of dimensions in a space. So, in a pentahedron we have a *collision* and *collusion* of four dialectics, which produce one virtual dialectic, but in four-dimensional space, the same structure is created with only five theses interacting. This structure appears in nature through the Natural Log, the Fibonacci Series, and the Golden Mean. Thus, we can imagine that there is a type of meta-design operating in nature that is fully four-dimensional temporally, and that the Quadralectic is half of that higher level Penta-lectical structure. Two Quadralectics (where Quadralectics means two dialectics or four theses) collide and collude in a Pentalectic at the point where four orthogonal time lines intersect. We will call them *orthogonal worldlines*. The fact that there is a Pentalectical form that is the basic design of nature, which is probably rarely achieved by humans except through genius, allows us to frame the question of Intelligent Design differently. We have mundane design, which opens up possibilities and attempts to produce artifacts with emergent capabilities, but this does not adequately describe the necessary synthesis between Hyper Being and Wild Being. If there was an effective meta-synthesis between these two meta-levels of Being, then we could posit a meta-design and that must be more intelligent than mundane design because it is an expression of the collision of *four dialectics* on *four orthogonal timelines* and their emergent *Aufhebung*. This occurs only rarely in the genius that we see in the creativity of individuals such as Plato, William Shakespeare, Leonardo Da Vinci, or Albert Einstein. The fact that meta-design exists as a *limit*, suggests that we can better understand the *Quadralectics of Design*. Meta-design allows us to relate the Quadralectic to the cube/octahedron, which can also be referred to as an interpenetration or fusion of tetrahedrons. This allows us to use the icosahedron/dodecahedron dual and the pentahedron self-dual (that defines the Pentalectic) as an analogy for the upper limit of design activity for humans, which is equivalent to the design activity in nature that is ‘intelligent’¹²⁴², i.e., autopoietic and autogenetic.

In this chapter we have explained the concept of the Quadralectic and we have shown how it is related to both methods and meta-methods for System and Meta-system design. This is based on our thesis that the methods for System and Meta-system design are the same. We then looked carefully at the relationship between the elements of the Quadralectical moments. From there we saw how the Quadralectic leaps to the emergent level beyond the merely supervenient. Finally, we introduced the concept of meta-design, i.e., design that

¹²⁴² In the sense of reflexive self-knowing. Sandywell, Barry. Presocratic Reflexivity: The Construction of Philosophical Discourse C. 600-450 BC (London: Routledge, 1996) p. 373.

resigns to what is out-of-control that expresses Wild Being, which is the modality beyond the in-hand of Hyper Being. We suggested that this limit of the Pentalectic could serve as a limit for the Quadralectic in order that we could explore the nature of the Quadralectic between the limits of Dialectic (as defined by Hegel) and the Pentalectic, which is the meta-design of the Emergent Event. Meta-design is the limit of Design where human beings, on rare occasions, imitate the Intelligent Design of Nature through their works of genius. The type of genius that we have described produced works in which every detail was interwoven into the fabric of the Whole, including historical accidents, giving us a *comprehensive whole* that reflected a *complete integration of the worldview*. Sometimes we marvel over how genius can control a work of art or science to such an extent that every detail, even the accidents of history, combine to give a complete fabric of existence. Human creativity of this kind has gone *beyond* design, into *meta*-design where the Hyper Being level of possibilities is fully integrated into the Wild Being level of propensities, inclinations, dispositions, and the tendencies of the materials that are being manipulated producing a single fabric of design. It suggests that at the Quadralectic level, Beyng is a thread that leads through differences to produce meaning, while indicating that there is *another level* where there is a completely woven fabric that *unites* the work. We have a few rare instances of this in our culture that present this possibility through genius, and when this occurs, we get an entire worldview portrayed in the work as *a single compelling concept, invention, or performance*, which demonstrates the goals of human life, gives sense to all things in the world, and arrays the pragmata that support the world. It is at the Pentalectical level where this is rarely achieved except through genius where the fabric woven by the Fates is represented. In it, the single Golden Thread of Beyng gives meaning, or becomes the conceptual fabric of the world within an epic, such as those attributed to Homer, or within a set of philosophical dialogues, such as the works of Plato, or in a series of plays like The Oresteia of Aeschylus and the Oedipus Cycle by Sophocles, or through the paintings and forethought of a renaissance man such as Leonardo Da Vinci, or through the discoverer of a timeless and elegant theory, such as Relativity, by Albert Einstein.

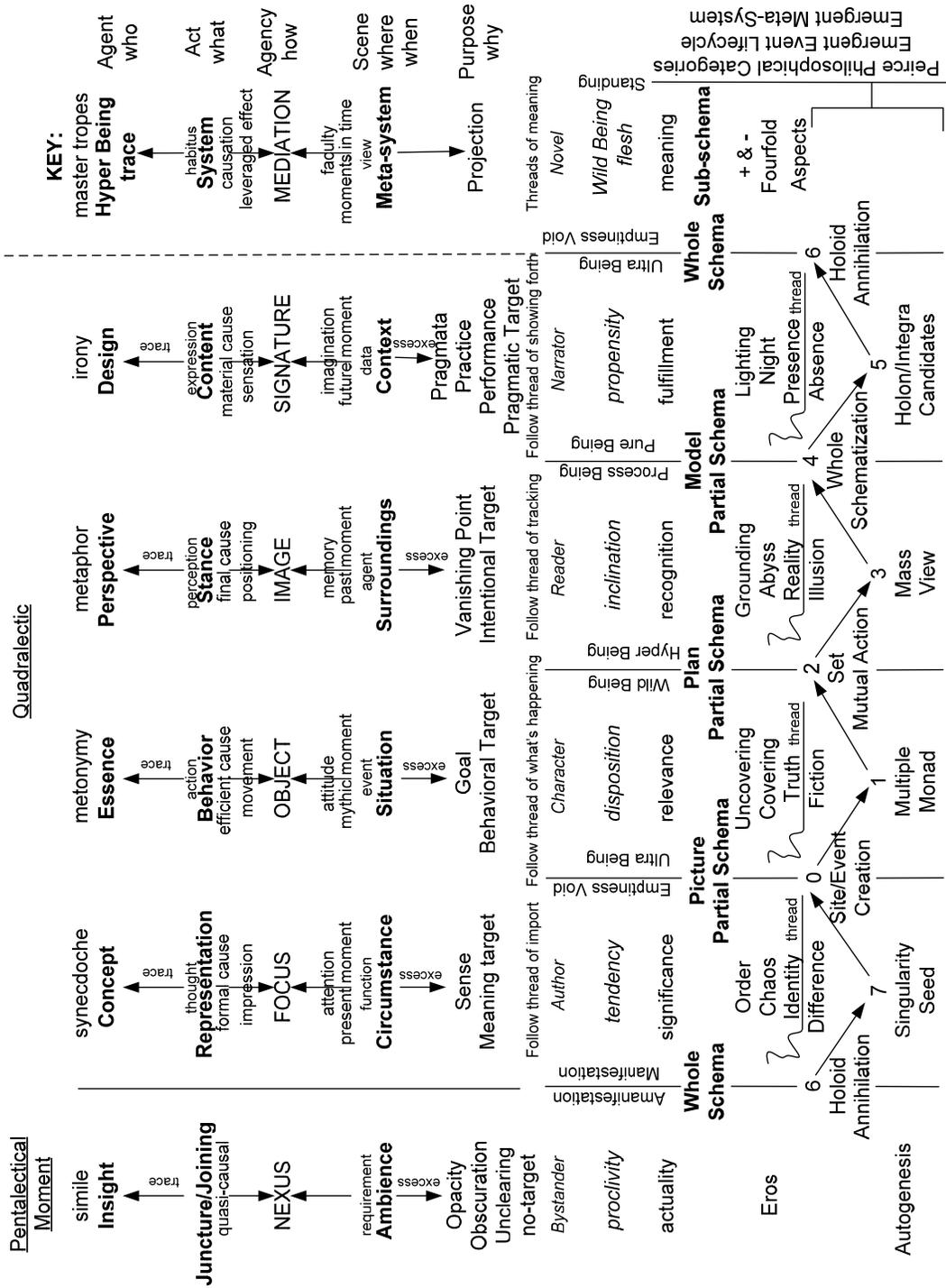


Figure 14.1. Quadrialectical and Pentalectical Tableau.

Notes:

We summarize the structure of the Quadralectic and the Pentalectic in a single diagram (Figure 14.1) which represents each moment and the alignment between the various elements we have posited in our journey. In this diagram the key shows the various types of elements we have posited as being associated with each moment. We use the distinctions introduced by Burke between Agent, Act, Agency, Scene and Purpose as the means of organizing the structure of the moments. Agency is associated with mediation which is the second order mediation of each moment. Act and Scene are System and Meta-system that are related through mediation in each moment. Agent is the Hyper Being Trace which is the nihilistic opposite of the Purpose that is the projection in each moment. The moments are associated with Master Tropes, with the image of the Quadralectic found in the Logic of Practice by Bourdieu which are the articulation of the Habitus. The moments are also aligned with the faculties, and the moments of time, and the views of the realtime system. We give the alignments with the golden threads of meaning, the perspectives on the novel, the flesh of Wild Being, the types of meaning, the sub-schemas, and the fourfolds of the world as well as the aspects of Being. There is also an alignment with the Emergent Meta-system and the Foundational Mathematical Categories. All these alignments are given in order to produce the juxtapositions and conjunctions that will give meaning to the Quadralectic as it appears in various thematic subject areas. These are by no means the totality of the possible associations of the Quadralectic and Pentalectic. The glossary contains references to the individual features of the Quadralectic so that one may look up the special terms that are used throughout the dissertation and see where they fall within the deep structure of the Quadralectic as hypothesized in this diagram.

Speculations on Meta-design

Considering the Nature of the Pentalectic

This chapter defines the Pentalectic based on the structure of the Quadralectic with the addition of a new moment. The appearance of this moment is itself an Emergent Event. This structure provides a new and higher order of organization that allows us to contemplate practicing System and Meta-system Co-Design. The implications of the distinction between the Virtual and Actual are explored and the importance of the structural interlock of the theory between Existence and Being is made clear. Another look at the implications for understanding meaning based on Beyng is provided.

Grounding the Pentalectic

We are fortunate that we have the resources of Badiou¹²⁴³, Deleuze¹²⁴⁴, and the late Heidegger¹²⁴⁵ to support our speculations on the nature of meta-design. We have described meta-design as the movement from the Quadralectic to the Pentalectic, and we have likened the Quadralectic to the cubo-octa-hedron and the Pentalectic to the icosadodeca↔penta-hedron. This mathematical analogy supports our speculations, however, the basic thrust of our first forays into the nature of the Pentalectic will be to attempt to define the *fifth moment*, which we will add to the Quadralectic to form the Pentalectic. As we have previously noted, this movement is also a movement from the predominance of Hyper Being (Differance) to the predominance of Wild Being. This movement is also illustrated within Merleau-Ponty's The Visible and Invisible¹²⁴⁶. The *Hyper-dialectic* of Hyper Being operates between the *Nothingness* of Sartre¹²⁴⁷ and the *Process Being* of Heidegger¹²⁴⁸. Nothingness is the antimony of Process Being. Wild Being appears as Merleau-Ponty's concept of the *Flesh of embodiment*, which is described as the *chiasm* (or

¹²⁴³ Badiou, A. Being and Event Op. cit.

¹²⁴⁴ Deleuze, G. Difference and Repetition, Op. cit.

¹²⁴⁵ Heidegger, M. Mindfulness, Contributions to Philosophy, Op. cit.

¹²⁴⁶ Merleau-Ponty, M. The Visible and Invisible, Op. cit.

¹²⁴⁷ Sartre, J. P. Being and Nothingness, Op. cit.

¹²⁴⁸ Heidegger, M. Being and Time, Op. cit.

*reversibility) of touch-touching*¹²⁴⁹. This contrast between the two kinds of Being brings us closer to conceptualizing the difference between Hyper Being and Wild Being. Deleuze explored this new standing of Being (in terms of the concept of the *rhizome*¹²⁵⁰) more deeply than any of the other Continental philosophers. However, several authors have attempted to build philosophies within the precincts of Wild Being, like John S. Hans (The Play of the World: Play¹²⁵¹) and Cornelius Castoriadis (The Imaginary Institution of Society: Magma¹²⁵²). We can say that the modality of *being-in-the-world* in Hyper Being is the *in-hand*, which is an *expansion* of *being-in-the-world*, and that Wild Being is the dual modality of the *out-of-hand*, which is a *contraction*. *When we are thinking in terms of the moments of the Quadralectic, the fifth moment must be a contraction that is the opposite of an expansion.* An analogy of this would be the pentahedron, which is often represented as a tetrahedron with a point at its center that is connected to all the points of the tetrahedron. These lines are shorter than the lines of the tetrahedron itself. But if we were to push these lines into the *fourth dimension*, they would define a point orthogonal to the other three dimensions. The lines connected to this new point would be the same length as all the other lines in the tetrahedron. So, there is a contraction of the lines that were represented in the third dimension. This displacement of the point that is at the center of the tetrahedron to the place where it would be in the pentahedron¹²⁵³ is an *expansion*, which is the opposite of the *contraction* that is caused by the embedding. The contraction of the embedding is what we are talking about when we move from the pentahedron of the Pentalectic, to the tetrahedron of the Quadralectic, to the embedding of the third dimension, which can be characterized as a contraction after the expansion into the fourth dimension. After becoming aware of the vast realm of possibilities in Hyper Being, a return to the propensities in Wild Being will be experienced as a severe limitation. Being thrown back into our bodies after being lost in projections is a shock. But that shock serves as a sign pointing to the *clearing* and *open* as a continual possibility that we assert based on the realizations of potentials that can unfold fortuitously at times, or, on occasion will manifest as a result of planning and design.

¹²⁴⁹ Merleau-Ponty, M. Phenomenology of Perception, Op. cit.

¹²⁵⁰ Deleuze, G. and Guattari, F. Anti-Oedipus, Op. cit.

¹²⁵¹ Op. cit.

¹²⁵² Op. cit. See also The World in Fragments.

¹²⁰⁹ As we move up every simplex in each higher dimensional space the center of the simplex is displaced from the last lower simplex's center.

Figure 15.1



Icosahedron

1-12-30-20-1
V E F

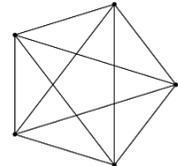
DUALITY

V E F
1-20-30-12-1

Dodecahedron



A5 group
Order 60



Self-Dual
Pentahedron

1-5-10-10-5-1
V E F S

V = vertices
E = edges
F = faces
S = solids

Figure 15.1. The relationship between Icosa/Dodeca-hedron and the Pentahedron.

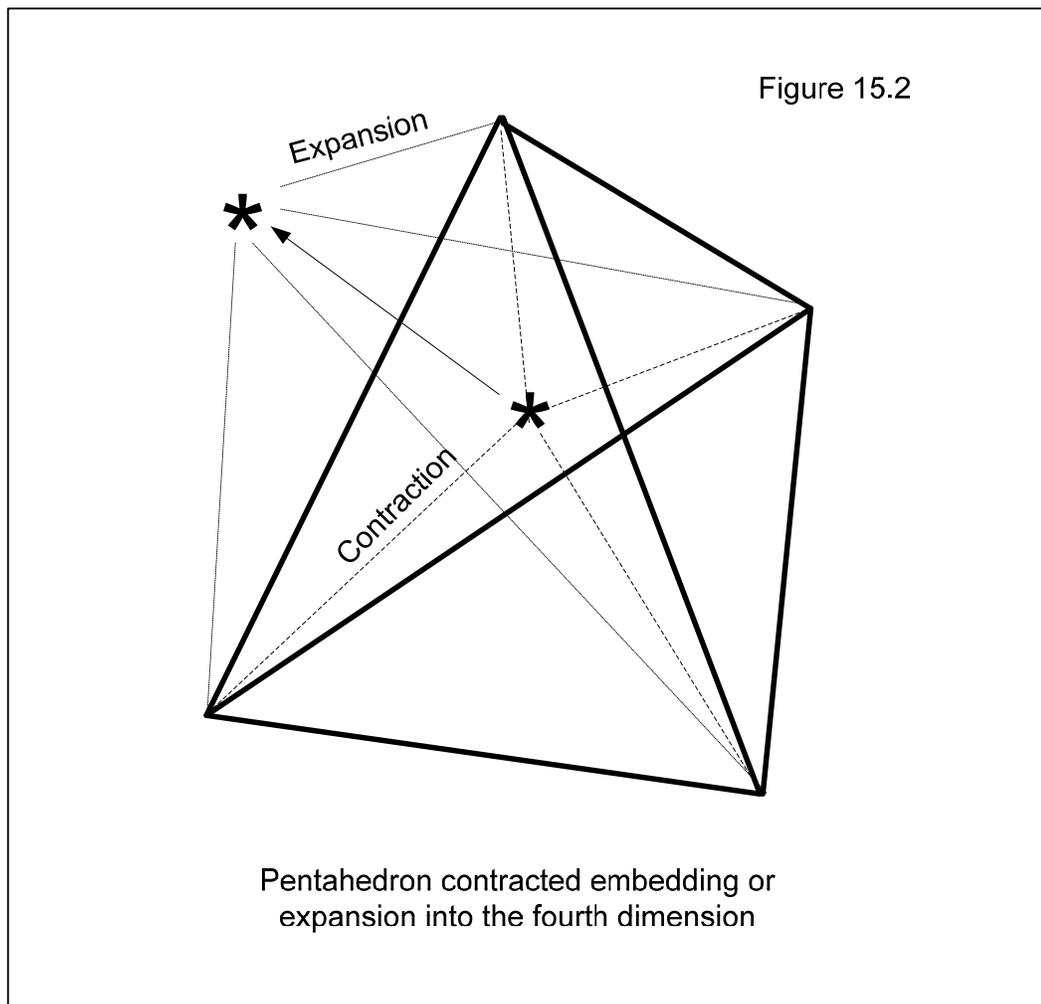


Figure 15.2. Embedding of the Pentahedron in Three-dimensional Space.

This juncture, or joining moment, must encapsulate the momentariness of the other moments of the Quadralectic, so we will talk about this moment as a ‘juncture’ or ‘joining’ and we will contrast that with the ambience where that joining arises. The juncture will be an indication of the ipsity between Set particulars and Mass instances, while the ambience will be the conglomerate of that ipsity. Thus, we are striving to grasp the nondual as we move into the fourth dimension. We will call the mediation of the juncture and its ambience the NEXUS. A nexus is a confluence of junctures or joinings. In terms of the Hyper Being trace, we will refer to this *confluence of junctures, joins, or hinges*, as an **insight**. And the projection from which we are recoiling we will call an *opacity* because it is noumenal. In addition to the traces we will reveal the relationships of the various shades of Wild Being and we will call this the *proclivity*, but when we relate these various shades of Wild Being to the other moments, we will refer to them as the *tendency, disposition, inclination, or propensity*. This gives us the following Pentalectical structure:

Moment0:: trace¹²⁵⁴ : System: MEDIATION Meta-system: **projection**: intensity¹²⁵⁵

Moment1:: concept: Representation(FI): FOCUS circumstance(BI): **sense**: tendency

Moment2:: essence: Behavior: OBJECT: situation: **goal**: disposition

Moment3:: perspective: Standpoint: IMAGE: surroundings: **vanishing point**: inclination

Moment4:: design: Intext: SIGNATURE: context: **pragmata**: propensity

Moment5:: insight: juncture (ipsity): NEXUS: ambience (conglomerate): **opacity**: proclivity

When we enter the Pentalectic we are moving into the realm of the philosophy dominated by Deleuze and Guattari as well as the late Heideggerian works titled Contributions to Philosophy: From Ereignis¹²⁵⁶ and Mindfulness¹²⁵⁷. Deleuze and Guattari present a nihilistic representation of Wild Being¹²⁵⁸, while Heidegger attempted to *avoid the nihilism* that would be incurred by the possibility that an infinite number of the kinds of Being could exist *by avoiding the problem of ontological difference all together*. Wild Being is very difficult to represent because it is right on the edge of what is thinkable. In our opinion, Deleuze does not go quite far enough to avoid nihilism and Heidegger goes too far in abandoning the thinkable, i.e., that which is beyond Ultra Being. Thus, we need to strike a compromise between these two tendencies toward obscurity and cleave to the analogy that has been constructed with the icosadodeca↔penta-hedron. The icosadodeca↔penta-hedron analogy implies that there is a structure that represents a non-

¹²⁵⁴ Hyper Being

¹²⁵⁵ Wild Being

¹²⁵⁶ Op. cit.

¹²⁵⁷ Op. cit.

¹²⁵⁸ Anti-Oedipus, Thousand Plateaus, Op. cit.

nihilistic distinction between these tendencies of Deleuze and Heidegger. We can use the analogy to construct a model of the collision and collusion of the Quadralectic and Anti-Quadralectic in order to steer our course as we begin to explore the grounds of meta-design.

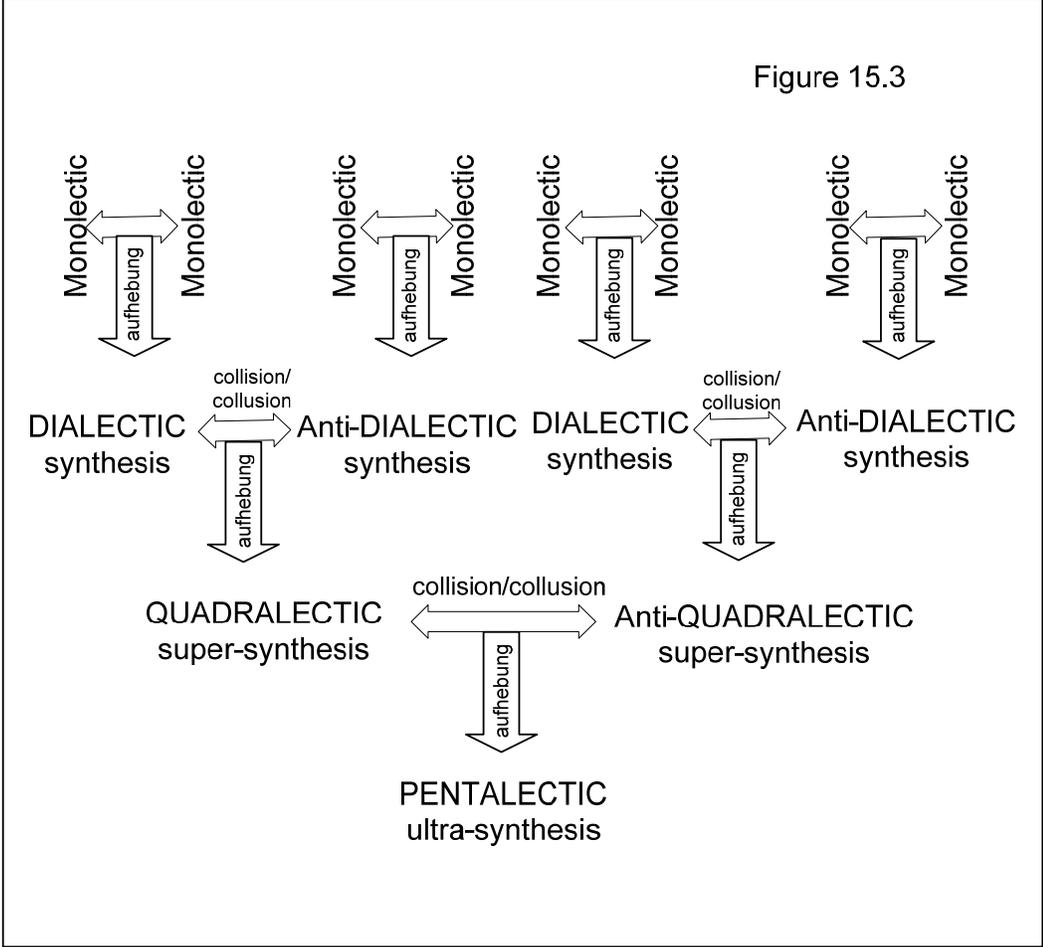


Figure 15.3. Cascade from Monolectic, to Dialectic, to Quadralectic to Pentalectic.

We say meta-design because we are attempting to go to the next level *beyond* design, which is actually beyond the Quadralectic. The next level beyond design takes us from the artifact that unleashes a cascade of Emergent Events to a design of the Emergent Event itself. We have called this a *resign* because we are resigned to it being *out-of-hand* rather than *in-hand*. Wild Being is utterly encompassing, rather than merely something we bear¹²⁵⁹. It is difficult to think of design in this way because we must accept that we are not in control but that the artifact that is being designed is sometimes partially in control. It has designs *on us*, instead of the other way around, which is why the Emergent Event is always

¹²⁵⁹ Levinas, Emmanuel. Otherwise Than Being: Or, Beyond Essence. Martinus Nijhoff philosophy texts, Volume 3. (Hague: M. Nijhoff, 1981).

so overwhelming. It holds us in its sway and orders *us*, as we attempt to impose order upon *it*, in other words, the Emergent Event is out of our control. It is experienced as a contraction of our being-in-the-world. Heidegger calls this reticence¹²⁶⁰ when the contraction is voluntary. In that contraction some *dehiscence* occurs, i.e., a splitting or cracking of the surface of our being-in-the-world under strain. We are *resigned* to that dehiscence, that encompassing the out-of-handness that appears in Wild Being, which Merleau-Ponty calls the chiasm of Flesh (as touch-touching). It appears as an enigma to us while we are an enigma to ourselves at the Wild Being level.

¹²⁶⁰ Scott, Charles E. Companion to Heidegger's Contributions to Philosophy. Studies in Continental thought. Bloomington: (Indiana University Press, 2001) p. 22.

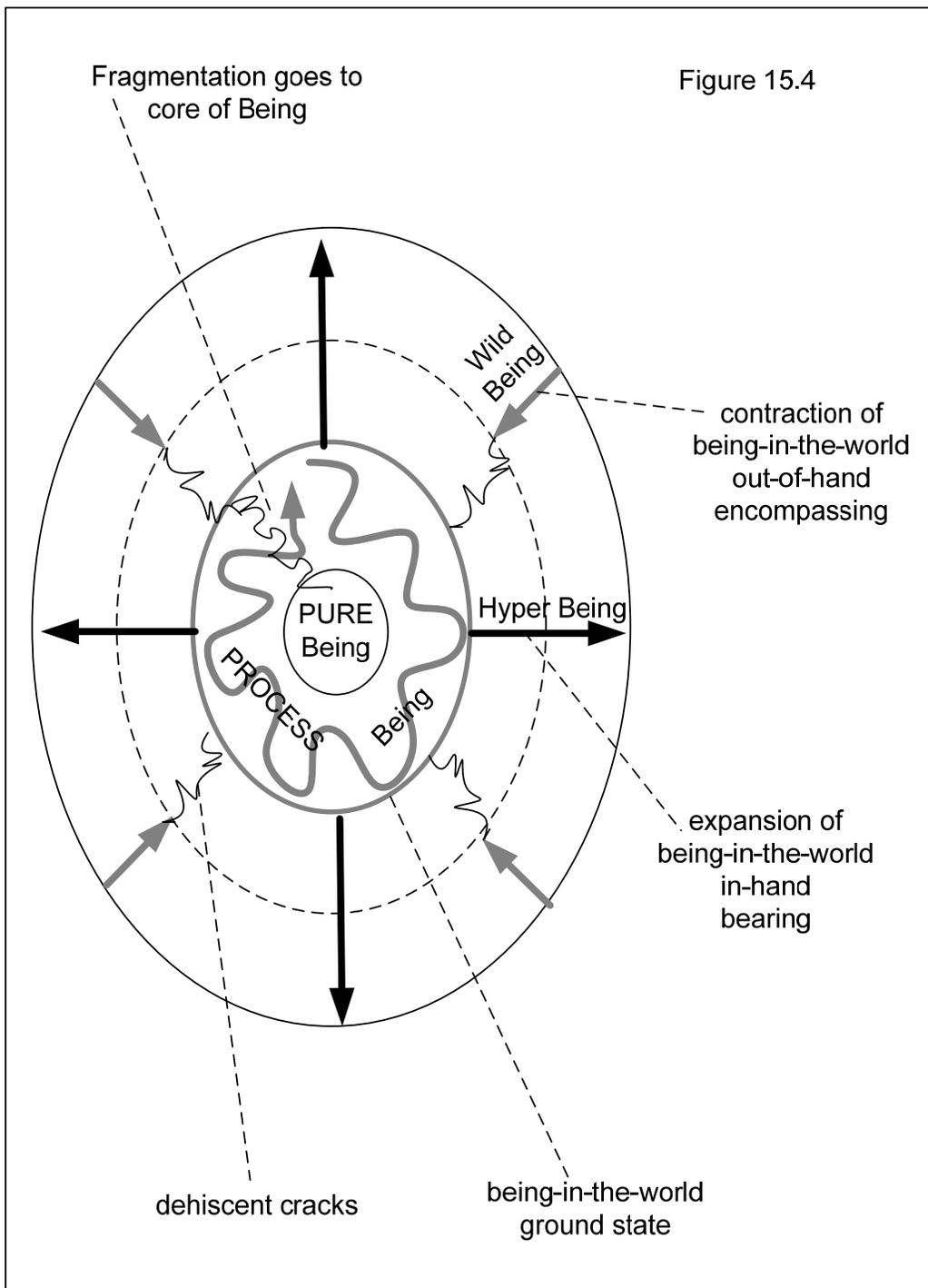


Figure 15.4. Expansion and Contraction of Being-in-the-world.

System:: **juncture** (joining), representation, behavior, stance, content or intext

Trace of Hyper Being:: **insight**, concept, essence, perspective, or design

Mediation:: **NEXUS**, FOCUS, OBJECT, IMAGE, or SIGNATURE

Meta-system:: **Ambience**, Circumstance, Situation, Surrounding Horizon, or Context

Projection:: **opacity**, sense, goal, intentional target (vanishing point), or pragmata¹²⁶¹

Wild Being:: **proclivity**, tendency, disposition, inclination, or propensity

Because there is a contraction of being-in-the-world, we have an *in-jection* rather than a *projection*. What might have been a target of projection becomes opaque as noumena. The contraction suggests a pull back into the ambience where the proclivity of the noumena becomes the center of attention. These proclivities, tendencies, dispositions, inclinations, and propensities of the ontic noumena, which are the *eject of Dasein*, form a NEXUS, which mediates between the ambience and the junctures (or joinings) of the Flesh, i.e., the chiasm of 'touch-touching'. These can produce insights at the trace level beyond what can be held by concepts, essences, perspectives, and designs. This *flow-back* produces a counter movement to the Quadralectic and that is what brings us into the four-dimensional space of the pentahedron.

¹²⁶¹ or we might call it 'practice' or 'performance'.

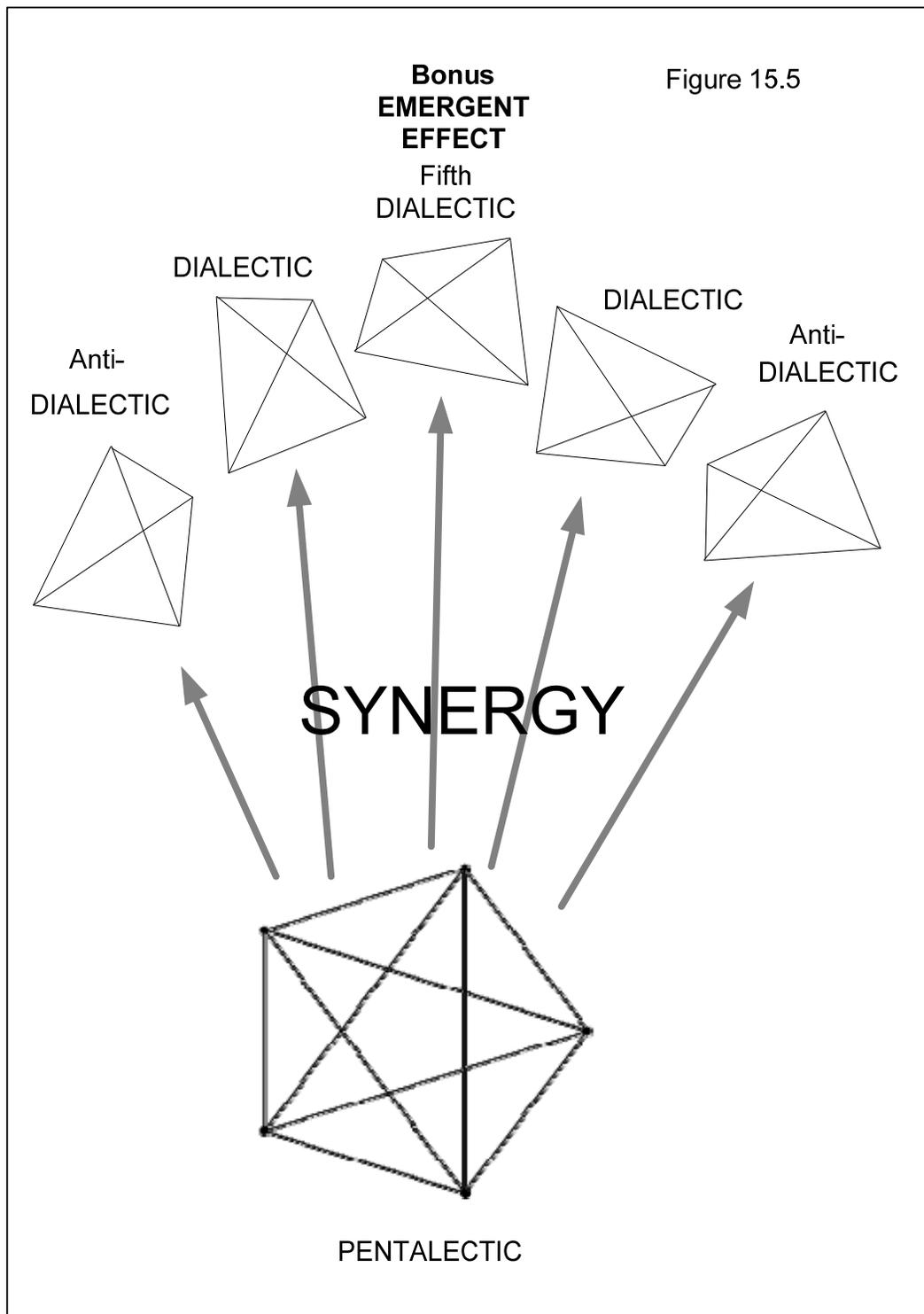


Figure 15.5. Emergent Effect from the Synergy of the Pentahedron.

The Pentalectic is a collision and collusion between the Quadralectic and the anti-Quadralectic. This produces a three-dimensional waveform and a four-dimensional core. The three-dimensional waveform is dual and the four-dimensional core is a self-dual. The three-dimensional waveform of the collision is seen in the icosadodecahedron, which is equivalent to five tetrahedrons interacting. There are the four that come from each of the

dialectics, but there is the *fifth*, which is emergent and it is the one that makes up the *sum greater than the parts*. But the core in the fourth dimension merely adds one moment to the Quadralectic, while the fifth moment represents that emergent property that is produced by the collision and collusion, which is the ultra-synthesis beyond the super-synthesis of the Quadralectic. Tetrahedrons are self-dual, cubo-octahedrons are dual, but the icosadodeca↔penta-hedron complex is both dual and self-dual and mediated by the alternating group A5 of the order 60¹²⁶². The Pentalectic takes us from the outer waveform in the third dimension into the minimal solid simplex of the fourth dimension and it functions as the core of the collision. It also takes us into Wild Being, which is the key basis for *meta*-design rather than Hyper Being, which supports design. Here the sign becomes the *re*-sign, since we are resigned to the encompassing of what is out of control and out-of-hand as a modality of being-in-the-world.

Now, what prevents this language from becoming merely nihilistic? What is it that prevents this from being mere words signifying nothing? One insight that we can take from the late Heidegger is that there is a *double ground* of projection in Being, one is normal Being that unfolds from Ontological Difference (the *greatest difference* being the *meta-levels* of Being) and the other is Beyng, which is onefold, unique, and strange. This other ground, the *recoil* from the *withdrawal of Being* is the sway of Beyng that provides the sense, meaning, significance, relevance, recognition, fulfillment, and actualization that is the Golden Thread, which connects the differences (in Being) and allows us to see them as belonging together as the Same. But, in the Pentalectic, this effect is doubled and we not only have the Golden Thread, but we also have the *Golden Fabric*¹²⁶³, which (in myth) is woven together on the loom of the *Norns* (Fates)¹²⁶⁴. It is this *other* ground that guarantees the meaning of these words, because between these two grounds, which are Being and Beyng (situated on either side of the Singularity of Ultra Being and separated by Emptiness and Void) a *clearing* emerges. This clearing is an opening, that allows the operation of the *Ereignis*¹²⁶⁵ of Generalized Dasein¹²⁶⁶, which is what we are. Being withdraws in the projection. Beyng holds sway over beings. One of those beings is

¹²⁶² <http://for.mat.bham.ac.uk/atlas/html/A5.html> accessed 081227.

¹²⁶³ The Golden Fabric is woven out of Golden Threads as both warp and woof.

¹²⁶⁴ The Norns are the Fates in Norse Mythology. See Bauschatz, Paul C. *The Well and the Tree: World and Time in Early Germanic Culture* (Amherst: University of Massachusetts Press, 1982).

¹²⁶⁵ Ereignis means 'a happening'. See Moyle, Tristan. *Heidegger's Transcendental Aesthetic: An Interpretation of the Ereignis*. Ashgate New Critical Thinking in Philosophy (Aldershot, Hants, England: Ashgate Pub. Ltd, 2005).

¹²⁶⁶ Here we mean that Dasein is not tied to Process Being but generalized beyond all the kinds of Being and related to Beyng.

Generalized Dasein, which is the source of the ecstasy of the projection of Being. Dasein expresses its being under the sway of Beyng through *Ereignis* by ‘opening the clearing’ and ‘clearing the opening’ as an appropriation of beings within the enframing¹²⁶⁷. Dasein en-owns¹²⁶⁸ itself by allowing other beings to shine forth, which allows emergence to occur at the site of time-space. And we are *t/here*, i.e., there/here¹²⁶⁹ in the ‘open-clearing/clear-opening’.

The Pentalectic is the key to genius. It is the genius who can engage in meta-design. It is the genius who produces the mirroring of the world in the epic, in theater, in the novel, in art, in science, and in engineering. This is the limit of our design aspirations. Design exists between the limit of the synthesis produced by the Dialectic, and the ultra-synthesis of the Pentalectic. Design creates the emergent artifact, which can set off the cascade of an Emergent Event, *while the Pentalectic is the meta-design of the Emergent Event*, i.e., the embodiment of four-dimensional time within the world. The intrusion of four-dimensional time as an emergent event in the world is seen as the *face of the world*¹²⁷⁰ in which all the kinds of Being are embodied, where all the transcendentals become immanent against the background of the tapestry of Beyng. In this moment of the Emergent Event, the clearing clears, the opening opens, and we have the *Ereignis* of Generalized Dasein under the sway of Beyng. *Ereignis* is a ‘drawing back’ to allows things to be within the ‘clearing open’, or the ‘open clearing’, under the sway of Beyng. When Dasein projects Being upon beings within this opening and clearing, a new order arises. This ‘working out’ of that new order is the work of the Pentalectic.

Against this background we will now revisit the Pentalectic and note that for some time we have maintained that concepts can be conceived as knots, although we now understand that these concepts are actually the knots of the Golden Threads of Beyng. We can say similar things about the perspective, essence, and design traces in Hyper Being. Each one can be seen as a juncture, or joining, in which Beyng comes closer to the differences in Being. So, we can talk about *possible perspectives* as being held together by a juncture or as a joining in Beyng, or we can speak of *possible essences* as a juncture, or joining, between the

¹²⁶⁷ Ge-stell. See Evans, Fred J. *Psychology and Nihilism: A Genealogical Critique of the Computational Model of Mind* (Albany, NY: State University of New York Press, 1993) p. 36.

¹²⁶⁸ Maly, Kenneth. *Heidegger's possibility: language, emergence-- saying be-ing* (Toronto: University of Toronto Press, 2008). See also Scott, Charles E. *Companion to Heidegger's Contributions to Philosophy*. Studies in Continental Thought (Bloomington: Indiana University Press, 2001) p. 90.

¹²⁶⁹ Fuller, Andrew Reid. *Insight into Value: An Exploration of the Premises of a Phenomenological Psychology* (Albany, N.Y.: State University of New York Press, 1990) p. 55.

¹²⁷⁰ A ‘face of the world’ is when all the kinds of Being are present at the same time in some configuration of phenomena.

attributes that constrain them. In the same vein we can talk about *designs* as juncture, or as a joining, of the *designed parts* that make up the global design of the whole System or Meta-system. At each juncture, or joining, there is a point of re-signation where we lose control and things get ‘out-of-hand’. This is the limit of the possible concept, the possible essence, the possible perspective, or the possible design. It is at this point of resignation that we will attain *insight* into the concept, essence, design, or perspective and their interleaving interaction. These form the NEXUS of the mediations through their focus, object, image, and signature. Within this ambience there is a conglomerate of ipsities¹²⁷¹ that we see in either a juxtaposition, or conjunction, as a specific juncture or as a specific joining. But, these ipsities only appear as opacities to our projections of sense, goal, intentional target, or practice. We see the proclivities, tendencies, dispositions, inclinations, and propensities in the ipsities. We think of them as ontic noumena that can give us *insight* through their resistance to our projection. Yet, we only understand them through the dehiscence that comes from the contraction of Being.

No wonder we do not understand semantics. We think of it as a homogeneous plenum that is the nihilistic opposite of the pragmatics of speaking, and that these two opposites are structured by syntax, which can be isolated, creating closed languages. That closure is the opposite of the openness of the clearing. We can use the terminology of Hilary Lawson to describe the “closure of the openness”¹²⁷², which results in ‘material’ that can then be further closed. Emergence is a *reopening and reclosing* of the ‘material’ within a scope at a particular level, whether it be facticity, theory, paradigm, episteme, ontos, existence, or absolute. But, in fact, from the point of view of Wild Being there are many unconnectable points with their own intensities¹²⁷³ and their own virtual lines of flight¹²⁷⁴. We see them in the coloring of the Mandelbrot Set¹²⁷⁵, which is based on acceleration toward an infinity of individual points in a complex plane. These points that are isolated Firsts, have their *own* propensities, inclinations, dispositions, tendencies, and proclivities as highlighted by the Pentalectic although we try to project upon them our sense of representations, our goals for behaviors, the intentional targets of our stances (as vanishing points) and our performances based on content (intext). We project Meta-systems as *milieu* for these Systems in terms of

¹²⁷¹ A ‘Conglomerate of ipsities’ is half way between the extreme of difference represented by a ‘Set of particulars’ and the extreme of identity represented by a ‘Mass of instances’.

¹²⁷² Lawson, Hillary. *Closure*. Op. cit.

¹²⁷³ See Deleuze and Guattari. *Anti-Oedipus* Op. cit. p. 20ff

¹²⁷⁴ See Deleuze and Guattari. *A Thousand Plateaus* Op. cit. p. 3, 9, 11ff.

¹²⁷⁵ Mandelbrot, Benoit B. *Fractals and Chaos: The Mandelbrot Set and Beyond*, Selecta Volume C (New York: Springer, 2004).

context, the surrounding horizon, situation, and circumstance. And we try to *mediate* these Systems to their Meta-systems through Focus, Object, Image, and Signature. These various mediations form a Nexus prompting the Pentalectic to take over and structure Wild Being, but after the expansion of being-in-the-world, Wild Being tries to overcome this imposed structure *through the process of projection* as it *enforces a constriction* upon being-in-the-world. This gives us the *dehiscence* that produces the cracks and distinctions within the world that tell us the most about the noumena, which is ultimately a singularity of Ultra Being. The ‘dehiscence’ shows up as distortions in the hyle that we previously referred to as the ‘introjected hyle’. At the level of Wild Being the only thing that can connect the points of intensity is the Golden Thread of Beyng. Only through the Pentalectic and through an alternative ground such as Beyng can this connection be made that will make sense, give goals, produce intentional targets, or provide performances. In the onefold uniqueness and strangeness of Beyng there is a bridge for the unbridgeable. It exists in the *Other Beginning*¹²⁷⁶ prior to Metaphysics that was “always already”¹²⁷⁷ connected with all the differences within Being.

This explains the way that the concept can be a *knot* and yet still be a *junction, or joining, of uncrossable differences*. At the trace level there are dotted lines between the points in the uncrossable space. These traces form hinges between them, which allow the junctures, or joining, to form. So, when we look at the scene in Wild Being there are scattered Firsts. But when we look at it in Hyper Being, there are hinges that are proto-relationships that will become *real* in Process Being, and *continuous* in Pure Being. The same is true of Hyper Essence, Hyper Perspectives, Hyper Design, and Hyper Concept. What is uncrossable becomes threaded together through the counter projection of Beyng, which cannot be connected in Being. This is because Being generates the differences and what *generates difference* cannot also *act as a bridge* between those differences. By contrasting Being and Beyng, we generate meaning, so that semantics are produced as a specific field of Golden Threads connecting the differences. Deleuze refers to these Golden Threads as having infinite speed, which allow the differences in the concept to be connected¹²⁷⁸. But Heidegger’s difference is deeper. Heidegger explains meaning and escapes nihilism by doing so. Deleuze describes a philosophy poised at the threshold of Wild Being but

¹²⁷⁶ Marx, Werner. *Is There a Measure on Earth?: Foundations for a Nonmetaphysical Ethics* (Chicago: University of Chicago Press, 1987).

¹²⁷⁷ Raffoul, François, and David Pettigrew. *Heidegger and Practical Philosophy*. SUNY Series in Contemporary Continental Philosophy (Albany, N.Y.: State University of New York Press, 2002) p. 150.

¹²⁷⁸ See Deleuze, Gilles, and Félix Guattari. *What Is Philosophy?* (London: Verso, 1994).

Heidegger goes beyond Ultra Being to retrieve the dual counter projection of Being. We can use Heidegger's insight in a transformed Phenomenology that recognizes the threading together of differences in Being by the onefold of Beyng. And beyond that we can use the Pentalectic to comprehend the next level *beyond* design – the *meta-design* in which a tapestry is woven from the Golden Threads. The propensities, tendencies, inclinations, dispositions, and proclivities are seen as the *differences* of the Golden Threads that weave the warp and woof of the meta-design if we consider them from the point of view of the Norns, the weavers of the Fate¹²⁷⁹ of Beyng.

System and Meta-System co-Design

We can think of *meta-design* as a System and Meta-System *co-Design*. In other words, we can use the Quadralectic to design a System, and we can use the Quadralectic to design a Meta-system, but when we engage in designing *both* the System as well as the Meta-system, then we need the added perspective of the Pentalectic. With the Pentalectic we have a single fabric that enmeshes the System with the Meta-system, which would weave the thread of Beyng from the *System* with the thread of Beyng from the *Meta-system*. When we think of meta-design as a *co-design* we see it in a completely different light. We tend to ignore Meta-systems, and think of them as homogeneous plenums. We perceive that Systems can be designed in any way regardless of the Meta-system that they must be able to function within. All we care about is whether or not the System will function with minimal regard for how the functioning System will affect its environment except for the occasional environmental impact report. *If we could design the System and the Meta-system at the same time and in the same way by merely adding another moment to the Quadralectic, rather than by using two separate Quadralectics — see how efficient that would be?* The co-design of two Quadralectics, one aimed at the System and the other aimed at the Meta-system, is actually an expansion of the design process by the Pentalectic. As a result we can achieve efficiency by adding one more moment to the Quadralectic to achieve meta-design and this gives us an emergent benefit that is equal to two Quadralectics. *The Pentalectic is the core of the collision and collusion between the Quadralectic and anti-Quadralectic.*

¹²⁷⁹ 'Wyrd' in Old English.

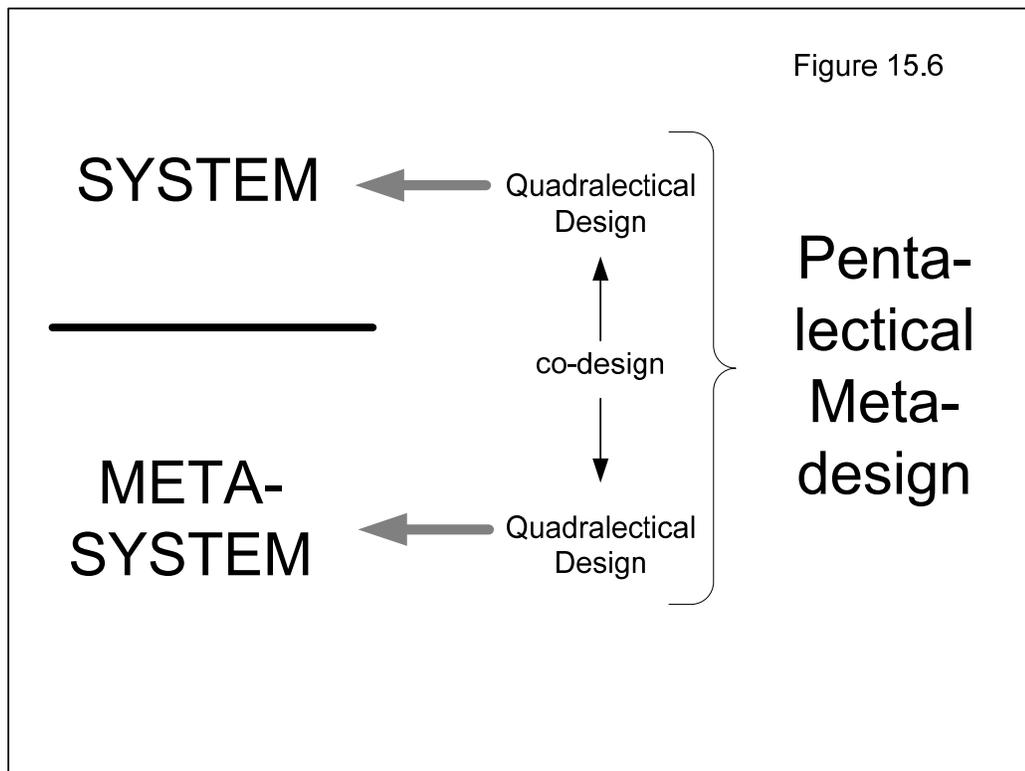


Figure 15.6. Quadralectical Co-Design.

Let us review how this is the case once more. Dialectics are composed of two Monolectics, i.e., two theses, which are opposite each other and perform an *Aufhebung*¹²⁸⁰ to produce a synthesis. This concept of Dialectics as well as Trialectics, comes directly from Hegel. As we have seen, a Trialectic is a structure that mediates the foreground and background and appears within the moment of the Quadralectic. A Quadralectic is a collision and collusion of two dual Dialectics that becomes unified in a super-synthesis. Beyond that, the collision and collusion of two *dual Quadralectics* coalesces in an ultra-synthesis to become a Pentalectic *Shell*. This is parallel to the three levels of the Platonic solids: the tetrahedron¹²⁸¹, cubo-octahedron¹²⁸², and icosadodecahedron¹²⁸³. The first is a *self-dual* while the other higher thresholds have *external* duals. So, the tetrahedron is equivalent to the System and corresponds to the Dialectic. The Dialectic is the synthesis of the System as a whole. That System is composed of parts and in this case the parts are *theses* composed of contradictions, which we see as a meta-contradiction in the System. The *resolution* of the meta-contradiction is *the synthesis*. We can use N. Hellerstein's Diamond

¹²⁸⁰ Sublation. Cf. Hegel.

¹²⁸¹ <http://en.wikipedia.org/wiki/Tetrahedron> accessed 081227.

¹²⁸² <http://en.wikipedia.org/wiki/Cube> and <http://en.wikipedia.org/wiki/Octahedron> accessed 081227.

¹²⁸³ <http://en.wikipedia.org/wiki/Icosahedron> and <http://en.wikipedia.org/wiki/Dodecahedron> accessed 081227.

Logic¹²⁸⁴ and also Delta Logic¹²⁸⁵ to portray the contradiction in the thesis. It is composed of two parts, the *i*, and *j* paradoxes. The thesis has two moments: *i yet j* and *j yet i*. See G. Spencer Brown's Laws of Form¹²⁸⁶ for the origin of this idea characterized as a formalization of the limits. These are the limits of the thesis. Yet, because a dialectic can occur at many levels, a thesis can actually be a synthesis because it contains the synthetic opposites of its resolved contradiction within it. The synthesis of a resolved contradiction remains as a trace in the *Aufhebung* that produces the synthesis. Thus, the tetrahedron of the *dialectical system synthesis* is another higher level resolution of contradictions that has all four moments within itself, which are the limits of the thesis and anti-thesis¹²⁸⁷.

When we move up to the next higher threshold of dialectical organization related to the octahedron and the cube, we see that there are two ways to combine two tetrahedrons. One way to combine two tetrahedrons into an octahedron is through fusion. Another way to achieve this 'combining' is through interpenetration within the cube. These two alternatives represent the two limits of the *divided line*¹²⁸⁸, i.e., the supra-rational, which can be represented as interpenetration or fusion, which suggests paradoxicality. These correspond to the two Foundational Mathematical Categories, one of which is the Holon/Integra that embodies Mathematical Category Theory, and the other, which is the Hoidal that embodies interpenetration and intra-inclusion. Mathematical Category Theory represents fusion because the elements disappear, although the relations and meta-relations continue to exist. Thus, the elements are fused through their relationships, which is all that is left to specify the elements. This means that when we produce a synthesis of the tetrahedron, we have created an image of Wholeness.

As we know, there are four possible hypercycles of stability in spacetime. They are spinors and have 720 degrees of angular change that are embodied in the knot, mobius strip, torus, and tetrahedron. The minimal system has four different views that correspond to the sub-schemas. The tetrahedron is only one of these, the *structural* one. The one representing the *whole* system is the torus. The mobius strip represents the *picture* of the system. The knot represents the *plan* of the system. And the tetrahedron represents the *structural model* of

¹²⁸⁴ Hellerstein, N. S. K. Diamond, a Paradox Logic (Singapore: World Scientific, 1997).

¹²⁸⁵ Hellerstein, N. S. K. Delta: A Paradox Logic (Singapore: World Scientific, 1997).

¹²⁸⁶ Spencer-Brown, G. Laws of Form (New York: Julian Press, 1972).

¹²⁸⁷ See "The Anamorphic Cycle" by the author at <http://archonic.net>

¹²⁸⁸ Plato, and Reginald E. Allen. The Republic (New Haven: Yale University Press, 2006) section 509c-511e. Desjardins, Rosemary. Plato and the Good: Illuminating the Darkling Vision. Philosophy of History and Culture, v. 21 (Leiden: Brill, 2004) p. 55.

the system. Thus, from the view point of sub-schema theory, we are dealing with *models* of wholes of the system, not the whole itself.

When we produce the whole system, or torus, we are producing a whole in relation to the Foundational Mathematical Category of the Whole. That Whole, as synthesis, is composed of the outer boundary of the Mass and the Mereology of the parts within that boundary. If you want a whole comprised of a boundary and parts, then you need to combine the Mass with the differentiation of the mereological parts through Mereotopology. Mass plus Mereology equals Whole (i.e., Mass + Mereology = Whole). Thus, the Mass Foundational Mathematical Category is implicated in the Whole. The Mass Foundational Mathematical Category is the dual of the Set. A Set is a projection of an ordering of difference but a Set (as a projection) does not need any elements in it. A Mass, on the other hand, does not exist if it has no instances. Thus, Sets are ideal and Masses are existential. When we engage in design, we design in Sets, but when we *operate* and *execute* Systems we operate in Masses. Both Masses and Sets have full logics, while all other Foundational Mathematical Categories have degenerate or surplus logics. For example, the logic of the Whole is Dialectics, which is a surplus over the minimal complete logics of the Set and Mass. The Set uses syllogistic logic while the Mass uses pervasion or boundary logic. The other Foundational Mathematical Categories are preparatory for the Set and Mass, and they include the Multiple, the Site/Event, and the Singularity. In Dialectics we are mostly concerned with the ‘over abundant’ side of the Foundational Mathematical Categories. But it is an important insight that the tetrahedron gives us the two ways to combine Dialectics by way of fusion and interpenetration, which we can visualize in the octahedron and the cube. Thus, the Quadralectic is inherently dual with these two modes of combination that simulate the limits of the *divided line* of Plato and represent the paradoxical and the supra-rational.

Notice that at the tetrahedron/dialectical level there are four moments, but at the Quadralectic level there are eight moments. That means that when we push up to the icosadodecahedron level there are sixteen moments. These moments are ordered as either an icosahedron or a dodecahedron and they are hidden in this lattice, which is 1-12-20-30-1. The cube and octahedral lattice is 1-6-12-8-1. The self-dual lattice of the tetrahedron is 1-4-6-4-1. Thus, there is an emergent order at each level. The lattice of the icosahedron/dodecahedron duality is homeomorphic to the pentahedral polytope, which is

a four-dimensional simplex¹²⁸⁹ that has the lattice 1-5-10-10-5-1. They are related through the alternating group A5 of order 60, which expresses the symmetries of both geometrical configurations. B. Fuller in *Synergetics*¹²⁹⁰ can be consulted for the synergies within and between these levels of Platonic solids. B. Fuller does not deal with the synergies of the Platonic solids in the fourth dimension. The pentahedron is the first solid of the fourth dimension. It is a minimal solid whose lattice is produced by the Pascal Triangle¹²⁹¹. Thus, you can see that the sixteen moments are well hidden in the orders that are imposed at each emergent level of the unfolding of the Platonic solids. This unfolding is a necessity. In our universe this is the only ordering of the Nomos that is possible. Furthermore, in addition to this ordering of the Nomos, there is a meta-dialectical form associated with each of these thresholds of organization. This meta-dialectical configuration is arranged such that the icosadodeca↔penta-hedron level is *outwardly dual*, but *inwardly a self-dual* with two different organizations. The outward organization is the *shell* composed of the alternating group A5 and is homeomorphic to the pentahedron in four-dimensional space. Four-dimensional space is the space of nonduality. Thus, the pentahedron is the nondual basis of the duality between the icosahedron and the dodecahedron¹²⁹². The Pentalectic encapsulates this relationship between the dual Quadralectics and the nondual core that appears in the fourth dimension.

At this point, the sixteen discrete moments appears to have vanished because their traces have been effaced as we moved up the hierarchy of meta-dialectics and the hierarchy of spatial figures. We must note that in Being there are four aspects, which are identity, presence, reality, and truth. We note that the permutation between these give sixteen quadragrams. As a result, we posit that the sixteen moments are, in fact, these quadragrams **from reality**, plus truth, plus presence, plus identity **to illusion**, plus fiction, plus absence, plus difference. Deleuze privileges difference, but in spite of that, he is still moving in the orbit of Being. Other philosophers privilege other aspects. For example, Heidegger privileges truth. Hegel privileges identity by attempting to build a dynamic philosophy that accepts contradiction and subsumes it into synthesis. Above all, the entire tradition

¹²⁸⁹ Recently renamed the “pentachoron” because of confusion between three and four-dimensional names. See <http://en.wikipedia.org/wiki/Pentachoron> accessed 081221.

¹²⁹⁰ Op. cit.

¹²⁹¹ http://en.wikipedia.org/wiki/Pascal_triangle accessed 081221.

¹²⁹² We also wish to mention that there exists two abstract four-dimensional polytopes called the 11-cell and the 57-cell, which also embody this relationship between the icosadodecahedron and the pentahedron. <http://en.wikipedia.org/wiki/11-cell> accessed 081221; <http://en.wikipedia.org/wiki/57-cell> accessed 081221.

privileges either presence¹²⁹³ or reality¹²⁹⁴. Up until the late Heidegger all these philosophers remained in the orbit of Being until Heidegger discovered that Being has a dual, which is Beyng. In other words, Heidegger understood that Being is not necessarily a self-dual as everyone had assumed. So, we are saying that these sixteen moments of the combinations of the aspects of Being are inherent at the level of the pentahedron and icosadodecahedron. Note, that they too are organized by the next higher level of emergent organization that exists in the fourth dimension, which is the eight or sixteen cell polytope with a lattice of 1-8-24-32-16-1¹²⁹⁵. Notice that in the fourth dimension this polytope has points within it for 8, 16, and 32 permutations of elements. Beyond this there is the 24 cell polytope with the lattice 1-24-96-96-24-1¹²⁹⁶, which is a higher nondual threshold within this eight and sixteen cell dual. Beyond that there is an even higher nondual threshold, which is the 120¹²⁹⁷ and 600¹²⁹⁸ cell polytope.

Our point is that the sixteen quadragrams, which represent the moments of the four tetrahedrons that enter into the Pentalectic, are organized at the next level up and this gives us the full structural articulation of Being, over against the onefold of Beyng. Now, as we have said before, the icosahedron and dodecahedron are homeomorphic to the five tetrahedrons that appear in the pentahedron. The fifth tetrahedron is the *emergent excess* that appears in the *pentalectic shell* and *core*. When we consider that four-dimensional space is actually four three-dimensional spaces related in a quaternionic rotation of its axes, then we see that in this figure there is a tetrahedron for each of the three-dimensional spaces with one in excess. This excess is the *emergent addition* that appears at this level of organization from the intersection of the Quadralectic and the anti-Quadralectic in a new synthesis. All of the moments in the four tetrahedrons are supported at the next level up within four-dimensional space in the eight and sixteen cell polytopes, which form duals that function as space-filling lattices. The nondual core of these is the self-dual 24 cell polytope. That polytope is the self-dual center of the space of Existence, which organizes all the aspects of Existence within the nondual realm¹²⁹⁹. That polytope has the special property of ultra efficiency. In other words, it is only the octahedron whose lines (if given direction) have a mode in which they do not interfere with each other and have laminar

¹²⁹³ Continental Philosophy.

¹²⁹⁴ Analytical Philosophy.

¹²⁹⁵ <http://en.wikipedia.org/wiki/16-cell> <http://en.wikipedia.org/wiki/Tesseract> accessed 081221.

¹²⁹⁶ <http://en.wikipedia.org/wiki/24-cell> accessed 081221.

¹²⁹⁷ <http://en.wikipedia.org/wiki/120-cell> accessed 081221.

¹²⁹⁸ <http://en.wikipedia.org/wiki/600-cell> accessed 081221.

¹²⁹⁹ Whether this self-dual center is Being, Beyng, or Existence as Emptiness or Void is open to discussion.

flow. The 24 cell is made up of octahedrons, which represent fusion but have this laminar flow. Thus, at the center of Being within the nondual realm, there is this special efficiency at the core. This is called *Chi* in China¹³⁰⁰, *Prana* (Shakti) in India¹³⁰¹, and in the West, physics refers to it as *laminar flow*. The same ultra efficiency that exists in the non-dual realm is also seen in the Special Systems. Each of the thresholds have their particular emergent quality, although it is interesting that the Pentalectic is the transition between the third and fourth dimension. In the icosadodecahedron we can see the organization of the shell where the two Quadralectics collide and then collude to produce an ultra-synthesis. That ultra-synthesis has a core in the fourth dimension, which is the pentahedron that structures the Pentalectic. In China this is called the five *Hsing*¹³⁰². At this level we see that there are sixteen moments from the original tetrahedrons that composed the four dialectics that combine at the level of the Pentalectic. These moments appear as the combination of the aspects of Being, which are organized at an even higher level of the 8/16 cell polytope, which, in turn, has its own nondual in the 24 cell polytope. The 24 cell polytope is the nondual interface between the two dual lattices that fill the space in the fourth dimension based on the 8 and the 16 cell polytopes.

The Pentalectic gives us an emergent synthesis between the four dialectics (or two Quadralectics) and the nondual core. Furthermore, we can also see that the fourth dimension gives us an organization that supports all the moments of the original dialectics with both its dual and nondual representations of the lattice of Existence. However, all of these diverse elements that appear at the various emergent thresholds are given meaning and held together by the Golden Threads of Beyng that appears as the laminar flow of the 24 cell polytope. And it is particularly significant that the Pentalectic allows these two such threads to be woven together in a fabric that connects the design of the System with the design of the Meta-system. To make this point in a specific situation; when we design systems that do not take into account the consequences that can affect our environment, both physically and socially, we can see that there is a need for the *meta-design*, which takes into account the interplay of the System and Meta-system in the same manner that nature balances processes and events. By adding one more moment of insight to the Quadralectic, our design concepts can move from the realm of Hyper Being into Wild Being. This is what we need in order to understand the Design of nature, and to appreciate the Wild in nature. As part of nature we have the genius to create the Emergent Event as an

¹³⁰⁰ <http://en.wikipedia.org/wiki/Ch%27i> accessed 081221.

¹³⁰¹ <http://en.wikipedia.org/wiki/Prana> <http://en.wikipedia.org/wiki/Shakti> accessed 081221.

¹³⁰² http://en.wikipedia.org/wiki/Wu_Xing accessed 081221.

eruption of four-dimensional time into our worldview. But because we have lost touch with meta-design, i.e., our own connection to Intelligent Design, we rely too heavily on individual genius. By ignoring the need for *cooperative* discovery and *mutually* innovative techniques, we are actually accelerating a path of destruction for ourselves and the other species of this planet.

Once we know that there is a basis for meta-design in the Pentalectic, such as the basis we have discovered for design in the Quadralectic, then we see that there is an open horizon for research into the nature of meta-design, which leads to higher and higher thresholds of emergent organization. As theorists of design, it is our job to explore this open horizon and to understand the consequences of a restriction to monochrony in this Metaphysical Era, and how our understanding of our own human nature will be enhanced if we embrace heterochrony (recognizing Kairos¹³⁰³ as well as Chronos¹³⁰⁴) as what lies beyond the metaphysical rather than relying on historic facticity. Heterochrony is the door to our comprehension of the self-organizing Intelligent Design of nature. We can de-artificialize our products by allowing the System and Meta-system to mesh in their meta-design. This is the new horizon that Design Theory must understand by going beyond the artificial. It is the basis for understanding Emergent Engineering as a co-design process that encompasses the System and Meta-system. In Meta-design, two Emergent Meta-system cycles and two Emergent Event lifecycles interact. This means that the foundation of Existence is related to Emptiness and Void and doubles as a basis for the synchronization of the Pentalectic. Emergent Engineering is an Engineering that emerges from the ‘forgetfulness of the machination’¹³⁰⁵ that is leading to the destruction of the earth. Our present projection process is destructive if left unchecked. *The Pentalectic moment is the checking of the projection process.* It can be expressed as what Heidegger calls reticence¹³⁰⁶, which occurs when we let ‘what is made’ manifest and speak for itself with its own voice. It is the drawing back from the realm of possibilities into the contraction of Wild Being after the expansion of Hyper Being. The Pentalectic moment adds only one moment to the hubris of the Quadralectic, and in doing this we realize the core of the ultra-synthesis of the System and the Meta-system. That occurs within the panoply of the permutation of the aspects of

¹³⁰³ <http://en.wikipedia.org/wiki/Kairos> accessed 081221.

¹³⁰⁴ <http://en.wikipedia.org/wiki/Chronos> accessed 081221.

¹³⁰⁵ Heidegger’s term for the en-framing in certain works. Beistegui, Miguel de. Heidegger & the Political: Dystopias. Thinking the political (London: Routledge, 1998) p. 76.

¹³⁰⁶ Scott, Charles E. Companion to Heidegger’s Contributions to Philosophy. Studies in Continental thought. (Bloomington: Indiana University Press, 2001) p.22. See also Heidegger’s Contributions Op. cit. Section 38 “Reticence and Silence” p. 55. See also Heidegger’s Mindfulness p. 72.

Being, which, in turn, has its own ultra-efficient core. That ultra-efficient core is the subject matter of the Special Systems.

Virtual and Actual

The movement of the Pentalectical moment toward the center of the Quadralectic can also be seen as a move up into a dimension of virtuality, which would then collapse into the next higher schema, as has been suggested previously in our consideration of the S-double-prime Theory of General Schemas Theory¹³⁰⁷. Our analysis shows that a schema is unstable at dimensional levels higher than three and we posit that this causes a collapse into the next higher schema. Yet, this is precisely what brings the two Quadralectics into coherence. When the lower and higher sub-schemas are associated with two adjacent schemas, each has its own Quadralectic as the transition between the sub-schemas. This is how we see the relationships between the *core* Pentalectic (as a pentahedron) with five moments versus the *shell* Pentalectic (as an icosadodecahedron) that represents a collision and a collusion of the two Quadralectics. The five moments are related to the Pentahedron of four-dimensional space, while the two colliding Quadralectics are related to the icosadodecahedron geometrical formation, which shares the same group as the Pentahedron. This allows us to apply our concept of the two Quadralectics as they relate to the System and Meta-system to *any* two adjacent schemas. The Pentalectic can also act as a cohering factor that could connect two separate single Quadralectics. Thus, we see that the Pentalectic is synergetic to a high degree because the minimal addition of a single moment not only serves to produce the coherence of the Quadralectic at one schematic level, but it also connects two adjacent sets of sub-schemas at different schematic levels. This synergy is an ultra-efficiency and is a very interesting consequence of the application of the Quadralectic to the sub-schemas.

In this way we can integrate our concept of the Pentalectic with the ideas of Deleuze that discuss the difference between the virtual and actual¹³⁰⁸. If the Pentalectic moment is integrating a set of sub-schemas, it may also be thrusting into a higher virtual dimension for that particular schema, which will cause it to collapse into the next higher schema. Thus, the Pentalectic moment acts as a coordinating factor between adjacent schemas. The Pentalectic could be visualized as having a virtual, as well as a synergetic, aspect depending on whether it is exercised in relation to one schema or two. The Pentalectic has

¹³⁰⁷ See “General Schemas Theory” by the author at <http://holonomic.net>

¹³⁰⁸ Deleuze, Gilles, Claire Parnet, and Gilles Deleuze. *Dialogues II* (New York: Columbia University Press, 2002) p. 148. “The Actual and the Virtual”

outward and inward collusive aspects. The outward aspects are associated with the icosadodecahedron, which expresses the collision between two Quadralectics. The inward aspect is related to the pentahedron, which can give coherence to the Quadralectic (of one schema) or provide a connection (as an interface) for the next higher schema. In that case, it would render the lower level schema to be virtual, and precipitates a collapse into the next higher schema as an actualization. This double duty of the Pentalectical moment is a very highly leveraged synergy, which is of great interest. It is similar to the efficiency of the tactics celebrated by M. de Certeau¹³⁰⁹. The Pentalectic can be the basis of a schema/meta-schema co-design, or it could be the basis of the synergy of the design at a single schematic level (collision or collusion). There is a chance that these two expressions of the moment are related. In other words, it is possible that expressing the relationship of the schema to the meta-schema is what gives the schema a greater synergy. However, it is clear that the Pentalectical moment has special properties in relation to the sub-schemas at different schematic levels. The Quadralectic model demonstrates how a higher standard of efficacy can be introduced into the design process. We do not see this level of efficacy with the Ennead model proposed by Wisse, nor did we see it when we added the perspectival moment to the Ennead. Adding the perspectival moment allowed us to better understand the structure of the moments, and to elaborate on the framework of the Ennead, but, when we added the Pentalectical moment to the Quadralectic, we suddenly attained a higher degree of synergy that could be expressed as an *emergent effect* within the interface between the geometries of the third and fourth dimension. We are positing that this does not only occur at the dimensional level of the System and Meta-system, but at *every boundary* between adjacent schemas.

Structural Interlock

What we are seeing here is a structural interlock between several very different structures. It is clear that all these various structures interlock to define the Quadralectic, the sub-schemas, the Pentalectic, the Emergent Lifecycle, and the Emergent Meta-system Cycle, as well as the relationship between adjacent schemas in the hierarchy of schemas. Together this complex structure represents the whole Theory of Design and Meta-design of Emergent Eventities.

¹³⁰⁹ Certeau, Michel de. *The Practice of Everyday Life* (Berkeley: University of California Press, 1988). See also Highmore, Ben. *Michel De Certeau: Analysing Culture* (London: Continuum, 2006).

Once we understand the elaborated structure of the moments of the Pentalectic and place it back into the structure of the Sub-schemas, it becomes clear that the Pentalectic can serve two purposes. It takes design into the next higher dimension, or virtualized sub-schema, and it can synergize the already given sub-schemas. As a result, we are able to get a very precise and detailed picture of the transformations between the sub-schemas and how they produce a super-synthesis that collapses back down into the whole schema. This allows the schematic hierarchy to become well defined as a whole since it is based upon the convergence of the structure of the Emergent Event's Lifecycle and the Emergent Meta-system. The geometry of the relationship between the Dialectic, Quadralectic, and Pentalectic serves to give even greater definition to the whole structure. All of these structures work together to produce a very robust theory. For example, our theory of the Quadralectic is enhanced by realizing that it is part of the more complex structure of the Pentalectic, which can also be correctly described as 'dual Quadralectics'. Contrasting the Dialectic with the Quadralectic and the Pentalectic levels of complexity and geometrical interpretations gives us an intriguing picture of a design pattern. We also note that the sub-schemas are related to the various ways of representing the minimal system in terms of 720 degrees of angular change such as appears in the torus, tetrahedron, mobius strip, and knot. As we line up these various geometrical analogies they provide quite a bit of detail as to the nature of the structures under consideration. These structural interlocking foundations serve to stabilize our theory and to connect it to the structure of the worldview. Our hypothesis is that this structure of the Pentalectic of Meta-design and its devolution into the Quadralectic of Design and the Ennead, is part of a structure of the worldview that expresses the *relationship between emergence and nihilism*. This hypothesis gives a firm foundation to the connection between Design and Meta-design within our tradition. And that gives us greater confidence in the theory and its efficacy. However, a question remains: Will knowing the Quadralectic/Pentalectic Theory reflexively, actually improve our ability to do design, and will that knowledge encourage the practice of System and Meta-system *co-design*, as well as generate greater *synergy* in System Design?

In general, the Ennead, Quadralectic, and Pentalectic serve as a foundation for understanding the *underlying structure* of the cognitive processes in design. We need methods and meta-methods to articulate these cognitive moments into actual representations of particular designs. The Quadralectic devolves into approaches that can be used for each schema and its embodiments. The meta-methods serve to identify the design elements and their computability. The methods serve to give *slices* of Turing Machines that can be handled in isolation while still meeting the goal of the *entire* Turing

Machine that the design represents. Of course, these minimal methods and meta-methods need to be tailored to become part of our development processes so that they will produce specific products. This is a general foundational framework, which states that behind all design is the hierarchy of schemas. In turn, those schemas can be broken into sub-schemas that are related through the Quadralectic. Furthermore, those schemas can be synthesized with their super-schemas through the Pentalectic. There is complete transformational integrity between the sub-schemas and the moments of the Quadralectic. There is further synergy with the addition of the Pentalectic moment that takes us from Hyper Being into Wild Being.

The mathematical analogies taken from geometry serve to stabilize these structures and give specific guidelines for how the thought structures transform emergently at the various levels of the Monolectic, Dialectic, Trialectic, Quadralectic, and Pentalectic. That series may even go on to higher synergies if we take into account the other Platonic structures in four-dimensional space. Because of the coordination between the Quadralectic and the Lifecycle of the Emergent Event, as well as the Emergent Meta-system Cycle, there is an over-determination of the Quadralectic in its synchronization between these two cycles of existence. Yet, because the Lifecycle of the Emergent Event is also connected to the Foundational Mathematical Categories, there is a great deal of detail involved in how representations are created, which become behaviors, then stances, and then content. This detailed knowledge of the nature of the representational possibilities based on *mathesis* makes this theory very precise. The Foundational Mathematical Categories define the ways that the nomos is grounded, and the nomos defines the possible ways that ordering representations are produced, how their behaviors are elaborated, how their stances are articulated, and finally, how their content is fabricated. The Foundational Mathematical Categories build toward greater and greater complexity and synergy. On the other hand, the Emergent Meta-system complexifies as it loses its properties until it relaxes into lower and lower *material* states of optima where symmetries are no longer maintained. The Emergent Meta-system describes the symmetry breakings within the dynamics of existence that underlie the Emergent Event. The Emergent Meta-system is based on several mathematical analogies, the most complex of which are the hyper-complex algebras. These algebraic structures are very well defined. In a sense, the combination between the Foundational Mathematical Categories and the Hyper-complex Algebras furnishes us with

a Universal Algebra¹³¹⁰, where entities and relationships are defined. Entities are defined with the Foundational Mathematical Categories while the relations are defined with the Hyper-complex Algebras. This substrate of the Universal Algebra is taken into the realm of *spacetime by the schemas*, and into the realm of *possibility by the Quadralectic* where it can be expressed in terms of the Field of Design. This gives us a foundation for design at the level of Hyper Being and a foundation for meta-design at the level of Wild Being. But these are general cognitive structures that need to be augmented by the ‘approaches to’ and the ‘embodiments of’ the schemas, specifically in relation to the System and Meta-system, which become expressed as co-algebras¹³¹¹ in implementations. We have minimal methods and meta-methods that are defined and guide the application of these cognitive faculties. They are *differentiated* in the higher meta-levels of Being (Hyper and Wild), and then *applied* at the lower levels of Being, i.e., in relation to *products* in Pure Being and to *processes* in Process Being.

Being/Beyng and the Problem of Semantics

In addition to our Meta-Design Theory of Schemas, we must include an insight from Heidegger that will help us to solve the problem of Semantics. All of these structures discussed in the Theory of Design and Meta-design are discussed in terms of differences, mostly founded in the Nomos and discovered through Mathesis. We have attempted to stabilize their meaning by referring to the precedents established by Wisse, or even Wittgenstein’s Philosophical Grammar¹³¹². But, we posit that meaning is also generated in the *clearing and openness*, which we embody as Generalized Dasein. This is a result of our close proximity the two bases of Being, i.e., Being and Beyng. Just as we borrow from Emptiness and Void to provide the synchronized foundations of the Quadralectic, we can also use the concept of the onefold of Beyng to generate meaning through the differences of Being. In some ways this could be the most profound part of our theory, which we borrow from the late Heidegger. Regardless of how we have construed the differences of Being in order to describe the basis of design, there was some point *before* their arising

¹³¹⁰ Sabinin, Lev V., Larissa Sbitneva, and I. P. Shestakov. Non-Associative Algebra and Its Applications. Lecture Notes in Pure and Applied Mathematics, v. 246. (Boca Raton: Chapman & Hall/CRC, 2006). Springer, Tonny Albert, and Ferdinand D. Veldkamp. Octonions, Jordan Algebras and Exceptional Groups. Springer Monographs in Mathematics (Berlin: Springer, 2000). Dixon, Geoffrey M. Division Algebras: Octonions, Quaternions, Complex Numbers, and the Algebraic Design of Physics (Dordrecht: Kluwer Academic Publishers, 1994). Cohn, P. M. Universal Algebra (Dordrecht: D. Reidel Pub. Co, 1981).

¹³¹¹ See Fiadeiro, José Luis. Algebra and Coalgebra in Computer Science. Lecture Notes in Computer Science, 4624. (New York: Springer-Verlag Berlin Heidelberg, 2007). See also <http://en.wikipedia.org/wiki/Co-algebra> accessed 091017

¹³¹² Wittgenstein, Ludwig, Anthony Kenny, and Rush Rhees. Philosophical Grammar (Oxford: Blackwell, 2004).

where they were not only the same, but also indistinguishable. If we closely hold the indistinguishability of this ‘Other Beginning’¹³¹³ to the differences that are generated in the ‘First Beginning’¹³¹⁴, then sparks of meaning are generated that will make sense of our representations, give us goals for our behaviors, give us intentional targets for our stances, and supply the pragmata that work together to produce the emergent properties for our designs. So, beyond Ultra Being we need to borrow the “always already”¹³¹⁵ sameness, or “belonging together”¹³¹⁶, nature of Beyng so that we may *contrast* the various differences that we *construct* in Being, as well as those that we construct in the *meta-levels* of Being. These differences occur between the moments of the Ennead, Quadralectic, and Pentalectic, or the various schemas. All these interlocking structures could be given different meanings, but because the structures arise out of the Nomos, and because at some point prior to their arising they were all the *same*, then we are guaranteed that an *archetypal structuring*¹³¹⁷ will occur with their arising. So, if we recognize their interlocked and interconnected structure, then within the clearing of our own openness, the signifiers will indicate the structure of the emergence of our worldview as it comes into existence. Out of the Mass, this Set appears through the mediation of the Nomos and our own Mathesis. Thus, what it shows us will be our *ownmost* because it is what we see and understand to be actually produced from within ourselves and cannot but reflect our view of the world.

In other words, if we returned to a tabula rasa and renamed everything, we would still be referring to the same things but in different terminology. It is our *ownmost* because it is the way we express who we are within our worldview. *We* are the emergent ones whom the worldview discontinuously overwhelms with emergence. This is a fundamental part of our Western Dasein. If we stare into the Sun of the Good¹³¹⁸, its darkness and its

¹³¹³ This is the beginning that avoids Metaphysics all together in the Western Tradition. See Beistegui, Miguel de. The New Heidegger. Continuum Studies in Continental Philosophy (London: Continuum, 2005) p. 85.

¹³¹⁴ This is the beginning of Metaphysics in the Western Tradition. Boeder, Heribert, and Marcus Brainard. Seditions: Heidegger and the Limit of Modernity. SUNY Series in Contemporary Continental Philosophy (Albany: State University of New York Press, 1997) p. 203.

¹³¹⁵ Smith, P. Christopher. The Hermeneutics of Original Argument: Demonstration, Dialectic, Rhetoric (Evanston, IL: Northwestern University Press, 1998) p. 18.

¹³¹⁶ ‘belonging together’ is different from identity. Heidegger, Martin. Identity and difference (Chicago, IL: University of Chicago Press, 2002).

¹³¹⁷ Peat, F. David. From Certainty to Uncertainty: The Story of Science and Ideas in the Twentieth Century (Washington, D.C.: Joseph Henry Press, 2002) p. 67. See also Gray, Richard M. Archetypal Explorations: An Integrative Approach to Human Behavior (London: Routledge, 1996) p. 163.

¹³¹⁸ Nb. outside Plato’s cave. Desjardins, Rosemary. Plato and the Good: Illuminating the Darkling Vision. Philosophy of History and Culture, v. 21 (Leiden: Brill, 2004). See also Gadamer, Hans-Georg. The Idea of the Good in Platonic-Aristotelian Philosophy (New Haven: Yale University Press, 1986).

blindingness¹³¹⁹ is Beyng. But if we look away, then the myriad differences that are produced are derived from the nondual of the Good, and beyond that from Fate¹³²⁰ and the Sources¹³²¹ and the Roots¹³²². Generally we operate in the realm of the nonduals of Order¹³²³ and Right¹³²⁴, i.e., the representational nonduals at the core of the worldview. But these are founded on the *non*-representational nonduals, which are beyond the limit of the supra-rational, i.e., the sources and roots. These various nonduals that are at the core of the Western worldview are distinguished in relation to one another by the meta-levels of non-existence. Ultimately all this is founded on Beyng, which is the secret heart of the unique and strange onefold within the manifold differences of Being. If we want to know the meaning of *any one moment* of the Quadralectic, it is possible to compare it to the moments in *other* Quadralectics, or to the *meta-system* of the Pentalectic. It is also possible to appeal to the “*always already*”¹³²⁵ *there* sameness that existed prior to the arising of any particular distinction. In that way we can understand that *what is distinguished* is really the *same*. Comparing this ‘belonging together’ to differentiation, even if it is discontinuous, generates meaning and solves the problem of semantics, which has been a conundrum since the beginning of the Western tradition.

One way to view this whole complex is to see how it arises out of Beyng and appears as differentiated in Being. In other words, there is a genetic unfolding of differentiations that appears in Being when it is considered against the possibility of the strange and unique onefold of Beyng. This is a different genealogy from the ‘order of arising.’ For example, Protagoras describes how the schemas arise¹³²⁶, they are again discussed in Plato¹³²⁷, and

¹³¹⁹ If you stare into the sun you go blind. If you stare into the sun of the Good, which is the source of variety and difference, then you no longer see difference, which results in Nihilism. Milchman, Alan, and Alan Rosenberg. Foucault and Heidegger: Critical Encounters (Minneapolis, MN: University of Minnesota Press, 2003) p. 88.

¹³²⁰ Cavendish, Richard. The Powers of Evil in Western Religion, Magic, and Folk Belief (New York: Putnam, 1975) p. 73. Stanley, Eric Gerald, and Eric Gerald Stanley. Imagining the Anglo-Saxon Past (Cambridge: D.S. Brewer, 2000) p. 85.

¹³²¹ Called Forms in Plato. Silverman, Allan Jay. The Dialectic of Essence: A Study of Plato's Metaphysics (Princeton, N.J.: Princeton University Press, 2002).

¹³²² Called Archetypes in Jung. Larson, James S. The Theory of Archetypes (New York: Nova Science Publishers, 2004).

¹³²³ Kalman, Dan. Elementary Mathematical Models: Order Aplenty and a Glimpse of Chaos (Washington, DC: Mathematical Association of America, 1997).

¹³²⁴ Strauss, Leo. Natural Right and History. Charles R. Walgreen Foundation Lectures (Chicago: University of Chicago Press, 1971). Hegel, Georg Wilhelm Friedrich, Allen W. Wood, and Hugh Barr Nisbet. Elements of the Philosophy of Right. Cambridge Texts in the History of Political Thought (Cambridge UK: Cambridge University Press, 1991). Murphy, Jeffrie G. Kant: The Philosophy of Right (Macon, Ga: Mercer University Press, 1994).

¹³²⁵ Heidegger, Martin. History of the Concept of Time: Prolegomena. Studies in Phenomenology and Existential Philosophy (Bloomington: Indiana University Press, 1992) pp. 186-200.

¹³²⁶ Schiappa, Edward. Protagoras and Logos: A Study in Greek Philosophy and Rhetoric. Studies in Rhetoric/Communication (Columbia, S.C.: University of South Carolina Press, 2003).

then again in Aristotle¹³²⁸. We find them in Kant¹³²⁹ and Heidegger¹³³⁰ and Wittgenstein¹³³¹. During the Western tradition they unfold in a certain way historically. But, *in relation to Beyng* it could be that *time is irrelevant* and that these distinctions that are historically far apart *actually belong together* in their underlying *sameness prior to others*¹³³². Thus, the genetic *unfolding* of distinctions may *not* be the same as the *genealogy of the manifestations* of the distinctions under consideration. The genetic unfolding of the distinctions can be orthogonal to the flow of time. We suggest that this is another way to arrive at heterochrony and to contemplate its significance.

We have produced a *conceptual mechanism*¹³³³ to serve as an analogy to explain the process of design and meta-design and we have incorporated mathematical analogies, which have further stabilized this conceptual process. And, in addition, we have also produced a way of giving the process of Design and Meta-design *meaning*, regardless of the way that the distinctions are symbolically marked. In other words, we have a theory that *meaning* comes from the *comparison* between these distinctions and the *alternate ground* of Beyng. This means that in whatever manner we have symbolically marked¹³³⁴ the nodes of the moments based on the sedimentations of the distinctions in Being, it would have the *same* relationship to the alternative ground. As the basis for our structuring of the mechanism of the Quadralectic and the Pentalectic, we have chosen the strongest possible distinctions that can exist within Being, which are the distinctions between Being

¹³²⁷ See Cratylus. Partial commentary by the author at <http://holonomic.net>. See also Sedley, D. N. Plato's Cratylus. Cambridge Studies in the Dialogues of Plato (Cambridge, UK: Cambridge University Press, 2003).

¹³²⁸ Aristotle, and Hugh Lawson-Tancred. De Anima = On the Soul. Penguin classics (Harmondsworth, Middlesex, England: Penguin Books, 1986). Durrant, Michael, and Aristotle. Aristotle's De Anima in Focus. Routledge Philosophers in Focus Series (London: Routledge, 1993).

¹³²⁹ Kant, Immanuel, and Norman Kemp Smith. Immanuel Kant's Critique of Pure Reason (London: Macmillan, 1929) p. 182. Brann, Eva T. H. What, Then, Is Time? (Lanham, MD: Rowman & Littlefield, 1999) p. 68.

¹³³⁰ Cherniakov, A. G. The Ontology of Time: Being and Time in the Philosophies of Aristotle, Husserl, and Heidegger. Phaenomenologica, 163. (Dordrecht: Kluwer Academic, 2002). Heidegger, Martin. Phenomenological Interpretation of Kant's Critique of Pure Reason. Studies in Continental Thought (Bloomington: Indiana University Press, 1997). Heidegger, Martin. Kant and the Problem of Metaphysics. Studies in Continental Thought (Bloomington: Indiana University Press, 1997). Schalow, Frank. The Renewal of the Heidegger-Kant Dialogue: Action, Thought, and Responsibility. SUNY Series in Contemporary Continental Philosophy (Albany: State University of New York Press, 1992).

¹³³¹ Wittgenstein, Ludwig, Anthony Kenny, and Rush Rhees. Philosophical Grammar (Oxford: Blackwell, 2004).

¹³³² A point often made by Heidegger and part of the method of Deleuze. Porter, James I. Nietzsche and the Philosophy of the Future (Stanford, Calif: Stanford University Press, 2000) p. 244.

¹³³³ X-lectics in general, i.e. thinking through contradiction. Priest, Graham. In Contradiction: A Study of the Transconsistent (Oxford: Clarendon Press, 2006). See also Adorno, Theodor W. Negative Dialectics (New York: Seabury Press, 1973). Note use of term 'conceptual' p. 5ff. See also p. 151 for term 'conceptual mechanism'.

¹³³⁴ We must admit that the basis of this symbolic marking as it is expressed by Wisse in his reading of Peirce may be arbitrary. In that case our elaborations of these Wissian distinctions from the Ennead to the Quadralectic and the Pentalectic may be distorted.

and Itself through the articulation of meta-levels. Yet, however arbitrary this symbolic marking of the ‘cognitive machine’ of the Monolectic, Dialectic, Trialectic, Quadralectic, and Pentalectic may be, there must be some marking that emanates from the variations of all possible markings. We are stating that whatever that marking is, it has to have arisen from the Onefold of Beyng in some strange and unique order of distinction that was a genetic unfolding, which was perhaps not necessarily in *genealogical order*, but possibly in some *other order*. The Nomos discovered by Mathesis will be ‘the same’ and the symbolic markings will have the same genetic pedigree. As a result it will be an equivalent structure from the point of view that it tells us about the “clearing of the openness”¹³³⁵ in regard to *being-in-the-schema*. In other words, a meaning that is particularly deep and involved in the structure of the worldview can also be produced by starting from any *other* set of genetic distinctions regardless of the genealogical unfolding that actually occurs. This is because the Nomos constrains the possible positions, and because their diacritical meanings are actually equivalent. Having an orthogonal basis in Beyng is to comprehend a set of differences in Being and this frees us from a specific set of those distinctions as being perpetually fundamental and unchangeable.

This gives us an Afoundational perspective on the necessity of grounds or first principles. Whatever the distinctions are that produce the labels for the mechanism of the Quadralectic and Pentalectic, they will be an expression of the onefold of Beyng with a specific genetic unfolding that will have the same relationship to the worldview as the Quadralectic and Pentalectic, which we have defined. Thus, we claim that all such configurations are homeomorphic with each other, and equally meaningful, and that in their own way they would all indicate the same thing about the clearing in Being, *because their roots are in Existence, not in Being*. Their tie to Beyng, instead of Being, frees us from depending on any particular semantic reading of the distinctions that were attached to the Nomos after its unfolding from Mathesis¹³³⁶. This is a bold claim because we tie ourselves to distinctions that *appear* fundamental and non-interchangeable. If meaning is not produced *within* Being or Beyng, but is instead produced through its close proximity to the *fragmentation* of Being and the *onefold* of Beyng, then the symbolic labeling that indicates distinctions will produce the same meaning. *This is why meanings can be shared and are not dependent on their symbolic substrata*. This is the phenomenon that allows us to communicate across languages. Just as Indo-European languages are unique in having

¹³³⁵ Kockelmans, Joseph J. *Heidegger on Art and Art Works* (Dordrecht: M. Nijhoff Publishers, 1985) p. 168.

¹³³⁶ Mathematical learning, the exploration of the Nomos, the nondual realm of order.

Being, they are also unique in having Beyng. Other languages also supply an alternative duality and do the same thing in their own interpretation of existence. However, at this point we are not concerned with the general case of how this would work in all languages. Our particular concern is whether it makes sense in languages that have the concept of Being, and how those languages carry their connection to Beyng within them. In the Indo-European tradition Beyng is presented as the sinister side or left side. Being is characterized as the right side and is given pre-eminence defining the *rightness of Being*¹³³⁷. Beyng, as *left*, is orthogonal to the distinction between Right and Wrong. This is similar to Hegel's idea that all moments of thought at a given stage in the development of consciousness cancel out¹³³⁸. As a result, Hegel presumes that *cancelling out* is more basic than the *appearance* of the moments of consciousness. If *different* configurations appeared, they would also cancel out and lead to the next stage of consciousness. It is the *configuration of cancellation*, not the *specific content* that matters. We are reminded that all of language changes over time: the phonemes, the grammar, the meaning of the words, and the pronunciation of words. Yet, in any given moment, language still seems to make sense synchronically despite its radical long term diachronic changes¹³³⁹. All these syntactical and phonetic changes are in Being, but the *meaning* associated with those features (in their flux) is from the alternative ground of Beyng. That ground is there regardless of the syntax or pragmatics that are schematically projected at any given time. Emergent Events produce reorganizations of the schemas and clear away the nihilistic background that obscures *ultimate meaning*. Emergent Engineering participates in this process by initiating cascades of Emergent Events through the application of the Quadralectic in Sign Engineering, or it participates in the Intelligent Design of the Emergent Event through the contraction of Wild Being as signified by the Pentalectic.

¹³³⁷ See the concept of Dharma in the Mahabharata. Buitenen, J. A. B. v. The Mahabharata. (Chicago, University of Chicago Press, 1973).

¹³³⁸ Roche, Mark William. Tragedy and Comedy: A Systematic Study and a Critique of Hegel. SUNY Series in Hegelian Studies (Albany, NY: State University of New York Press, 1998).

¹³³⁹ McWhorter, J. H. The Power of Babel : A Natural History of Language. (New York, Times Books, 2001).

Knowing Practice

Considering the Kairos of Our Practices

The final chapter is on the nature of practice. The theories of P. Bourdieu and M. de Certeau are explored. The way in which the Quadralectic unfolds into the Pentalectic is presented as an example of M. de Certeau's theory of practice. M. de Certeau believes that the tactics and tricks of narrative gives us some insight into the nature of practice because story telling is itself a practice. This is where the thread of the Novel and its perspectives are woven back into our understanding of practice. That understanding helps us to grapple with the problem of the differentiation of time and its four-dimensionality, which is a representation of the nondual. The anagogic swerve is then explained in terms of geometrical images based on stability in spacetime. Finally, we present a vision of how the System and the Meta-system can be represented as a geometric coupling.

Approaching Practice

Now that we have formulated a theory of design in the form of the Quadralectic at the Hyper Being Level, we must investigate how the *practice* of design is different from the *theory*. Our theory is an overdetermined synchronization of various cycles found in Existence and in Hyper Being. We have also made a point of contrasting the differentiation of Being with the strange unique onefold of Beyng, asserting that meaning comes from the ability to negotiate between these two apparent foundations, which are held apart by Emptiness and Void. Kant differentiates between theory and practice in his critiques of practical and pure reason. He also differentiates between these two duals (theory and practice) and judgment in his critique of judgment¹³⁴⁰. So, the differentiation between these various terms go back to the roots of our tradition, even to Plato and Aristotle, who both use the *practice of craft* as a key example of their theoretical philosophies. However, the foremost theorist of *practice* in modern times is Pierre Bourdieu. Bourdieu approaches his

¹³⁴⁰ Kant, Immanuel, and Mary J. Gregor. Practical philosophy (Cambridge, U.K.: Cambridge University Press, 1999). Price, A. W. Contextuality in Practical Reason (Oxford: Clarendon Press, 2008). Chang, Ruth. Incommensurability, Incomparability, and Practical Reasoning (Cambridge, Mass: Harvard University Press, 1997). Raffoul, Francois, and David Pettigrew. Heidegger and Practical Philosophy. SUNY Series in Contemporary Continental Philosophy. (Albany, N.Y.: State University of New York Press, 2002).

theory of practice in two of his works¹³⁴¹, Outline of a Theory of Practice¹³⁴² and Logic of Practice¹³⁴³. His theory is also mentioned in his book Distinction¹³⁴⁴. In his later works his theory of practice gives way to the concept of the *field* and as a result, his concept of practice changes fundamentally. We will be concentrating on the early theory, but not without forgetting the idea of the field. We will also use the monograph of Alan Warde¹³⁴⁵ as a way of framing the difference between these two concepts. Yet, this consideration of Bourdieu is merely a prelude for applying the work of Michel de Certeau outlined in his book The Practice of Everyday Life¹³⁴⁶. It will be a useful tool for demonstrating the value of the Quadralectics of Design and Non-design.

Bourdieu makes a case for separating Practice from Reflexive Theory¹³⁴⁷. He proposes that Reflexive Theory cannot understand practice. He illustrates this by introducing the concept of Habitus¹³⁴⁸. Habitus are our habits, or *habitude*, what we do automatically without thinking about it. Bourdieu was primarily influenced by Merleau-Ponty¹³⁴⁹, although he references other historical sources as well¹³⁵⁰. In this way Bourdieu was able to introduce Wild Being¹³⁵¹ into the equation, as he attempted to develop a Sociology and Ethnography based on the concept of the Propensities of Wild Being. In our view we believe the influence of the theories of Merleau-Ponty to be the strongest in comparison to the other

¹³⁴¹ Which is basically the same work rewritten.

¹³⁴² Bourdieu, Pierre. Outline of a Theory of Practice. Cambridge Studies in Social Anthropology, 16. (Cambridge, UK: Cambridge University Press, 1977).

¹³⁴³ Bourdieu, Pierre. The Logic of Practice (Stanford, Calif: Stanford University Press, 1990).

¹³⁴⁴ Bourdieu, Pierre. Distinction: A Social Critique of the Judgement of Taste (Cambridge, Mass: Harvard University Press, 1984).

¹³⁴⁵ "Practice and field: revising Bourdieusian concepts" Center for Research on Innovation and Competition, Manchester University, CIRC discussion paper 65, April 2004.

¹³⁴⁶ Certeau, Michel de. The Practice of Everyday Life (Berkeley: University of California Press, 1984). See also Sheringham, Michael. Everyday Life: Theories and Practices from Surrealism to the Present (Oxford: Oxford University Press, 2006).

¹³⁴⁷ Bourdieu, Pierre, and Loïc J. D. Wacquant. An Invitation to Reflexive Sociology (Chicago: University of Chicago Press, 1992). O'Neill, John. Sociology As a Skin Trade: Essays Towards a Reflexive Sociology (New York: Harper & Row, 1972).

¹³⁴⁸ Crossley, Nick. The Social Body: Habit, Identity and Desire (London: SAGE, 2001). Hillier, Jean, and Emma Rooksby. Habitus: A Sense of Place. Urban and Regional Planning and Development (Aldershot, Hants, England: Ashgate, 2002).

¹³⁴⁹ Mauss, Marcel. The Gift: Forms and Functions of Exchange in Archaic Societies (Glencoe, Ill: Free Press, 1954). Mauss uses the term "habitus" first. Mauss, Marcel, Wendy James, and N. J. Allen Marcel Mauss: A Centenary Tribute. Methodology and History in Anthropology, v. 1. (New York: Berghahn Books, 1998). p. 20.

¹³⁵⁰ Williams, Simon J., and Gillian Bendelow. The Lived Body: Sociological Themes, Embodied Issues (London: Routledge, 1998). p. 54. Strathern, Andrew. Body Thoughts (Ann Arbor: University of Michigan Press, 1996).

¹³⁵¹ Merleau-Ponty, Maurice, and Claude Lefort. The Visible and the Invisible: Followed by Working Notes Northwestern University Studies in Phenomenology & Existential Philosophy. (Evanston: Northwestern University Press, 1975).

sources¹³⁵². This leads us beyond Hyper Being to consider the role of Wild Being in Design. Bourdieu argues that what we do out of habit operates autonomously without theory being necessary because of the propensities that exist in our culture and their effect on our behavior. Therefore, when we theorize *practice*, we are, in a sense, disturbing and misrepresenting it because it is essentially *non-representable* in its essence. Bourdieu claims that what takes over *in action* is the Habitus, our imbued and inbuilt propensities to act in a certain way that has its own internal logic, which we ourselves do not understand. When we act on theory as a praxis, i.e., in terms of a ‘theory governed action,’ we are actually applying the ‘logic of theory’ to practice, which is not based on Habitus. This non-representable kernel of practice needs to be understood in its own terms and not reduced to theoretical action. This is the argument that Bourdieu makes throughout his books. Michel de Certeau, on the other hand, has a different view that is closer to our own. He proposes that practice is *metis* and that it operates in language in the same manner that it operates in practical actions, and that it has its own mode of comprehension, which he calls *narrative*. But more than that, rather than seeing *practice* as a black box of non-representability as Bourdieu does, we will take a closer look at how M. de Certeau opens up that box and finds a very interesting structure that we will discuss at length because it illuminates the Quadralectic and its transformation into the Pentalectic.

But let us return to Bourdieu and his concept of practice. Bourdieu cites that *practice is an irreversible series of actions*, while *theory contemplates the reversibility of those actions*. This brings to mind the shift between the Complex numbers and the Quaternion numbers where the commutative property is lost. This is also a characteristic of the difference between the Dissipative Ordering and Autopoietic Symbiotic Special Systems. In other words, practice has to deal with the *disassembly* that occurs in the Special Systems as we *lose* the various Algebraic properties within the cycle of the Emergent Meta-system. We propose that we can expand this idea and claim that the various levels of practice must deal with the various losses of properties at the different levels of the Special Systems. The Special Systems are distinguished by the kinds of Being, so, as we lose properties in the algebras we are also *ascending* the meta-levels of Being, and at the end of this series of property losses we are taken into the Meta-system. The transition between the Dissipative and Autopoietic Special Systems is governed by Process Being. Processes are probabilistic, not determinate, and one difference between those probabilistic processes is

¹³⁵² The problem that Bourdieu is trying to grapple with was proposed by Levi-Strauss, but his approach is taken from Merleau-Ponty. Grenfell, Michael. Pierre Bourdieu, Agent Provocateur (London: Continuum, 2004). p. 13.

that they are no longer reversible, only determinate actions are reversible. Beyond that, when we transition from the Autopoietic Special System to the Reflexive Special System, we encounter the *differance of Hyper Being*, which is where design and other traces such as concept, essence, and perspective lie. In the Reflexive Special System, which is governed by the Octonion Algebra¹³⁵³, we lose the associative property. This is the transitional point where the social relations of contiguity count¹³⁵⁴ and cannot be reversed. Finally, when we go from the Reflexive Social Special System to the Meta-system we encounter Wild Being, and it is in Wild Being where the proclivities, propensities, dispositions, inclinations, and tendencies of the Habitus are lodged. In that transition we lose the division property, so the Meta-system appears as interpenetrated (it cannot be divided). In addition to this it has ‘division by zero’¹³⁵⁵ undefined singularities embedded in it. Bourdieu posits that practice has to deal with the fundamental unraveling of reversible orders in relationships through a series of symmetry breakings. Practice has to deal with a world where these symmetry breakings have already occurred in some areas of life, which makes it difficult to initiate certain practical changes. Theoretically that would be easy in the best of all possible worlds where these symmetry breakings have not yet occurred. But instead, we are in the outlying pluriverses where these symmetry breakings have occurred and where these reversible properties have been lost. Practice has to negotiate in these difficult circumstances and still come up with an acceptable result. Many times practice fails, until it learns how to do what needs to be done, i.e., the pragmata, in order to achieve the outcomes that are desired. An accomplished practice is the result of having the skill and learned knowledge of the practices that are necessary to produce the outcomes we desire in spite of the hindrances that exist, which can thwart our desires. *One of the things that we learn to do in our practice of Design is to produce emergent outcomes.* Generally, the overcoming of resistances, hindrances, incompatibilities, and other problems are a fundamental part of the pragmata that make Emergent Design possible.

Note that one of the synchronized bases of the Quadralectic is with the Emergent Meta-system, which is composed of the conjunction of Special System elements. We posit that

¹³⁵³ Okubo, S. Introduction to Octonion and Other Non-Associative Algebras in Physics. Montroll Memorial Lecture Series in Mathematical Physics, 2 (Cambridge: Cambridge University Press, 1995). Springer, T. A., and Ferdinand D. Veldkamp. Octonions, Jordan Algebras, and Exceptional Groups. Springer Monographs in Mathematics (Berlin: Springer, 2000). Sabinin, Lev V., Larissa Sbitneva, and I. P. Shestakov. Non-Associative Algebra and Its Applications. Lecture Notes in Pure and Applied Mathematics, v. 246. (Boca Raton: Chapman & Hall/CRC, 2006).

¹³⁵⁴ Who sets next to whom at the banquet matters.

¹³⁵⁵ Division by zero is undefined in Mathematics.

as we go through the Quadralectic, we are not only going into material optima states, but we are also going *through* these symmetry breakings. As a result, at each stage of the Quadralectic this process becomes more difficult to perform and to understand. In other words, the theory of the Quadralectic has ‘built in symmetry breakings’ that *practice* needs to deal with and negotiate. This is what Bourdieu emphasizes. As we ascend the meta-levels of Being, our ability to conceptually understand practice becomes exponentially more difficult at each level. Furthermore, at the level of practical operations we are also losing properties through symmetry breakings, which makes it more difficult to reverse course once an action has been executed. This loss of intelligibility and this loss of operational room intensify as we go through the Quadralectic. The Quadralectic is not merely *moving through its cycle*, it is also *going deeper* into the Worldview. At the same time we are moving through the Foundational Mathematical Categories toward interpenetration, which causes the disparate elements of our practice to be honed down into something simple, complete, and subtly connected so that one can influence and affect the necessary results despite the odds against it. This is where the leverage that M. de Certeau discusses originates. Even though we are working in more and more incomprehensible areas, with ever more asymmetries to deal with, our practices become interpenetrated and intra-inclusive in a super-rational way so that we are able to function operationally and do things that we would not generally be able to accomplish if we were not specialized in our craft through a regime of practice. This regime of *practice* means that we have concentrated our efforts within a *field* that has some degree of specialization. This is where Alan Warde¹³⁵⁶ points out how practice and field go together. We refer to a *field* as a *Domain* and we note that the domain is the next schema up from the Meta-system. In our theory of the Quadralectic we have made each systemic act appear in a Meta-systemic scene, but in the deeper background these systemic acts also take place in the domain of practice. In Sign Engineering there is another field of interest, which is the Design Field. The Design Field designates the types of characteristics that the semiotic Design Object may have. *Design, in particular, orients the semiotic Design Object¹³⁵⁷ to the Object of Design¹³⁵⁸ as a technologically emergent artifact within a given Domain.*

For Bourdieu, the concept of Habitus bridges the gap between what is objectively seen by the observer and what is experienced by the subject who is involved in the practice. In

¹³⁵⁶ Op. cit.

¹³⁵⁷ The Design Object is the Semiotic Representation of the Design objectified in some form.

¹³⁵⁸ The Object of Design is the actual material artifact being designed, which will have intended emergent properties.

other words, his theory proposes that there is a harmonization between the subject and object through Habitus. That is because Habitus existed at a meta-level of Being prior to the arising of the subject/object dichotomy. Actually, we were already at that level when we moved beyond the dualism of the subject/object dichotomy into Dasein (riddle), although Merleau-Ponty pushed much further past Dasein to the Query¹³⁵⁹ (mystery), and then past the Query, to the Enigma¹³⁶⁰. In 1939 Winston Churchill famously stated, "I cannot forecast to you the action of Russia. It is a riddle, wrapped in a mystery, inside an enigma; but perhaps there is a key. That key is Russian national interest"¹³⁶¹. If we take Churchill's statement out of context, and consider it as unexpectedly offering us some insight into the layers of being-in-the-world, then the encompassing enigma is the *nature* of what Merleau-Ponty calls the Flesh, which is the ultimate source of subjectivity and objectivity in Being. In the Flesh, there is only the chiasmic proclivities, propensities, tendencies, inclinations, and dispositions that are embedded within us from our nature (or nurture). This is opaque from the point of view of cognitive understanding, but it determines our actions as they unfold in such a way that we learn *what* we think as we speak, and we learn *how* to do a task as we negotiate its actual performance with the pragmata that we use and manipulate in order to attain our goals, make sense, and achieve our intentions. Returning to our own proposal, the theory of Quadralectics of Hyper Being and its extension through the Pentalectic of Wild Being allows us to see how we are moving into this realm of asymmetries that affect the execution of operations, as well as how we are moving into the realm of non-representability and unintelligibility. Yet, at the same time, in terms of the Lifecycle of Emergence, we are also entering the realm of interpenetration and intra-inclusion where there is a supra-rational integral and holonomic synchronization of our actions such that we *can* do things that we did not expect ourselves to be able to do. This is the existential confluence of the Lifecycle of the Emergent Event coded into the Foundational Mathematical Categories and the Cycle of the Emergent Meta-system. In addition to that, our *projections* appear within Hyper Being, which express themselves as the *moments of the Quadralectic* that allow us to explore the realm of possibility, and that will essentially bring about unprecedented emergent effects. But,

¹³⁵⁹ Query is the Hyper Being level of the Subject.

¹³⁶⁰ Enigma is the Wild Being Level of the Subject.

¹³⁶¹ Churchill, Winston, and Winston S. Churchill. Never Give in!: The Best of Winston Churchill's Speeches. (New York: Hyperion, 2003) p. 199.

beyond the moments of the Quadralectic in Hyper Being, there is a chiasmic¹³⁶² expression in Wild Being that appears in the Pentalectic.

Bourdieu does not delve deeply enough into the heart of practice in the way that M. de Certeau does. So, our purpose will be more adequately served by contrasting Bourdieu's and M. de Certeau's positions on practice. Bourdieu's theory states that practice is non-representable from the point of view of theory, and posits that Habitus is the fundamental ground of practice. Yet, this gives us an argument that is vague and lacks substance. At one point he says that the Habitus is the basis of thought, action, perception, and expression¹³⁶³. His theory is apropos from the point of view that we can associate these human expressions with the moments of our Quadralectic. Thought is associated with concept based on representations, action is associated with behavior that reveals essences, perception is associated with perspectives that appear based on stances taken, and expression is an articulation of the designs of contents. So, there are some aspects of his idea that actually point toward the Quadralectic as the product of the Habitus. Bourdieu discusses schemas in terms of their wider meaning as 'intelligible relations in environments'. He does not consider schemas in the narrower sense in the way that we use the term, which is to discuss schemas as spacetime envelopes. When Bourdieu does engage his more general, or wider use of the term, he does not depict the schema as rules, but as 'intelligible relations' that can generate an infinite number of responses that can adapt to endlessly changing environments¹³⁶⁴. In order to think of the schemas in the *general* sense, we first need to understand schemas in the *narrower* sense, which delimits each thing in the environment for the purpose of identifying and discovering its relationships with other things in the environment. The key point is that schemas are part of the Habitus but are not the same as rules. Rather, they are like motifs for the variety of production. And as Stafford Beer says in The Heart of Enterprise¹³⁶⁵, humans are, before all other

¹³⁶² Reversible Merleau-Ponty, Maurice, and Claude Lefort. The Visible and the Invisible: Followed by Working Notes. Northwestern University Studies in Phenomenology & Existential Philosophy (Evanston: Northwestern University Press, 1975). p. 264. Lanigan, Richard L. Speaking and Semiology: Maurice Merleau-Ponty's Phenomenological Theory of Existential Communication. Approaches to Semiotics, 22. (Berlin: Mouton de Gruyter, 1991) p. 139. Cataldi, Sue L. Emotion, Depth, and Flesh: A Study of Sensitive Space: Reflections on Merleau-Ponty's Philosophy of Embodiment (Albany, N.Y.: State University of New York Press, 1993) p. 75.

¹³⁶³ Bourdieu, Pierre, and Richard Nice. Outline of a Theory of Practice. Cambridge Studies in Social Anthropology, 16. (Cambridge: Cambridge Univ. Press, 1977) p. 95.

¹³⁶⁴ Pothos, Emmanuel M. "The Rules Versus Similarity Distinction" Behavioral and Brain Sciences (2005) 28, pp. 1–49. See use of term 'Loose Prototype' as different from rules or similarity. Notice Memory is the antipode to the Loose Prototype.

¹³⁶⁵ Beer, Stafford. The Heart of Enterprise. Managerial Cybernetics of Organization, 2. (Chichester UK: Wiley, 1979).

characteristics, variety producers. This is a point that is not really brought out by Bourdieu because he is focused on understanding how behaviors generate the structures that Levi-Strauss considered to be objective¹³⁶⁶. But, in fact, practices are all executed differently and have variety within themselves and naturally produce variety in their outputs. The regimentation of practices is very difficult. It is the natural variety production that causes humans to explore structural space completely. Exploring structural space completely allows the special benefits of variation to be found and exploited. However, for Bourdieu this exploration is blind in some sense, because Habitus is a black box that we cannot examine through theory, even though it has a structural logic. As a result we cannot understand the practice that we are engaged in, which creates a blindspot in our experience.

Tactics of Practice

M. de Certeau has a very different theory, which he illustrates by comparing Foucault and Bourdieu. For Foucault, practices are attempts to deal with power relationships that are already in place¹³⁶⁷. For Bourdieu, practices are the expression of unconscious drives that end up having an order that is perceived objectively but not intended subjectively. M. de Certeau distinguishes strategy from tactics. Strategy is seen as the ‘marshaling of forces into place’ by those who are imposing a power structure. Tactics are the micro-response, which attempt to derail the intent of the power structure through the use of time. Thus, M. de Certeau adopts an approach similar to Foucault who discusses dominant power structures imposed on places by the orchestration of forces, similar to the way power struggles are resolved in a game of chess. He proposes that those who cannot resist overtly will respond by throwing the intent of the dominant power off course through small diversions and distortions of the field. An excellent example of this is computer software hacking¹³⁶⁸. Through hacking we actually become more familiar with the technological infrastructure than those who first built it and deployed it. Hackers exploit the weaknesses in a system forcing us to take time and effort to further understand the system in order to subvert the hacker’s tactics. For example, *Apple* attempted to block alternative ways for

¹³⁶⁶ Lévi-Strauss, Claude. The Savage Mind. The Nature of Human Society Series. (Chicago: University of Chicago Press, 1966). Sturrock, John. Structuralism and Since: From Lévi Strauss to Derrida (Oxford: Oxford University Press, 1979). Gardner, Howard. The Quest for Mind: Piaget, Lévi-Strauss, and the Structuralist Movement (Chicago: University of Chicago Press, 1981).

¹³⁶⁷ Foucault, Michel, and James D. Faubion. Power (New York: New Press, 2000). Foucault, Michel. Language, Counter-Memory, Practice: Selected Essays and Interviews (Ithaca, N.Y.: Cornell University Press, 1977). Gardiner, Michael. Critiques of Everyday Life (Oxfordshire: Taylor & Francis, 2000).

¹³⁶⁸ Erickson, Jon. Hacking: The Art of Exploitation (San Francisco: No Starch Press, 2003).

using the iPhone¹³⁶⁹ *other* than those that the company had specifically authorized, but the phone was unlocked almost immediately and other programs were able to run on them. The company then updated the firmware to disallow those changes, and again the hacking community came up with other techniques for using the phones as they saw fit beyond what was authorized by the company. The internet has all kinds of hacking episodes where users find ways of getting around blockages placed in products and in connections so that they may exploit the internet in ways that have not been authorized – sometimes by wreaking destruction as with Viruses, Trojans, and Worms¹³⁷⁰. For the most part, the havoc that hackers have wrought has been negative, although, at times their tactics have had a positive effect by subverting barriers that should not have been imposed in the first place. M. de Certeau is interested in tracking this consumer rebellion and studying it. But for us, the heart of his book is the theoretical part where he does two important things.

First he associates the intelligibility of *metis*, or practice, with narrative. He says that it is correct that practice does not have any theory that can explicate it directly, but he also says that this does not mean that we cannot understand or theorize about it because the tactics of practice are applied to speech, such as telling stories in narrative, and other actions as well. Thus, by analogy, narrative tells us about the intelligibility of practice. Therefore, rhetoric and its tropes in language are the equivalent to the tactics applied in action. So, we can learn about the intelligibility of practices by the stories we tell about them. This insight of M. de Certeau has several important implications. One of which will help us to better understand the nature of hermeneutics. Hermeneutics comes from the relationship between the differences in Being and the onefold of Beyng. Meaning is generated in the open clearing, or the empty void of this gap. Thus, narrative is following of the thread of Beyng. The Narrator follows characters in a particular order by jumping between them as he weaves the tapestry of the narrative. By implication, the Reader has his own ‘narrative drive’ and reads a story by the Writer in which there are narrators and characters and bystanders, which are part of the broader context of the narrative that the writer constructs. But, the reader can have his *own* agenda and not follow the same track that the writer intends when he is reading a story. Practices that are made up of ‘action tactics’ are also following the thread of Meaning that is generated out of the difference between Being and Beyng. We line up the evolution of the story with the evolution of the acts of the characters

¹³⁶⁹ Apple Computer cell phone product. See Zdziarski, Jonathan A. [iPhone Open Application Development](#). (Beijing: O'Reilly, 2008). See also Chen, Jason, and Adam Pash. [How to Do Everything with Your iPhone®](#). (New York: McGraw-Hill, 2008).

¹³⁷⁰ Dubin, Joel. [The Little Black Book of Computer Security](#) (Loveland, CO: 29th Street Press, 2005).

that play out the plot and by *analogy* we indirectly *understand the practices through the story*. We use tropes to twist the language. They are like the tricks that we use to take advantage of situations in order to produce an efficacious effect. This is why the master tropes can be used to define the Quadralectical moments. *The master tropes are to language what the Quadralectical moments are to practice in action*. This is why we see the imprint of the various viewpoints associated with the author, narrator, reader, character, and bystanders, which are held together by the narrative in the Novel. The dual of the narrative is the map, and the map is the layout of the imaginary world that the novel creates. The narrative tracks through the imaginary world and tells what happens in each place. Thus, space and time are both important aspects of the narrative/mapping structure through which the various viewpoints are expressed. The tactics and strategies that the author uses to put across his message appears as analogous to the tricks of the trade that the character (who is engaged in action, and in the pursuit of some craft) uses so that he may maximize his efficacy. Through analogy, the narrative indirectly illuminates practice. From the narrative we hear about the practice being accomplished or performed in a particular order, but sub-consciously we see the tropes in action from varied viewpoints. Thus, when we do a protocol study of designs¹³⁷¹ in progress, the designer will often vocalize or narrate his ideas. The designer weaves the story of his design, which traverses the problems of the design and helps to bring resolution to these problems. We can see the designer attempting to follow the Golden Thread in his narrative, which is the most meaningful and incisive path through the space of problems regarding the design. *Glimpsing Beyng through the jungle of the distinctions of Being is the road that each designer must travel*.

In addition, M. de Certeau says something that is particularly illuminating, which is that the goal of our tactics is to deploy the *least force possible* for the *most leveraged effects*. At the same time he also says that it is important to apply as much memory as possible in the shortest possible amount of time. As a result, M. de Certeau defines the trick of *metis* and transforms our understanding of the Quadralectical moments. We have already associated the various moments with the different kinds of Aristotelian causes, so what we need to do next is to investigate what the immediate effect is for each kind of cause. For example, the *formal cause* tends to yield the greatest *impression* for the least amount of articulation that is produced by the representations. The *efficient cause* produces the most *movement* with

¹³⁷¹ Lawson, Bryan. How Designers Think: The Design Process Demystified (Oxford: Elsevier/Architectural, 2006). p. 183.

the least behavior. The *final cause* produces the greatest *positioning* with the least deployment in stances. And finally, the *material cause* produces the most *sensation* with the least amount of content. In other words, we can see that what M. de Certeau says about how cause and effect can be applied to each moment of the Quadralectic. And furthermore, we can see that there is a *faculty* associated with each of these leveraging tricks of *metis*. For example, it is *attention* that uses its focus to leverage representations. It is *attitude* that points behavior toward an object, which, in turn, affects movement. It is *memory* that gives the final cause the ability to leverage positioning because of its use of images. It is *imagination* that allows the signature to be in the service of producing sensations from material causes. In each case there is a different faculty for the way that time can be manipulated to produce a higher degree of efficaciousness in each moment of the Quadralectic. Each moment of the Quadralectic uses time differently in order to shorten its duration and this is accomplished through a specific faculty that is in coordination with the leveraging effects based on the different types of cause. Each of these efficacious tropes, or turns of the Quadralectic, are expressed by *more effect* with *less cause*, and in *less time* with *more faculty* invested. The coincidence of operating in less time with greater effect gives us a definition of the efficaciousness that is being sought through tactics. This is a chiasmic relationship, which is the sort of relationship that Merleau-Ponty says we have in the Flesh, the chiasm of touch-touching. We are expanding our understanding of the context of touch-touching to articulate the realms in which touching occurs chiasmically in relation to itself through its blind reversibility. In other words, there is a different chiasmic differentiation of touch-touching as it expands beyond itself to touch the *eject*, and this internal differentiation corresponds to the four types of efficacy that we have identified. Thus, touch-touching unfolds to touch the other (eject) in a primordial way.

M. de Certeau is giving us an insight into the moments of the Quadralectic, which fuse in touch-touching at the Wild Being level showing us its internally differentiated chiasmic nature. The application of these moments of the Quadralectic simultaneously has the effect of producing a counter moment in the Pentalectic. We deploy causes attempting to get more effect than we deserve. We invest faculty in order to conserve time. If we combine the use of faculty with the lessening of cause, this could produce a maximum effect with less effort, but a greater investment of faculty for the purpose of conserving time will produce a quantum leap in efficaciousness. This is precisely what we see in the Pentalectic where we gain additional complexity at the next level of the synthetic structure of the interior self-dual Pentahedron, as well as in and the exterior dual icosadodecahedron by simply adding one more moment. Therefore, in the Pentalectic we see an excellent

example of what M. de Certeau is indicating. By the fusion of the Quadralectic in a moment of contraction, a higher more expansive super-synthesis is created, which is like the combination of two Quadralectics. We define efficaciousness as *efficiency and effectiveness*, and see these as the *opposite* of the *differing and deferring of difference*¹³⁷². In Hyper Being alone only the differing and deferring occurs. But in Wild Being, it is possible to see the dual of the *effectiveness and efficiency* that define *efficaciousness*. This efficaciousness is composed of an expansion of scope at the next level of synthesis, while at the same time a higher degree of integration within the non-duality of the fourth dimension can also be achieved. Thus, the tactics we are searching for are those that are most efficacious, but they may be deployed in a way that makes use of the differing and deferring as Bourdieu indicates. As both Bourdieu and M. de Certeau express, timing is everything. Thus, the Pentalectical moment unveils kairos in the midst of chronos. *Therefore, the Quadralectic is not a mechanical cycle, or a natural cycle, but a human cycle in which the tactics that achieve efficaciousness in the light of difference are weighed against each other continuously.* Each faculty determines a different way to look at time within the Quadralectic. Time is different depending on attitude, attention, memory, and imagination. These are modes of access to the equi-primordial moments of time. Past is accessed by memory, while present is accessed by attention. Future is accessed by imagination and mythological time is accessed by attitude or posture. Our attitudes (or posture) are set by the mythological narratives that have been passed on to us as a guide for an approach to life. M. de Certeau gives one specific chiasmic trade-off¹³⁷³ but from that we can transform the Quadralectical moments into a *series* of these chiasmic trade-offs. In this way we can better understand the Quadralectic through the lens of M. de Certeau's deconstruction of the trick, which is the nature of *metis* itself, as (for example) it was employed by Homer's Odysseus.

Practice and Time

By expanding the chiasmic relationships of efficaciousness across the Quadralectic and into the Pentalectic, we suddenly find that the Quadralectic expresses the moments of time in a particular order, which is: present, mythic, past, and future. In other words, time, as kairos, can be seen from the vantage points of different faculties, different causes, and

¹³⁷² Derrida, Jacques. *Margins of Philosophy* (Chicago: University of Chicago Press, 1982). p. 17. See also Culler, Jonathan D. *Deconstruction: Critical Concepts in Literary and Cultural Studies* (London: Routledge, 2003). p. 154 Volume 2. Section 7, Difference, J. Derrida, p. 141-166.

¹³⁷³ The goal of our tactics is to deploy the *least force possible* for the *most leveraged effects* while at the same time applying *as much memory as possible in the shortest possible amount of time.*

different leveraged effects, which constitute the equiprimordial moments of time. There were four moments of time in the Mythopoeitic Era and it was the ‘symmetry breaking’ of these moments that gave us linear time in the Metaphysical Era. Culturally mythic time (characterized by the presence of the Norns) ended, although it still haunts our era. Time became linear in relation to three-dimensional space, but this was *surface time*. Primordial time incorporates the cycles of all four moments of time, which we see in the Indo-European primal scene¹³⁷⁴ of the Well and the Tree¹³⁷⁵. The tree is the *world tree*, Yggdrasil, a place where all beings dwell. In this place there is a circulation of water from the rain falling upon the *world tree* that goes down to its roots. Some water flows back internally to the tree, while other water flows into the *three wells*. The Norns take water from these wells and water the tree, completing the cycle by which the water returns to the tree through their intervention and nurture, while the other cycle is completed by nature through evaporation and the fall of new rain. The Norns, or Fates, play a key role in completing the cycle of primordial time. That time is represented by the OrLog¹³⁷⁶, which is the sedimentary build-up in the well. It is what has been laid down as the strata of deposits from moment to moment by the proclivities, propensities, inclinations, dispositions, and tendencies that inform action.

Primordial time has only two tenses, complete and incomplete. The present is seen as the incomplete. The past and future divide the completed time. The incompleteness of the present must be balanced against what is fated in mythic time, which is the cyclical return. The same thing will happen again, and the same set response will occur over and over. The Habitus will determine what we do, and by playing out the entire response set we will reveal the hidden structures that determine our lives. Not until the completion of our actions will we know which one of the possibilities that we will have actualized comes from the response set¹³⁷⁷. And that completion can be thrown into the past or future, as memory and imagination. In mythic time there is a return that is fated but with a twist that is unavoidable. This unavoidable twist foists the specific possibility of the set response upon us. The mythic narratives give us the limits of experience within which the set

¹³⁷⁴ Lukacher, Ned. Primal Scenes: Literature, Philosophy, Psychoanalysis (Ithaca: Cornell University Press, 1986).

¹³⁷⁵ Bauschatz, Paul C. The Well and the Tree: World and Time in Early Germanic Culture (Amherst: University of Massachusetts Press, 1982).

¹³⁷⁶ Bauschatz, Paul The Well and the Tree. Op. cit. Explains how the OrLog is a repository of experience for the Indo-Europeans whose time only has two parts Complete and Incomplete, where Past and Future are collapsed together as a Fate that binds what will happen with what has happened. This repository plays a similar role to the Alayavijyana in Mahayana Buddhist texts that expand upon Karmic action. This is the place where the Habitus is realized in the remote Indo-European cultural past.

¹³⁷⁷ The set of possible responses that is available.

response is articulated within the Habitus. Losing *mythic time* has caused us to lose our access to the understanding of *primordial time* so that we are trapped in surface time, which is cyclical and/or linear. With mythic time, there is always a return, but with a twist, or with a trope, which could be one of the master tropes identified by Vico¹³⁷⁸.

Representation always occurs in the present. We break off *one part* of the whole and then use it to represent the whole. But our behavior is governed by the Habitus, which is the OrLog that contains the sediments of predispositions upon which our behavior is based. Mythic time sets our attitudes based on the stories we have heard and how we interpret them within our own mythology. To look at the past we must distance ourselves from what has happened and take a stance toward it in order to gain perspective, we can then convert it into something completed. When we transform that memory into imagination and throw that into the future, based on the actualized possibilities of Hyper Being, then it is possible to encounter an Emergent Event that changes the world in a fundamental way. We bring that future Emergent Event back into our present to actualize it, and thus the *cycle of the moments of time* starts all over again producing a basis for the next Emergent Event. We can see the Quadralectic as merely a return to the four-dimensional time of the Mythopoeitic prior to the Metaphysical narrowing of time. We need to understand what it means to return with a twist, or trope, or tactic, and we need to understand that this twist involves a return in two cycles rather than one. It is like the mobius strip and the other spinor images that have 720 degrees of angular change, which miss themselves on the first revolution but then join back up at the second revolution through their orbits. A trope, or twist, or tactic can appear in any of the moments of the Quadralectic and there are different master tropes that are available to be that twist, which makes all the difference between the *primordial time* and *surface time* of the Metaphysical Era.

Trope Cross as the Entry into Nondual Four-dimensional Spacetime

Let us imagine what David Grove¹³⁷⁹ has called a Theater of the Mind¹³⁸⁰. We will imagine it as being like the memory theaters described F. Yates¹³⁸¹ that were built in the

¹³⁷⁸ Hutton, Patrick H. History As an Art of Memory (Burlington, Vt.: University of Vermont, 1993). p. 33. Danesi, Marcel. Vico, Metaphor, and the Origin of Language. Advances in Semiotics (Bloomington, Ind: Indiana University Press, 1993). Croce, Benedetto. The Philosophy of Giambattista Vico (New Brunswick, N.J.: Transaction Publishers, 2002).

¹³⁷⁹ Grove, David J., and B. I. Panzer. Resolving Traumatic Memories: Metaphors and Symbols in Psychotherapy (New York: Irvington Publishers, 1989). See also Lawley, James, and Penny Tompkins. Metaphors in Mind: Transformation Through Symbolic Modelling (London: Developing Co. Press, 2000).

¹³⁸⁰ Discussed in the last workshop before his death in early 2008. Personal Communication.

Renaissance. David Grove draws a cross, which is called a trope cross¹³⁸² on the fourth or back wall of his theater. That trope cross is where orthogonal lines of metaphor and metonymy cross. In other words, we can play two of the master tropes off against each other, and we do so while searching for the point where the *anagoric*¹³⁸³ *swerve*¹³⁸⁴ takes us out of the three-dimensional theater into the fourth dimension beyond the point where the two tropes cross. David Grove based many of his ideas on Bill Rawlins work¹³⁸⁵, which was based on Roman Jakobson.¹³⁸⁶ Grove only considered the cross of Metaphor and Metonymy, but we can cross any of the master tropes. There are, in effect, four possible back walls to the theater of the mind, with four possible trope crosses, which, in fact, place us in a four-dimensional tropic space. This is the point: We are already in four-dimensional space, even though it appears that we are in three-dimensional space. Thus, it is possible to stabilize ourselves within this four-dimensional space, and look back upon the theater of the mind in three-dimensional space, rather than trying to *break out* of the theater of the mind into four-dimensional space. This jump to realizing that we are *already in* four-dimensional space when it *appears* that we are in three-dimensional space is the *embodiment* of the *tropic push* that sends us out into four-dimensional space by way of an *anagoric swerve*. In the context of the theater of the mind, we do not need to push out into a nondual four-dimensional space, nor be pulled into it, *because we are already there*. From that stabilized vantage point in a nondual inertial four-dimensional *reference frame*, we can look back to see the *illusion* of the theater of the mind that actually exists in three dimensional space. We have noted that the Golden Thread is the path of narrative that

¹³⁸¹ Yates, Frances Amelia. *The Art of Memory* (London: Pimlico, 1992).

¹³⁸² Trope Cross is an idea that goes back to Roman Jakobson that appears also in Bill Rawlin's work (unpublished) upon which David Grove's Metaphor Therapy was based. It meant that Metaphor and Metonymy were crossed with each other, but could have been applied to any of the pairs of master tropes. Ricœur, Paul. *The Rule of Metaphor: Multi-Disciplinary Studies of the Creation of Meaning in Language*. (London: Routledge and Kegan Paul, 1978). p. 175. Dowling, Paul. *The Sociology of Mathematics Education Mathematical Myths, Pedagogic Texts*. Studies in Mathematics Education Series, 7 (London: Falmer Press, 1998). p. 109. See Fernandez, James W. *Beyond Metaphor: The Theory of Tropes in Anthropology* (Stanford, Calif: Stanford University Press, 1991). See also Tilley, Christopher Y. *Metaphor and Material Culture*. Social Archaeology (Oxford, UK: Blackwell, 1999). p. 25-26.

¹³⁸³ Kunze, Donald, "Alcestis Backstory" http://art3idea.psu.edu/kunze_alcestis/kunze-alcestis.html accessed 081231. See also <http://art3idea.psu.edu/boundaries/> accessed 081105. See also "The Anamorphic Cycle" and "An Anagoric Logic" by the author.

¹³⁸⁴ Bloom, Harold. *The Anxiety of Influence; A Theory of Poetry* (New York: Oxford University Press, 1973) p.42 for *clinamen* or swerve. See also Miklowitz, Paul S. *Metaphysics to Metafiction: Hegel, Nietzsche, and the End of Philosophy* SUNY Series in Hegelian Studies. (Albany, N.Y.: State University of New York Press, 1998). p. 170, footnote 40. See p. 189 for "rhetorical swerve"; O'Regan, Cyril. *The Heterodox Hegel* (Albany: State University of New York Press, 1994). p. 7 ff.

¹³⁸⁵ "Toward an Archeology of Clean Space Metaphor Therapy" by the author unpublished.

¹³⁸⁶ Jakobson, Roman, Krystyna Pomorska, and Stephen Rudy. *Verbal Art, Verbal Sign, Verbal Time* (Minneapolis: University of Minnesota Press, 1985). Jakobson, Roman, and Linda R. Waugh. *The Sound Shape of Language* (Bloomington: Indiana University Press, 1979).

takes us through the differences within Being, which we ground alternatively in Beyng in order to bring forth meaning. This Golden Thread may be knotted, but in four-dimensional space all the knots unfold and become unknotted. Knots have 720 degrees of angular change that they enact through self-interference until they return unto themselves. This 720 degrees of angular change is exactly what is necessary as a movement to stabilize in the fourth dimension. To be still in four-dimensional space you must be spinning. The minimal spin is one where you spin around twice and return to the same position. But, within this motion, as you are spinning in the circle twice, you must manage to miss meeting up with yourself after 360 degrees, and instead, meet up after 720 degrees, which is a neat trick, or a trope that causes you to be motionless in four-dimensional space although you are spinning in three-dimensional space. This little twist that prevents self-identity after 360 degrees and defers it to 720 degrees is the trope, the tact, the twist, the trick. There are four figures that embody this 720 degrees of angular change: Knot, Mobius Strip, Torus, and Tetrahedron. When you allow a knot to unfurl so that it does not self-interfere, then it appears as the edge of the mobius strip. So, the mobius strip is a model of an anagoric swerve without self-interference, it produces a non-orientable surface. Let us think about this from the point of view of Hermeneutics. We have all heard of the hermeneutic circle, the fact that we need to go around and around something in order to interpret it, and that we need to keep coming back to it in different contexts. This is like the behavior that reveals the essence. In more sophisticated texts, this hermeneutic circle becomes a hermeneutic spiral because there is the realization that one is spiraling through time as one circles the same object, the anamorphic object, while attempting to interpret it. The circle, itself, is the narrative and is made up of the Golden Thread of Beyng, i.e., the onefold that is held up, over, and against the differences in Being. Meaning comes from this juxtaposition of the two grounds of Being, and the 'open clearing' comes from the spacing and timing differences between them expressed in terms of Emptiness and Void. The anamorphic object in the center is ultimately the singularity of Ultra Being.

Now we must realize that in order to have a mobius strip as an embodiment of the anagoric swerve, we need to follow the path of the narrative around twice, as it 'misses itself' the first time and 'meets itself' the second time. Once we realize that the anagoric swerve is what the trope cross is meant to produce, and that it is embodied as a mobius strip, which is a non-orientable surface, then it is possible to understand something very fundamental about the heart of practice. These mobius strips can be composed. They can

be fused together to make Kleinian¹³⁸⁷ and hyper-Kleinian¹³⁸⁸ bottles. There is a form of the Kleinian bottle where the surface is a figure eight that crosses itself at a point. This figure eight traces out two overlapped mobius strips to produce a Kleinian surface. This is equivalent to the fusion of two right and left handed mobius strips along the same line. We can then merge two other Kleinian bottles (like this) along the same line again to produce a hyper-Kleinian bottle. And, we can build up higher hyper-Kleinian bottles (like this) to any degree we want by adding more Kleinian bottles. We have shown that this series is equivalent to the series of hyper-complex algebras and can serve as an analogy for the relationships of the Special Systems to each other. What is special here is that we see that the same circuit of the Golden Thread can serve multiple purposes at the same time. In fact, we also can see how the various moments of the Quadralectic can overlap to produce the same anagogic swerve from the crossing of multiple master tropes simultaneously. In this analogy we can see how the time associated with the different moments, which are expressed in the Quadralectic, can be overlapped and unified in a single moment of kairos, the time of opportunity. The contraction of this fusion of the four moments of the Quadralectic in Hyper Being can be seen as the moment of the Pentalectic in Wild Being. But it also helps to follow out the mathematical analogy. This is because we know that the Kleinian bottle is different from the pentahedron in that they are both composed of mobius strips, except that in the Kleinian bottle they are fused and in the pentahedron they are interpenetrated. Thus, the four mobius strips that overlap in the hyper-Kleinian bottle, can be imagined to be a deeper fusion of these two possible relationships of dual mobius strips to each other, which is analogous to the difference between the cube and the octahedron as the interpenetration or fusion of dual tetrahedrons. Also we know that the hyper-Kleinian bottle, with four mobius strips in it, has four lobes, and if we separate these out we get four tori. These four tori can be seen as the ‘whole form’ in each of the four three-dimensional spaces in the realm of four-dimensional space. Thus, we can see that these four tori are projections of a single hypersphere in the four three-dimensional spaces that compose four-dimensional space. This hints that the super-synthesis of the ‘whole form’ is the hypersphere in the fourth dimension, and that the ‘whole schema’ is merely one of these projections. This isomorphic projection is found to be by surface area, not by volume,

¹³⁸⁷ http://en.wikipedia.org/wiki/Klein_bottle accessed 081231. See also <http://www.kleinbottle.com/> accessed 081228. See also Rosen, Steven M. *Dimensions of Apeiron: A Topological Phenomenology of Space, Time, and Individuation* (Amsterdam: Rodopi, 2004). p. 204.

¹³⁸⁸ Defined as joining multiple Kleinian bottles at the point of their self-interference. See “Mathematical and Physical Anomalies in Nondual Science” in *Nondual Science* by the author at <http://nondual.net>.

which reminds us that the *open* described by the hyperspheres is different with respect to the surface and volume that we mentioned before.

The key to this discussion is the difference between Being in the *dualistic* three-dimensional space or *the nondual* that is interpenetrating within four-dimensional space. We posit that we are really in four-dimensional space although the illusion is that we are in the third dimension. Thus, it is the *difference* between the positive and negative faces of the *aspects*¹³⁸⁹ that are held together supra-rationally, which throws us into the anagogic swerve, which is like a movement from the realm of duality to the nondual. The fact that we imagine it *concretely* as a ‘difference of dimensions’ is inessential because it can apply to anything that the aspects of Being, or Existence, apply to. Let us quickly add that the same is true for all the other negative and positive aspects of Being, like identity/difference, truth/fiction, and presence/absence. In fact, nihilism operates on the aspects of identity and difference. The difference between the aspects and anti-aspects of Being are marked by the difference that creates the difference of Beyng. They appear different but are, in fact, identical, which causes a loss of meaning in nihilism. This is what Achilles realized when Agamemnon took his war prize: the Achaeans were no better than the Trojans. Any realization or insight that causes you to hold two positive and negative aspects of Being together supra-rationally may cause an anagogic swerve¹³⁹⁰. And all these can overlap just like all four mobius strips can overlap in the hyper-Kleinian bottle. Thus, there is a moment (*kairos*) in which all four of the positive and negative aspects of Being are brought together in conjunction at the same moment simultaneously, *and this is a genuine Emergent Event*. If fewer are brought together, then that emergence is less intense and more artificial. But even one anagogic swerve is enough to stabilize someone in the inertial reference frame of the fourth dimension and allow the illusions of the third dimension to become untethered. All power structures are deployments of forces in the third dimension. By bringing in the aspect of time, one gains an efficacious leverage that greatly increases the change and twists of our normal frame of reference, which can cause emergent knowledge to come forth as fact, theory, paradigm, episteme, ontos, existence, or as absolute change. By using the analogy of the fourth dimension in relation to the third

¹³⁸⁹ Aspects: truth/fiction, reality/illusion, identity/difference, and presence/absence.

¹³⁹⁰ For concept of ‘heterodox swerve’ in Hegel see O’Regan, Cyril. *The Heterodox Hegel* (Albany: State University of New York Press, 1994). pp. 81, 85, 126, 137. Miklowitz, Paul S. *Metaphysics to Metafiction: Hegel, Nietzsche, and the End of Philosophy*. SUNY Series in Hegelian Studies (Albany, N.Y.: State University of New York Press, 1998). pp. 94, 97, 99. For concept of the anagogic see Schurmann, Reiner, and Reginald Lilly. *Broken Hegemonies. Studies in Continental Thought* (Bloomington: Indiana University Press, 2003).

dimension, we make it easier to understand the relationship of the dual to the nondual. In effect, if you can stabilize in the fourth dimension then illusion will dissolve, and the way to do that is to spin in such a way that you inscribe a mobius strip. This cyclical twist, with revolution and rotation happening at the same time, does not have to be physical. Rather, the physical rotation is an analogy for the supra-rational conjunction of the positive and negative aspects of Being, and the line between these two aspects is the Golden Thread of Beyng.

Kairos

In the present we have identity and difference as the primary aspects, and we need to realize that what is identical is, in fact, different and that what is different is, in fact, identical, and we need to hold these two thoughts together at the same time. This will produce an anagoric swerve if the conditions are right, i.e., at the right time and place, i.e., kairos. At the next moment of the Quadralectic, we have truth and fiction as the *aspects*, and the Golden Thread is between them. Mythos is a story that is false but expresses deeper truths. From the nihilism of realizing the identity of difference, or vice versa, we go deeper into the mythos where truth and fiction are delimiting the Golden Thread of narrative. This narrative sets up the postures and attitudes out of which our behavior arises. Kairos is the moment when truth is with fiction, and when fiction is with the truth, and this is when the Golden Thread separating this chiasm is revealed. In the next moment, we differentiate between illusion and reality. It is interesting that the first ‘perspective’ painting of Filippo Brunelleschi¹³⁹¹ was a trick. His picture was displayed covering the inside part of a Florence cathedral side door. The painting depicted a view of the street outside the church. When viewers from inside the cathedral looked at the painting that disguised the door, they *thought* that they were *looking out onto the street rather than at a painting*. It was one of Brunelleschi’s tricks. Notice how this trick leverages perceptual appearance by substituting a two-dimensional painting for the three-dimensional world outside the cathedral door. It brings the *memory* of the street scene into play and in a moment invokes that scene from memory to produce a very accurate illusion of the actual street scene. This type of perspectival accuracy was unknown to painting prior to Brunelleschi’s invention of perspective. Brunelleschi managed to pull off his trick by

¹³⁹¹ King, Ross. Brunelleschi's Dome: How a Renaissance Genius Reinvented Architecture (New York: Walker & Co, 2000). Walker, Paul Robert. The Feud That Sparked the Renaissance: How Brunelleschi and Ghiberti Changed the Art World (New York: HarperCollins Publishers, 2002).

substituting a *representation* for a presentation¹³⁹². That trick initiated the exploration of *perspective in art*, which has profoundly affected our society and culture since the Renaissance. It opened up a whole world of realistic representation in painting. Anagogic swerves are, in fact, our ways of looking at an anamorphic object. Anamorphic objects resolve contradictions, paradoxes, and absurdities. An anamorphic object is an object that looks different from competing perspectives. When we look at the world and we say that it is really one way, although it appears in another way, then we claim that the appearance is an illusion. In doing this we are using our memories to mediate the experience. It is *experience* that tells us that appearance is an illusion and not a reality, and that supposition is determined and confirmed by *testing*. It is in testing that meaning is injected into the world because that allows us to do verification, validation, and to check coherence. Identity, truth, and presence define the Formal System, and they allow the checking of properties such as completeness, coherence, and clarity (well-formedness). So, it is interesting that meaning arises before presence and absence can appear as significant. We look at signs in terms of what is *present* pointing toward what is *absent*, according to Heidegger, so hermeneutics is about understanding what is absent in the present. This affirms the significance of looking into the future. Future is seen as the time when the *prodigal son*¹³⁹³ will return and how something that was absent can become present. Yet, in the difference between the third and fourth dimension, there is a non-representable aspect of the interpenetration and intra-inclusion of the nondual. And so, however much we want to represent the fourth dimension, something will be lost in translation. If we render some aspect of it perfectly, then that simply pushes the higher dimensional distortion elsewhere within our representations. The idea is to have the absent become present. The supra-rational Golden Thread facilitates our realization that what is absent is really present, and, in fact, what can *never be made* present *still haunts* the present. Thus, the distortions of the present are brought about by ontotheology that tells us about what is absent, but also relates what is “*always already*” absent¹³⁹⁴.

In order to make the anagogic swerve occur (which takes us into the nondual), we are really *layering* a supra-rational realization of the *simultaneity* of the positive and negative *aspects* as they appear in our lives. We try to do this within the *kairos* of time, which is the

¹³⁹² Representations are lower dimensional and have less information than the presentations that they represent.

¹³⁹³ The prodigal son is *always present as a result of his absence* so that the present son is not considered special leading to sibling rivalry.

¹³⁹⁴ Henry, Michel. The Essence of Manifestation (The Hague: Nijhoff, 1973).

time and place of opportunity, so that the most change can occur as a delusion of our being trapped in three-dimensional space and one-dimensional time while asymmetry is evaporating. And, to the extent that all the moments of time are holding the Golden Thread in their hands, kairos can be realized and an Emergent Event may arise within some scope of our life experience. This will be where the machinations of the enframing of nihilism vanishes for a moment in time, and a re-organization of our lifeworld can emerge from within.

This actualization of the kairos, as the overlapping of the moments of the Quadralectic, is the heart of *practice*. We arrive there by moving from Hyper Being, which is the actualization of the realm of possibilities, to Wild Being, which is the actualization of the proclivities, propensities, tendencies, dispositions, and inclinations of the Habitus that creates our thought, action, perceptions, and expressions according to Bourdieu¹³⁹⁵. But, we choose to follow out the logic of M. de Certeau, who has understood the chiasmic nature of the ruse, the tact, the trope, the twist, and the trick that is at the heart of practice. This brings us back to an understanding of how the Quadralectic is merely the *disengagement* of the *unification* of the four moments of time. The closer they are engaged and overlapping, the more we live in kairos, which is the time and place of the moment of opportunity that reveals the fifth moment of the Pentalectic. The four moments of time can be seen as devolving from the four orthogonal time-lines of heterochronic time rather than from linear time. This is because time is inherently nonrepresentable in contrast to space, and in this nonrepresentability of time, *there exists the hidden possibility that time, as well as space, can be four dimensional*, as hypothesized by J. Dunne¹³⁹⁶. Kairos occurs at the intersection of four-dimensional time in the Emergent Event through an articulation of the lifeworld in the four equi-primordial moments of time.

Another way to think about this transformational process is in terms of the relationship of the System to the Meta-system. We have already noted that the Meta-system has four parts, which are the Origin, Arena, Boundary Horizon, and Source (See Figure 16.1). And we have shown that the three different types of Geometry are descriptions of the relationships between these various parts of the Meta-system. Within the Arena there is a Euclidian Geometry with its coordinates emanating from the Origin. The Boundary Horizon has an Elliptical Geometry. When we embed subjects in the Boundary Horizon they become Dasein, but they also transition from the present-at-hand of Euclidian

¹³⁹⁵ Bourdieu, Pierre, and Richard Nice. Outline of a Theory of Practice. Op. cit. p. 95.

¹³⁹⁶ Serial Universe and An Experiment in Time Op. cit.

Geometry to the ready-to-hand of Elliptical Geometry. Beyond the Boundary Horizon is the realm of Hyperbolic Geometry, and the source is at infinity which is the limit of that hyperbolic space. Hyperbolic space is inherently non-representable, but we can think about it as if there is a saddle at each point where everything is falling away from everything else, thus it is the source of the fallingness of Dasein. Dasein becomes authentic when it connects with this fallingness that originates from being recognized as embedded in Hyperbolic Space rather than Elliptical Space. We have also discussed that there is a pseudo-sphere with the same volume and surface area as the sphere but that it is shaped like two trumpet horns glued together at their mouths and with their blow hole openings at infinity¹³⁹⁷. Pseudo-spheres have negative curvature while actual spheres are elliptical with positive curvature. It is this difference in curvature that distinguishes Elliptical and Hyperbolic Geometry. At the point where the wide ends of the trumpets (their mouths) are glued together, the Singularity appears within the Meta-system where the negative curvature is lost. We also characterize the Hyperbolic Space as being like the Control Space of Rene Thom's Catastrophe Theory¹³⁹⁸, and that there are folds and cusps in that Control Space that define discontinuities in the Arena. It turns out that there is a relationship between the Pseudo-sphere and the Sine Gordon Equation that defines solitons, such that when these positive and negative vortices, or gyres¹³⁹⁹, interact with the Arena they produce soliton formations. We have associated the soliton (in terms of a physical analogy) with the Dissipative Ordering Special System. It is possible to have surfaces that are representations of multiple solitons interacting¹⁴⁰⁰ and these are deformations of the pseudo-sphere. It is also possible to have surfaces that represent the relationship of positive and negative solitons in breathers¹⁴⁰¹, which have stationary boundaries, to be associated with the Autopoietic Special System (See Figure 16.2). We have speculatively generalized from this that an interaction of two breathers would be a hyper-Kleinian bottle in which the Kleinian bottles intersect at their own self-intersection points. However, when we realize that the positive and negative vortices of the positive feedbacks in the hyperbolic region can intersect the Arena to produce 'soliton-like'

¹³⁹⁷ <http://virtualmathmuseum.org/Surface/pseudosphere/pseudosphere.html> accessed 090307.

¹³⁹⁸ http://en.wikipedia.org/wiki/Catastrophe_theory accessed 090307.

¹³⁹⁹ Yeats, W. B., and A. Norman Jeffares. *W.B. Yates: A Vision and Related Writings*. (London: Arena, 1990).

¹⁴⁰⁰ <http://virtualmathmuseum.org/Surface/two-soliton/two-soliton.html> accessed 090307.

¹⁴⁰¹ <http://virtualmathmuseum.org/Surface/breather/breather.html> Also see http://virtualmathmuseum.org/Surface/breather_p/breather_p.html accessed 090307.

behavior, then our theory can be represented dynamically, and we have a representation¹⁴⁰² of what is meant when we say that we are already in the fourth dimension and that we merely need to realize that the nondual state prevails over the three-dimensional dual state. Essentially, when we say that there is a transformation due to the anagogic swerve in relation to an anamorphic object, which takes us from the dual to the nondual state, what is really being said is that an intersection is occurring between the miracle and black hole vortices in the Hyperbolic Arena with the Euclidean Arena passing through the wall of the Elliptical Boundary Horizon. When this intersection occurs, then ultra-efficacious phenomena are produced by the marriage of these three realms together in a single dynamic phenomenon that we call the Emergent Event. The structure of the Emergent Event can be represented in terms of the deformations of the pseudo-sphere horns as they interact with each other¹⁴⁰³, but also with the Arena as it passes through the Elliptical Boundary Horizon. The Emergent Event is triggered when we recognize that the three realms of the Meta-system are, in fact, one field and that the elements of that field are not segregated, and their interaction is a nondual event that occurs within the realm of duality.

So, we have two analogies for the operation of the Anagogic Swerve. One of those analogies relates to stabilization in spacetime that involves a spinor motion, and the other has to do with the relationship between the hyperbolic vortices and their intersection with the Euclidian Space breaching the horizontal boundary. Both of these analogies from physics give us a picture of the dynamic of the advent of the Emergent Event, which may be triggered by the process of Emergent Design or may arise spontaneously as an ordering based on the structures of the Special Systems that Stuart Kauffman calls ‘order from nowhere’¹⁴⁰⁴. Our task in this Dissertation has been to show ways of thinking about Emergent Events such that we might be able to understand the *possibility* of Emergent Design. We can see the relationship between the Quadralectic and the Pentalectic and the leveraged transformation that takes place in the move from the Quadralectic to the Pentalectic. We think of the transition from the System to the Meta-system in terms of the transition between three and four-dimensional space, but we can also think of it as the way that the System interacts with *all* regions of the Meta-system and not just other systems within the Arena. The System is in *all* of the Meta-system at the same time. It is not merely isolated to only one region of the Meta-system. Thus, the System can, by insight, realize its

¹⁴⁰² <http://virtualmathmuseum.org/gallery4.html> <http://3d-xplormath.org/index.html> 3D-XploreMath Consortium

¹⁴⁰³ <http://virtualmathmuseum.org/Surface/three-soliton/three-soliton.html> accessed 090307.

¹⁴⁰⁴ Kauffman, S. Origin of Order, At Home in the Universe. Op. cit.

relationship to the whole of the Meta-system with all of its regions, and when this occurs, that System is transformed (by stages) into a Special System and will realize the inherent efficacy of that transformation in its own *self-transformation* as the advent of an Emergent Event, and once we realize that this is where new systems ultimately come from, Engineering can be practiced under the auspices of Emergent Design.

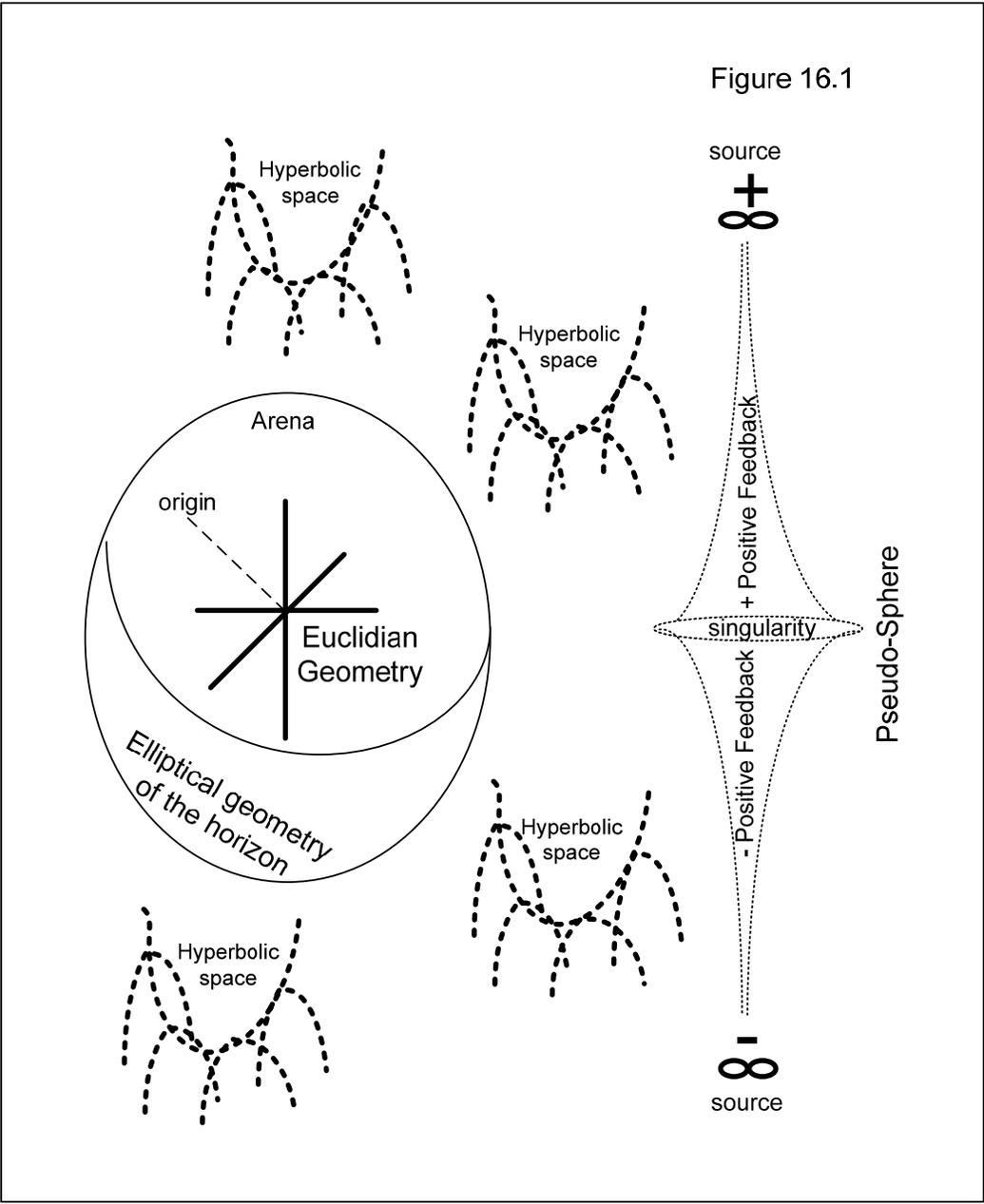


Figure 16.1. Vision of the Meta-system Tableau.

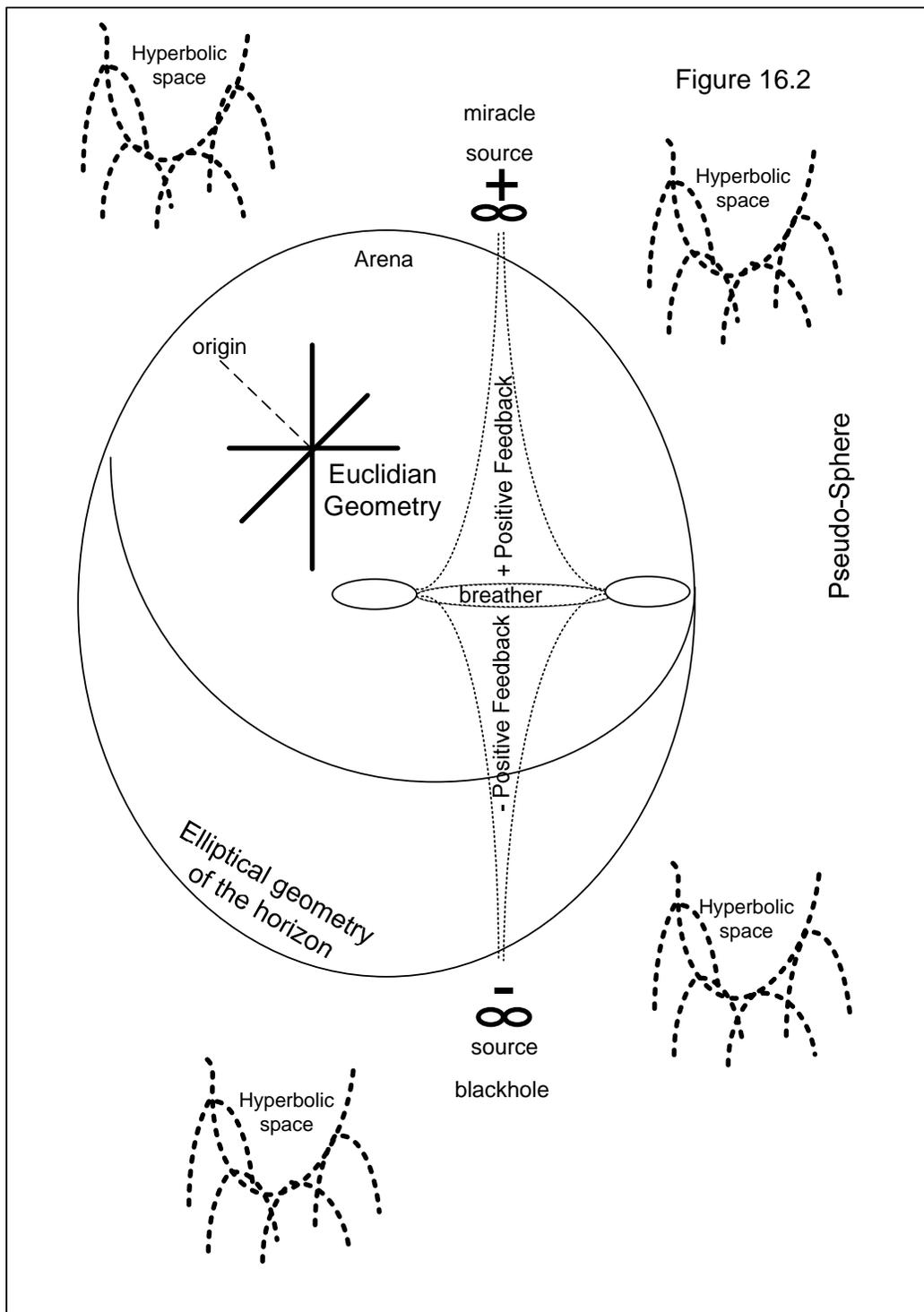


Figure 16.2. Breather within the Arena of the Meta-system.

Summary and Conclusion

Placing this Study in the Context of the Broader Research Program from which it Resulted

In this chapter the argument of the dissertation is summarized and various conclusions are drawn concerning the nature of Emergent Design within Systems Engineering.

Recapping the Argument

As part of a continuing research program, this dissertation endeavors to uncover a disciplinary foundation for Systems Engineering within the broader Western Tradition, particularly in terms of Philosophical thought, Systems thought, and Mathematical thought. One of the problems that Systems Engineering confronts is its isolation from the academic advancements of the Western Tradition in the Postmodern Era. Development in Systems Engineering is determined by the advances of Engineering in general and Engineering is one of the most conservative of the disciplines following Physics and other Hard Sciences. Yet, it is imperative for Systems Engineering to strengthen its academic base as it attempts to build artifacts that are based on Scientific Knowledge within a Technological Arena that is advancing rapidly. However, other Engineering Disciplines have established core knowledge that they transmit within the educational arena, and this has allowed them to expand their research agendas as they continue to push the cutting edge of technology. Systems Engineering has no established core knowledge curricula. Instead, it has traditions of *practice* that it seeks to transmit within its academic curricula. In relation to other disciplines, Systems Engineering is still working to establish its foundation and its credibility as having something significant to teach and pursue in its research. Yet, Systems Engineering raises broader issues than many Engineering disciplines and this calls for a more expansive search than most Engineering disciplines have had to pursue. During this research effort we have found that grounding Systems Engineering in Systems Theory is not enough. Due to the complexity of the artifacts that are produced by Systems

Engineering organizations, and the fact that some of the systems produced are truly global in scope, it is necessary to move to at least one higher level of abstraction into what we term to be General Schemas Theory, which is the next level of abstraction up from Systems Science. General Schemas Theory is the science of all schemas, which includes the System as well as other schemas such as Pattern, Form, and Domain. Schemas Science is also comprised of realms that we are not as familiar with such as Facets, Monads, Meta-systems, World, Kosmos, and Pluriverse. At this point in time, these are the schemas that exist as part of General Schemas Theory under the first hypothesis of S-prime theory. As yet, no discipline has defined General Schemas Theory as an object of investigation. Thus, in our attempt to ground Systems Engineering, we have discovered that it is necessary to expand our traditional view to new vistas while uncovering new territories of investigation in order to find a firm ground and basis for this fledgling discipline. In other words, our work has uncovered new research possibilities for other traditional disciplines. This is because Schemas Theory has not existed up to this point in any coherent fashion, and when we introduce Schemas Theory, it changes the relationship of other disciplines to their subjects. Just as Systems Theory changed the relationship of disciplines to the System they study, Schemas Theory affects the relationships of all the schemas that these disciplines use to schematize phenomena for the purpose of isolating them to make them amenable for study. Schemas Theory raises the reflective consciousness of all schemas just as Systems Theory has raised our consciousness of the Systems that exist in various disciplines. Our study makes way for a broader design space for possible schemas and possible schema interactions that have not been explored previously. And we have designed a theory called S-prime theory that specifies ten specific schemas and their relationships to each other as well as their mathematical dimensionality within this new space of possible schemas theories.

Once we move up from Systems Science to Schemas Science, which is actually something emergent within the current panoply of academic disciplines, then many fundamental questions are raised that must be addressed. It is at this point that we must call upon our resources from Philosophy, because Schemas have a long history within the Western Philosophical Tradition. It is also of utmost importance that we engage Mathematics because dimensionality has long been a fundamental part of mathematical understanding and the aspects of dimensionality form an integral part of the schematic scientific approach. Our approach has been to appeal to Continental Philosophy rather than Analytical Philosophy for help. We concentrate on Continental Philosophy because these philosophies have more consistently addressed the question of the nature of the Schemas

than Analytical Philosophy, which tends to limit itself to questions of Language or Scientific Method, or other more narrow issues. However, when Analytical Philosophers such as David Lewis have important things to say about Schemas, we have used their work. For example, Wittgenstein's Philosophical Grammar has many references to schemas as part of his thought on *meaning as use*, and that has influenced this research. We have also taken a similar tact to that of B. Fuller in his Synergetics as a way of using Mathematics to guide thinking about Systems' theoretical issues. However, among the Continental Philosophers, Kant is a particularly fundamental philosopher who uses the concept of the schema as a key (if less obvious) part of his philosophical architecture. The work of Husserl, Heidegger, and other Continental Philosophers can be seen as elaborations on Kant. Analytical Philosophy picks and chooses the philosophers from the Continent that they revere mainly harkening back to G. Frege who critiqued Husserl's early work causing Husserl to change his approach significantly in response to that critique. Other Continental Philosophers after Frege have not been of interest to Analytical Philosophers until recently. But we believe that the Analytical emphasis on *formalism* to the exclusion of *a grounding in experience through Phenomenology* is not conducive to producing solid foundations, even though this goes against the grain of Science and Engineering in general. Isolated formal models ungrounded in experience tend to ignore fundamental problems that need to be considered in order to have a broadly grounded appeal that is *responsive to the problems of practice* rather than merely focusing on the problematics of theory. Our theory of Design is essentially pragmatic and therefore firmly grounded in the Pragmaticism of Charles Peirce, which was further developed into Sign Engineering by Pieter Wisse.

This dissertation explores how the idea of the System manifests as it moves through the various meta-levels of Being as expressed by various philosophies such as those of Husserl, Heidegger, and Merleau-Ponty. In a previous dissertation the author explained the difference between the meta-levels of Being and their importance for understanding the phenomena of Emergence in the Western Scientific and Philosophical tradition. This present dissertation is meant to be a tutorial directed at a particular group of Systems Engineers, i.e., those on the Systems Science Enabler Group (which has become the Complex Systems Working Group) within INCOSE¹⁴⁰⁵. The dissertation focuses on the concept of the System and shows how it transforms as we push it up through the various meta-levels of Being that are identified in the evolution of Continental Philosophy.

¹⁴⁰⁵ International Council of Systems Engineers See INCOSE.org

However, within this basis of understanding, two things occur that are significant within the text of this dissertation. One is the discovery of the importance of considering the *duality* between the System and Meta-system, and the other is the focus on Design as a *pragmatic* and *practical activity* that takes place within the context of the elaboration of the System and Meta-system schemas. The duality between the System and Meta-system becomes a context for understanding the nature of the *sub*-schemas, that formulate the fine structure of the interaction between the schemas and dimensionality. But, in addition to the process of exploring the sub-schemas we have also worked to understand the nature of Sign Engineering, which gives us a theoretical basis for Design. Wisse presents a theoretical basis for Sign Engineering that is based on his understanding of the Semiotics of Peirce. Peirce is a pivotal theorist who developed his own Phenomenology and connected themes that were developed by the Continental Philosophers to pragmatic themes that he developed himself as he attempted to make Logic a Science and ground it pragmatically through the development of the threefold theory of the Sign. Wisse develops his theory of the Ennead as a ground for his Metapattern meta-method. We combine that meta-method with the Gurevich Abstract State Machine meta-method to produce a picture of the concrete embodiment of the meta-methods of Sign Engineering. We see the Ennead and the trifold sign in the broader context of what Plato called the WorldSoul. We then developed a theory based on Pascal's Triangle that focused on the higher reaches of this structure of the first, second, third, and fourth order mediations and how they relate to the information infrastructure. In this way the argument builds a higher order theory for Sign Engineering and bases it in a different understanding of Euclidian Geometry. The word for 'point' in Greek also means 'sign'. In the Modern Period it is possible to view the undefined elements of Geometry not only as geometrical objects, but also as *semiotic objects*. Peirce demonstrated this by articulating his Philosophical Categories in a way that coincided with the unfolding of the geometrical elements (Categories: First, Second and Third correspond to Geometrical Elements: point, line and surface). This turn toward Euclid's Geometry as a basis for Semiotics and Ontology is influenced by Badiou's Grand Style reading of Set Theory. In previous working papers in this research program, Badiou's approach to Set Theory was analyzed and a basic critique was offered that would expand the number of categories (covered by that Grand Style reading) to eight. The basic thrust of this critique is the recognition that Sets have a dual that is the Mass, although this is not well recognized in our tradition. Set Theory and Mass Theory are inverse duals of each other. But, whereas Set Theory is well worked out, Mass Theory has hardly been developed within our tradition. We see Mass Theory as a way to understand the

relationship between Design and Implementation. And the fact that both Sets *and* Masses possess their own logics holds out for the promise that we may be able to gain greater control over the design development process if we could move back and forth between Set-based Logic (Syllogism) and Mass-based Logic (Pervasion or Boundary Logics). Thus, we are forced by our pragmatic concerns to begin to explore a broader foundation for Mathematics in general. Just as we developed a theory of Schemas called S-prime, we also developed a theory for the Foundational Mathematical Categories that elaborates on the Badiou's theory, which is based on Sets. In our theory we include many of the other candidates for grounding Mathematics, such as Category Theory and Mereology. But here we also discover a structure in which there are deficient and excessive categories as well as the paired categories of Set and Mass, which brings together a full panoply of necessary categories that are needed to ground Mathematics. Just as we treated the schemas as a System, we will also treat the categories that are necessary to ground mathematics as a System, rather than advocating one over all the others. As a result, our approach to developing these foundational constructs is guided by the basic ideas of Systems Theory except that, in each case, we not only consider the *System*, but the *inverse* of the System, which is the *Meta-system*. We consider emergence as well as de-emergence. We consider all the dualities that are operative within the universe of discourse that is being explored. The concept of the Foundational Mathematical Categories was more extensively developed earlier in this research program in three sets of working papers. These categories are not developed in the same detail in this dissertation but the idea is used and played against the series of the schemas in order to understand the relationships between the trans-Peircean categories, the Schemas, the Foundational Mathematical Categories, the Standings (including Being, as well as the meta-levels of Being), Existence, Manifestation, and the Amanifest. One aspect of this dissertation involves playing these various series of theoretical constructs off of each other to see if they yield a deeper understanding of the nature of Design within the context of the Schemas and the Foundational Mathematical Categories.

One discovery made in this research program is the fact that Euclid's Elements and Data can be read in the Grand Style as containing indications of all eight of the Foundational Mathematical Categories. This leads to some very interesting results when we think of Geometry not only as a representational axiomatic basis for Mass, which ultimately leads to topology in Mathematics, but also as a basis for Semiotics and Sign Engineering. The fundamental distinction that we find between the System and the Meta-system can also be seen in the Axioms of Geometry and in the relationship of the fifth axiom (concerning

parallels) to the other four axioms that constitute Absolute Geometry. We find that Geometry, in its later elaboration into Euclidian and Non-Euclidian Geometries, is a picture of the relationship between the System and the Meta-system. It establishes this difference in a very precise way as the difference between Absolute and Euclidian/Non-Euclidian geometries that are based on variations within the fifth axiom, which has a long history of failed attempts at reducing it to the other four axioms of Geometry. In this analysis we discover that Wisse's Ennead is an *archetypal* approximation of the axiomatic platform, which is recognized as essential to Sign Engineering's second order mediation. This drives us to recognize that there is a concomitant duality between Geometry and Algebra because Algebra has a similar breakdown: the Standard Algebra and the complementary twins of Jordan and Lie Algebras. Thus, both Geometry and Algebra offer us images of the difference between the System and Meta-system, while at the same time giving us an example of how Hyper Being is embodied as the point of indecision between the System, Meta-system, and Hyper Being. These contrasting dualities are central to opening up the possibility of Design. In order to give Systems Engineering a firm academic foundation, we have been forced to push into new territory when confronting the foundations for Mathematics in general, and, as a result, have developed an approach that is neither Foundational nor anti-Foundational, but Afoundational. In other words, we agree that there is no foundation in Being for Mathematics, but we do not agree with the anti-foundationalists who claim that because there is no foundation in Being, there cannot be any foundation at all or only an abyss that all our foundations collapse into. Rather, we establish the concept that beyond Being there is Existence and that Existence has two interpretations, as either Emptiness or Void. Emptiness is a Set-like form of Existence and Void is a Mass-like form of Existence. And although there is no foundation in Being, there is a partial foundation in Existence that is inscribed in Emptiness. Existence serves as the meta-system for the system of Being. We see Nomos as this inscription in the Emptiness of Existence and it serves as a basis for the Foundational Mathematical Categories, which we consider to be an elaboration on the Trans-Peircean categories. In other words, it is *not* a foundation that we can grasp because it has no substance, but instead, it is a foundation that we can *indicate* as the basis for the ordering of our experience, particularly for the various orderings that appear in the schemas. It is Afoundational because we cannot use it for anything directly, we can only use it as a reference. It is interesting that this meta-axiomatic inscription in the Emptiness of Existence (of the Foundational Mathematical Categories), gives us a model of the Lifecycle of the Emergent Event in a form that is non-perishable. In other words, Mathematics is normally considered only present-at-hand and

completely static, but when we consider the arc of the development of the Foundational Mathematical Categories as a Systematic Set, then we can see that there is a definite development through stages that remind us of the stages of the Emergent Event. This dissertation studies the nature of Emergent Design and develops a theory that addresses the unfolding of the Emergent Event, which is key to understanding the nature of Emergent Design as a general phenomena where human design activities initiate a cascade of Emergent Events. Of course, other human activities in Science and other fields of endeavor also produce cascades of Emergent Events, but here we are focused on the way we can use this unexpected resource to ground our Systems Design activities, which we now view across all schemas under the auspices of Emergent Engineering. Schemas give us *sets of pre-understandings of orders* that we can apply to Design, but the Foundational Mathematical Categories give us the basis for *producing order*, particularly the new orders of Emergent phenomena that can arise out of Design activities. Discovering the Foundational Mathematical Categories as a set of axiomatic Systems, or as a System of Systems, is the most fundamental finding to date in the research program undertaken in preparation for the writing of this dissertation, and it is more fully explored in working papers that subtend the ideas that are developed here.

Once it has been established that there is a basis (i.e., the Foundational Mathematical Categories) for understanding the nature of Emergence, which is also a basis for ordering all schemas within the context of the systematic set of the Schemas, and once it is also understood that whatever we design is based on the Schemas in the context of our cultural and natural encapsulation of entities in spacetime envelopes within our experience, it is then possible to move toward understanding the nature of Design as a practice. We have already mentioned that as the Schemas interface with the dimensions of Mathematics, they produce the sub-schemas through the production of either representations or repetitions within the context of a general dynamic of mimesis between the various schematic objects that appear within any particular schema. As a result of analyzing Wisse's Ennead in terms of the Axiomatic Platform and the embodiment of second order mediation, we were able to introduce another moment to the Ennead, which is *perspective*. It is well recognized that complex systems demand multiple perspectives on their Design. Thus, the identification of perspective as a moment in the design process is just as important as the recognition of essences, concepts, and designs. One of the major ideas expressed here is that Design is an interconnected combinatoric field object at the third meta-level of the Sign, which is also the third meta-level of Being. In other words, design, like concept, perspective, and essence is a basic mode that we can use to explore the *realm of possibility* and understand

it. Introducing a fourth moment to the structure of the infrastructure of Sign Engineering makes it possible to begin to see these moments as part of a super-synthetic combination of Dialectics that we call the Quadralectic. This leads to the development of a series of X-lectics that include the Monolectic, Dialectic, Trialectic, *Quadralectic*, and *Pentalectic*. Hegel developed the concepts of the Dialectic and Trialectic (work) in his Phenomenology of Spirit. And so we build upon these concepts in order to introduce these higher forms of dialectical structures that underlie the design process. At first we align these with the various appearances of the minimal system as a tetrahedron, torus, mobius strip, and knot, but eventually further analysis and comparison of the various series prompts us to postulate that the Quadralectic (as it is posed at the Hyper Being level) is the operator that transitions between the various representations and repetitions of the sub-systems that the minimal system configurations correspond to. It is at this point that we discover the intersection between our theory of Design and our theory of Schemas. The Quadralectic describes the moments of the dynamic of Design and the Schemas break down into sub-schemas that define the various semiotic representations, which are intermediary products that lead to the implementation of the full design. Design is just one element of the Quadralectic that interacts with other non-design moments in order to produce the actual process of design. These moments do not *only* happen in this order, rather, they are moments that overlap in the production of emergent artifacts. They can overlap because they are all trace structures at the level of Hyper Being. They exhibit the properties that Plato identified in the Timaeus as the Third Kind of Being where the Demiurge creates the world by using the elements to produce embodiment in the *chora* or receptacle of spacetime. This way of perceiving the necessary ingredients of Emergent Design has a long and venerable history within our tradition even if it was temporarily lost until being recovered again through Continental Philosophy.

Once we have discovered the intersection between the sub-schemas and the moments of the Quadralectic our analysis does not end there. Rather, we realize that this is just a preparation for its extension into the Pentalectic and into the meta-level of Wild Being. And in that process we see that there is tremendous leverage that comes from that extension, far greater than the leverage of combining Dialectics into Quadralectics. This leverage appears in the accumulation of moments that are created and made possible by the addition of a single moment to our Quadralectic to form the Pentalectic, which takes us to the work of M. de Certeau, whose concepts help us to define the difference between practice and theory, which is key to understanding design. M. de Certeau defines the single moment of the Quadralectic's structure where leverage is obtained with little effort, albeit a

great intensity of concentration. We extended this theory of M. de Certeau to all the moments of the Quadralectic. We see the Pentalectic as a moment of contraction that counterbalances the moments of expansion in the Quadralectic. We see the Pentalectic as extending design into embodiment at the level of Wild Being from its base in the expansive possibilities of Hyper Being. This is an important step because we are tracing a theoretical path outlined by M. de Certeau that illustrates the theoretical unfolding as it is performed when moving from the Quadralectic to the Pentalectic. Our depiction of this unfolding as a *contraction after an expansion* is an example of the type of *narrative* that allows us to comprehend the design process through *reference* or by *indication* even though we cannot directly understand this unfolding in theoretical terms. Now we understand why it was important to explore the phenomenology of our states of consciousness and their relationship to the moments of the Quadralectic, as well as how they align with the various viewpoints of the Novel, that also appear in Blake's Four Zoas, or the viewpoints that Hegel illustrates in his Phenomenology of Spirit. Our theory must have its own special design in order to bridge the gap between theory and practice. The complexity of our argument is necessary in order to provide the conceptual space for this indirect connection between theory and practice that, in turn, will ground it in our experience. We have noted that schemas appear in all our states of consciousness in one way or another. Yet, those various states have differences that relate significantly to the differences between the moments of the Quadralectic as well as to the various viewpoints expressed through the novel. Blake and Hegel's first attempts to write meta-novels embodied images of these viewpoints. These points illustrate that our theory of the Quadralectic is deeper than if it were merely theoretical and not founded in our phenomenological experience within consciousness.

The arc of our argument is clear despite its complexity. We have generalized Systems Theory to the next higher level of abstraction to produce Schemas Theory and appealed to the Philosophical Tradition to help us understand what schemas mean. This push to a higher level of abstraction in order to find a ground (or basis) for our practice has initiated an exploration into wider orbits of conceptual thought than normally enters the purview of theorists who are specialized in a particular discipline. Systems Engineering is known to be interdisciplinary, which leads us to expect that its scope should be broad enough to support many different disciplines and perspectives coming together in concert to produce an emergent artifact. But this broader panorama has led us to uncover things that have not been previously recognized within the tradition, and this is partially because we treat the elements that we discover in our Schemas Theory *as a System*. We stress the importance of

understanding the *inverse* of the System Schema, *which is the Meta-system*, and we are also interested in defining them in terms of each other. As a result, we run into areas of exploration that have not been deeply studied and that gives our theory wide implications that go far beyond providing foundations for the nascent discipline of Systems Engineering. Our description of a basis for Emergent Design may have far reaching effects on other disciplines because we cannot merely add Systems Engineering into the mix of academic disciplines without affecting the boundaries and conceptualizations of other disciplines. Our new approach is in line with N. Rescher's Cognitive Systematization¹⁴⁰⁶. It states that our individual formal systems have axiomatic bases such as those that were established in the by Euclid Elements. For example, Mathematics has a series of axiomatic platforms as its foundation. But, surprisingly, this foundation is not in Being, but is found in Existence and is interpreted as Emptiness, which causes it to be somewhat out of reach but also very stable. Our work is to traverse the various axiomatic platforms in the same way that Rescher suggests our hermeneutics should traverse and revisit the various axioms that make up any one axiomatic platform. We take the form of the axioms of Geometry as the primary example of what an Axiomatic Platform should be like. Note that the relationships between the four axioms of Absolute Geometry and the 'fifth axiom of parallels' produces a formal model of the difference between the System and the Meta-system and very succinctly defines the third type of Being as discussed by Plato and known to us as Hyper Being, i.e., the type of Being that grounds all possibility, which is essential for the actualization and embodiment of Emergent Design to occur. But, we note that there is a process that occurs in Hyper Being in which there is a Quadralectical cycle of moments where each moment sees the relationship between the semiotic Design Object and the constructed Object of Design differently, although it is crucial that these two viewpoints mesh and work together in order to execute the process of Sign Engineering for the production of the emergent artifact. Yet, doing Sign Engineering is not enough. We must also strive for an *embodiment of the designed artifact* and that calls for a foray into Wild Being that is made possible by adding another moment to the Quadralectic that produces the Pentalectic. It is this move that allows us to transform our approach from one that is purely theoretical to one that comprehends practice. This move opens up an unexpected 'resource for ordering' that comes from the relationship between the third and fourth dimensions as embodied in the relationship of the Icosa-Dodecahedron lattice and the Pentahedral lattice This approach toward the nondual as it is embodied in four-

¹⁴⁰⁶ *Cognitive Systematization*. Oxford (Basil Blackwell), 1979.

dimensional space is key to making the embodiment and actualization of potentials possible.

This brings up the point that we use higher dimensional spaces to comprehend the complex systems that we design in tandem with our ability to decipher and use concepts, essences, perspectives, and designs. But higher dimensional spaces are not flat plenums, rather, they have structure that condition Design. One of those structures is the expansion and then unexpected radical contraction of the openness of hyperspheres beyond the third dimension. Active use of our knowledge of higher dimensional spaces to understand the context for design activities is perhaps one of the more unique and probably controversial aspects of this study. When we are producing complex systems, we are under the assumption that we are designing *higher* dimensional objects that are then captured in *lower* dimensional representations. Design has this fundamental barrier that is created by our *lack* of direct access to higher dimensions. But we assert that we *can* think through higher dimensional structures via the schemas and that we accomplish this through the *mediation of the schemas*. We can use these higher dimensions as a resource to make it possible to conceptualize and then design very complex Systems and Meta-systems and other types of artifacts that correspond to other dimensions that we cannot directly physically access. We design three-dimensional artifacts because all artifacts in our space are three-dimensional. But, these three-dimensional artifacts can be based on concepts, essences, perspectives, and designs that make use of higher dimensions in order to handle the complexity of these objects that we produce within our own space. This admission makes us dependent on spaces that we cannot directly relate to although these higher dimensions open up a realm of possibility for complex artifact design. As soon as we move beyond the static System, we suddenly need four dimensions to represent the emergent artifacts that we want to produce. And, as the System becomes more complex, we continue to need a higher schematic horizon so that we can relate to higher dimensions, which have the space to handle the complexity that we intend to integrate into a 'working whole' based on our Design. We propose that the design of complex emergent artifacts depends upon envisioning and understanding higher dimensional spaces, and this may be controversial, but we consider it a necessary step for dealing with the complexity of the Systems and Meta-systems that we design. Once we admit that there are higher dimensional spaces, then we need a way to access those spaces and that is where Quadralectics comes in as the means of translating the movement between those higher dimensional spaces and lower dimensional representations. And, it is important to understand that n-dimensional spaces are not flat and featureless but have their own properties that affect the nature of design,

because it is those spaces that hold the realm of possibilities that are opened up in Hyper Being. Beyond that, it is necessary to understand that Wild Being provides a conceptually creative space for design potentialities to become actualized. Once we have understood the major thrust of the argument, which transforms the Quadralectic into the Pentalectic, then another vexing question arises, which is how projected artifacts in Being are related to Existence, i.e., How do they come into existence, not just as possibilities whose potentials are actualized, but how do they manifest against the backdrop of universal entropy that mitigates against negative entropic events such as Emergence? Here we begin to see the necessity of describing the duality between Being and Existence and for that purpose we have constructed a model that shows how the Kinds of Being are interleaved with Special Systems that reflect the nature of Existence, which is fundamentally an expression of Interpenetration. This is where we begin to talk about the Emergent Meta-system and how a normal mundane system, together with the Special Systems, form a more complex structure called the Emergent Meta-system that models the nature of existence. We posit that the Quadralectic aligns with the Lifecycle of the Emergent Event and with the Cycle of the Emergent Meta-system, and that it is this alignment that produces the counter balance to the characteristic upsurge of negative entropy that is embodied in the Emergent Event. The Emergent Meta-system is characterized by a relaxation to a lower material optima that balances the higher energy state that produces the emergent order in things. A model of how these three cycles synchronize is presented. This is *not* a causal model, but a model of how spontaneous order can arise given the right conditions, which involves an interplay between Being and Existence. These two ways of looking at Existence coordinate (however briefly) with the Quadralectic to produce the *emergent order* of the *new designed artifact*. Within this theory there is a *compensation* in existence for the upsurges of Emergence in Being. The basis for the ordering comes from the Nomos, which is the emptiness of Existence, while the energy for its negative entropy is counterbalanced by the relaxation of the Emergent Meta-system Cycle. This model reflects what we have learned about the relationship between the System and Meta-system from Mathematics both in Algebra and in Geometry. The two cycles in Existence are complementarities in the Meta-system of Existence that counterbalances the upsurge of new order in the System of Being. Here, the term System and Meta-system are used in a broader sense than merely referring to their schemas because the distinction between Being and Existence is prior to the arising of the Schemas themselves.

Our intention has been to propose a broad theory that not only concerns the foundations of Systems Engineering but of Mathematics and Science as well. Our theory of Emergent

Design is placed in that context. and within that context we suggest that Systems Engineering be redesignated as *Emergent Engineering* based on *Schemas Science*. We hope that our critical attention will give added significance to this new discipline so that it may be more fully appreciated in academia.

Conclusion

The conclusion of this dissertation is fairly simple in spite of its complexity. When Systems Engineering is defined from the point of view of Philosophy, Mathematics, and Advanced Systems Science, it is imperative that we use and develop the plethora of unique ideas that our tradition has to offer. We have used Ontology, Semiotics, Dialectics, Phenomenology, and Hermeneutics to aid us in coming to terms with this new discipline and the dynamics of Emergent Design. We offer a vision of a Nondual Science that is founded on nondual higher dimensional space so that we may understand Existence and the nature of the projections of Being that appear in the Western Tradition. The Western Tradition of Science and Technology has a basis in Philosophical Thought that has not been fully appreciated although we anticipate that this will change because Systems Engineering highlights new problematics that introduce new perspectives when presented in the context of *Emergent Engineering*. *Emergent Engineering* is based on *Emergent Science*, which, in turn, is based on *Schemas Science*, as succeeded by Systems Science, which paved the way for Systems Engineering.

Engineering has missed much of the intellectual scrutiny that Science has undergone over the last half century. The Philosophy of Science is now an established discipline, but the Philosophy of Engineering is yet to be fully developed and appreciated. This is a beginning foray into the Philosophy of Engineering and it is as sophisticated as many of the Philosophies of Science that exist in the literature. Systems Engineering¹⁴⁰⁷ claims dominance as a result of the position it has pragmatically achieved in industry through the hubris of taking responsibility for developing whole emergent systems into working technological complexes that support important endeavors. This has been the case in the Aerospace Industry, if not in other technological industries as well. Yet, from humble beginnings, innovative things often happen. Now that we have endeavored to understand Science and its propensity for producing theories of great sophistication and depth for Nature's design, it is timely that we embark upon understanding Engineering more deeply,

¹⁴⁰⁷ The Philosophy of Engineering takes as its departure the arising of this new Engineering discipline within the family of Engineering disciplines because Systems Engineering claims to be the integrator of all other Engineering disciplines.

because it is Engineering that makes complex and sophisticated Science possible. Witness the complexity and sophistication of the Large Hadron Collider, which was recently powered up but experienced a failure that caused it to undergo repair before restarting. That very large machine is a marvel of Engineering that may lead to the discovery of the Higgs particle *if* we can get the machine to work properly. Its emergent properties give it the ability to produce higher energy collisions that have not been realized as yet. So, Science waits and depends upon Engineering to make its discoveries possible. You will hear the names of the Scientists who discover the Higgs particle if it is found, but the Engineers who designed and built the machine that allowed them to make the discovery – their names are not likely to be acknowledged or remembered! Searching the forgotten parts of culture is worthwhile because that is often where the great discoveries are made. Engineering has yet to be exploited as an object of serious Philosophical inquiry. But it is our belief that the Philosophy of Engineering is just as profound as the Philosophy of Science. We also propose a Philosophy of Practice, such as ‘The practice of the Emergent Design of Systems and Meta-systems’. This work is a beginning contribution to the nascent field of the Philosophy of Systems Engineering, and Engineering in general, which endeavors to specify its foundations and structure in terms of the inner dynamic of its practice. We must remember Engineering is a human practice that connects us to Nature in an essential way. Nature is in peril but if we endeavor to understand this interface between Systems Engineering and Nature, it will help to avert future problems as Engineering attempts to undo the damage that has been done by the creation of Systems that are unaware of their contexts, i.e., the Meta-systems in which they are embedded. Hopefully, we will eventually produce Systems and Meta-systems that are co-designed. It is our goal to understand the impact of creative Emergent Design upon Nature. As we explore Emergent Design in the context of its foundations in Schemas Science, we can expand our role as Engineers to include the role of stewards, who will not only create and build artifacts that support our lives, but will also continue to maintain our planet as a viable habitat for ourselves and other species well into the future.

Glossary

Format:

Word [Chapter Number] – Definition and Link (if available)

Note – Wikipedia is used as a reference in the Dissertation and in this Glossary. In this Glossary all the references are to items accessed between April and August of 2009.

See also Web Dictionary of Cybernetics and Systems for further definitions
<http://pespmc1.vub.ac.be/ASC/INDEXASC.html>

See also Stanford Encyclopedia of Philosophy. <http://plato.stanford.edu/>

abduction, abduct, abductive 3 – The process of positing a hypothesis and then looking for evidence of the hypothesis, the third logical method of argument according to Peirce, which is the basis of science and practical reason. See also deduction and induction as types of Reasoning. Cf. Peirce.
<http://en.wikipedia.org/wiki/Reasoning>

abgrund (without-ground), also translated as ‘abyss’ 7, 12 – Groundless Ground. Ground in Nothing. Reification of the ungroundable nature of Being. Lack of ground that itself serves as a ground. Cf. Heidegger.

absence – Design Field Element (Process2, Neganary)

Absence – Negative Aspect (special term: Quadralectic fourth moment)

Absolute Geometry 6 – First four axioms of geometry that are the same in all possible geometries both Euclidian and Non-Euclidian.
http://en.wikipedia.org/wiki/Absolute_geometry

abstracta – Moments of abstraction, simple ideas, noetic contents that are revisited in representations or repetitions. This term is only defined in order to have an opposite for the pragmata. Since we are concerned primarily with the pragmata this term plays no real role in the dissertation.

Abyss – Negative Fourfold (special term: Quadralectic third moment)

accumulator register 9 – Within CPU where bit manipulations are done. See
[http://en.wikipedia.org/wiki/Accumulator_\(computing\)](http://en.wikipedia.org/wiki/Accumulator_(computing))

aconceptual – Without concept. See Pauli Pylkko [Aconceptual Mind](#).

action – Habitus (special term: Quadralectic second moment)

actuality – meaning (special term: Pentalectic fifth moment)

Aczel's "non-well-foundedness" 6 – Description of sets that are allowed to be members of themselves. http://en.wikipedia.org/wiki/Non-well-founded_set_theory

adamantine modes 13 – (neologism) Modes of Interpenetration and Intra-inclusion referred to by Fa Tsang as the Ten Mysteries. Referred to as Vajra states in Tibetan Buddhism related to the Five Buddhas. This term was taken from the

Greek Gods and the Adamantine Scythe that was used by Cronos to castrate Uranus, it was the mythical hardest mineral that could be used only by the Gods. Cf. <http://en.wikipedia.org/wiki/Adamant>

adjacent possible 8, 10 – Things that can be made actual that are just within the realm of possibility and close to actuality; close to other things already actualized that are related or facilitate its actualization. That which is just over the horizon of actuality in the realm of the possible that has more potential for actualization. Cf. S. Kauffman. http://en.wikipedia.org/wiki/Stuart_Kauffman

Adonai – Name of God, Lord <http://en.wikipedia.org/wiki/Adonai#Adonai>

affinity – Design Field Element (Ultra5, Second) <http://en.wikipedia.org/wiki/Affinity>

afoundationalism, afoundational 8 – Neither with foundation nor against foundations in Being. Associated Terms Foundationalism, Anti-Foundationalism <http://en.wikipedia.org/wiki/Foundationalism>

agent – Real-time system view (special term: Quadralectic third moment)

Agent and Resource Diagrams 9 – Tasking and Semaphore diagrams. See Design and Analysis of Real Time Systems (DARTS) Cf. Gomma. See Spiteri Staines, Anthony “A Comparison of Software Analysis and Design Methods for Real Time Systems”, Proceedings of World Academy of Science, Engineering And Technology Volume 21 May 2007 ISSN 1307-6884 <http://www.waset.org/pwaset/v21/v21-10.pdf>

alayavijana (storehouse consciousness) 13 – Where the seeds of Karma are stored. This theory allows Buddhism to theoretically overcome the contradiction between emptiness and karmic causation. http://en.wikipedia.org/wiki/Store_consciousness Cf. [Awakening of Faith](#). http://en.wikipedia.org/wiki/Awakening_of_Faith_in_the_Mahayana.

aletheia – Truth as the process of uncovering <http://en.wikipedia.org/wiki/Aletheia>

alignment – Lining up of elements that are not physically connected in space. Design Field Element (Pure1, Fifth) <http://en.wikipedia.org/wiki/Alignment>

alterity – Otherness <http://en.wikipedia.org/wiki/Alterity>

alternating group A5 of order 60 16 – Connects Icosa-Dodeca-hedron to Pentahedron by having the same group. <http://for.mat.bham.ac.uk/atlas/html/A5.html> http://en.wikipedia.org/wiki/Quartic_equation http://en.wikipedia.org/wiki/Quintic_equation <http://brauer.maths.qmul.ac.uk/Atlas/v3/alt/A5/>

amanifest – Neither Manifest nor un-Manifest, deepest nondual beyond manifestation that is beyond Emptiness and Void, which are differing interpretations of the nonduality of existence.

Ambience – Meta-system for the moment of the multi-lectic (special term: Pentalectic fifth moment)

amicable numbers 6 – Two numbers whose divisors add up to each other's total. An example is (220,284). <http://djm.cc/amicable.html>

ana and kata 8 – Directions in the fourth dimension. Cf. Rucker, Hinton. http://en.wikipedia.org/wiki/Fourth_dimension

anagogic swerve 1, 16 – A change in perspective to a radically different viewpoint. It is a transformation *away* from a nihilistic situation through the recognition that two nihilistic opposites are really the same thing, and the realization that one is experiencing a radically different state of affairs than that which would have previously been assumed. We use the term in the special sense of realizing a nondual alternative to a contradiction, paradox, or absurdity produced by culture. In other words, it is a change in perspective that takes you from the Nihilistic conflict of duals to a non-dual understanding that is a new emergent perspective. (neologism) See “An Anagogic Logic” by the author.

Analytical Philosophy 1 – The predominate form of philosophy in England and America rooted in the works Frege, Wittgenstein, Moore, Russell, Quine, and Putnam. It emphasizes linguistic analysis, argumentation, realism, and formalism in philosophical presentation. http://en.wikipedia.org/wiki/Analytic_philosophy See

Soames, Scott. *Philosophical Analysis in the Twentieth Century*. (Princeton, N.J.: Princeton University Press, 2003).

anamorphic object, anamorphism 1 – A culturally produced object that embodies a pivot that can set off an anagogic swerve. The anamorphic object embodies a contradiction, paradox, or absurdity in a way that can give a different perspective that resolves a conundrum although the solution to that problematic reveals other deeper problematics. In some ways the anamorphic object is the dual of the synthesis in dialectics. It is not a whole that subsumes contradictory theses, but is instead a pivotal object that shows how to resolve a contradiction, paradox, or absurdity, but then reveals other deeper ones in the process. Key contribution here is from Donald Kunze see <http://www.arch.psu.edu/faculty/kunze.shtml> See also <http://art3idea.psu.edu/boundaries/> and <http://art3idea.psu.edu/art3/index.html> <http://en.wikipedia.org/wiki/Anamorphosis> Kunze maps out the anamorphic object and anamorphism as it appears in various cultural formations. He develops BoLaGrams, which specify the logic of Anamorphism based on reading Lacan through the figure of the Mobius Strip. See Kunze, D. “Vicoism (after Vico)” at <http://art3idea.psu.edu/locus/vico.pdf> *“In ways reinforced through references to mirror images, irony, and metaphor, Vico seems to hold that each cultural institution, act, and object is “anamorphic” in that it embodies these two exchanges of near and far. Anamorphosis is a term typically reserved to describe visual images that are concealed within ordinary images, visible only from a specific viewpoint. For readers of Vico, the idea of anamorphosis can be extended to cover (1) Vico’s account of the composite nature of human creations and (2) Vico’s methods — some of them strikingly optical — for discovering and deciphering their complexity. Because inversion began with perception, where the extended world of nature was seen in terms of bodies with demonic intentionalities, Vichian comprehension can retrace this process in reverse by paying attention to a topological rather than projective (Cartesian) use of dimensions and distances. As Vico points out, for the first humans the heavens were no further away than the tops of nearby mountains; Hades was as close as the bottom of the furrow. Near was construed as far. Distances were constructed as ritual relations. Vico’s theory of history itself was an anamorph — a “parallax view” produced by the “twin eyes” of geography and chronology. Geography stood for the immediate contingent conditions that gave rise to the great variety of human cultures; chronology was the necessary sequence of cultural stages through which all cultures (as well as all individuals, institutions, and even events) had to pass. Each stage was defined in terms of a form of metaphor. In the first, the mythic “age of gods”, humans unknowingly back-projected their robust sensuality onto the screen of external nature, regarding physical appearances as divine signs in need of translation. Mythic mentality was purely metaphorical but unaware of metaphor as such. It saw nature filled with literal messages from gods to humans. The practice of divination, the first form of knowledge, concealed the human authorship of natural signs.”* Kunze gives a definition: *“Anamorphosis” is (conventionally) a visual phenomenon where one image can contain other images hidden inside. To find the concealed image, typically, a special viewpoint is required. We encounter examples frequently but rarely notice them — traffic signs painted on the pavement to be visible from cars but “stretched out” when viewed by a pedestrian. Some cases just involve special points of view (lookouts, scenic look-outs, etc.) but no literal distortion, just a “privileged point of view.”* One of the most famous examples of anamorphosis was employed by Hans Hölbein in the portrait known as *“The Ambassadors”* (1533). The blur diagonally stretching between the feet of the two figures can be seen clearly by looking along the line of the blur, near the surface of the canvas. The blur is really a skull, all the more significant because it completes a geometric design, an isosceles triangle whose vertex intersects the horizon at a 27° angle. The date of the painting (1533) is 3 x 500 + 3 x 11, and the inscription on the back of the canvas gives the specific date of Good Friday. This date was particularly significant because many people of Hölbein’s day thought that this would be the Apocalypse, the end of the world, and the involvement of the number 3 was important, because three (French “tres” = “very”) is a “number of completion.” The crucifix barely visible at the upper left of the canvas confirms this hidden code, making Golgotha, “the Place of the Skull,” universally significant as the end of history. John North’s book (*The*

Ambassadors' Secret, 2004) details this covert design and its possible meanings. For us, it is important to note that anamorphosis works at a "hinge-point" between two kinds of meaning, one based on the transitive order of representational-projective space, another based on topological transformations, such as folds, twists, and ruptures.” <http://art3idea.psu.edu/boundaries/idp/tutorial/index.html>. See “The Anamorphic Cycle” by the author.

Annihilation – Emergent Meta-system operation

Apollonian 1 – Rational, ordered, opposed to Dionysian according to Nietzsche.

<http://en.wikipedia.org/wiki/Apollonian>

arche – Neologism, used to describe the negative meta-dimension level below the Schemas at meta-dimension zero within the worldview that contains sixteen "arche", which is presumed to be the source of the Quadrate of Squares described by Jung in the Aion through the myth of the Marriage of Moses. These sixteen arche are represented by the white or black pieces on the chess board, which, in turn, are related to the major Greek gods.

archetypal pattern 6 – A set of Jungian archetypes that form a pattern.

<http://en.wikipedia.org/wiki/Archetype> For example, the Ennead is an archetypal pattern seen not only in formalisms, but in Epics and mythology.

archetype of self-organization (See knots) 9 – Knots as lines crossed over and under themselves are the archetype of self-organization because they are organized against themselves. <http://en.wikipedia.org/wiki/Self-organization>

Archimedean Solids 3 – These are the semi-regular solids that can exist in three-dimensional space. http://en.wikipedia.org/wiki/Archimedean_solids

arena 2 – The space within the Meta-System within which systems find their niches, operate, and interact with each other. It is also where their resources allow them to remain viable when delivered by the Meta-system. The analogy is applications within an operating system. Systems are like the applications and the Meta-system is like the operating system. See also boundary, horizon, source, and origin, which are the other elements of the Meta-System.

array – Design Field Element (being0, Third) <http://en.wikipedia.org/wiki/Array>

Arrow – Relation¹ = mapping¹ between the elements. Also called a morphism. See Category Theory <http://en.wikipedia.org/wiki/Morphism>

artifact – A general name for an object made by humans.

http://en.wikipedia.org/wiki/Cultural_artifact

artificially intelligent theorem provers 10 –

http://en.wikipedia.org/wiki/Automated_theorem_proving

http://en.wikipedia.org/wiki/Artificial_intelligence

Aspect-oriented Programming 13 – Attempts to deal with issues in design that pure Object Oriented Design would separate but should be considered together, such as error handling and safety. http://en.wikipedia.org/wiki/Aspect-oriented_programming

Aspects, Negative Associated with multi-lectic – See difference, fiction, illusion, absence.

Aspects, Positive Associated with multi-lectic – See Identity, Truth, Reality, Presence.

Associative Property (Algebraic) 13 – Lost mathematical property when we go from Quaternions, to Octonions, which makes the positioning of numbers in relation to each other matter. It is because of the loss of the associative property that Reflexive Special Systems become social, i.e. become such that associations between elements matter, rather than being indifferent so that parentheses are not necessary. This is because the ordering precedence between operations determines the order in which operations are performed. Beyond that, the order in which the numbers or variables are written does not matter in normal algebra, although that order does matter in non-associative algebras. http://en.wikipedia.org/wiki/Non-associative_algebra

atemporal – Outside of time.

attention – Faculty associated with multi-lectic (special term: Quadralectic first moment).

- attenuation** – Design Field Element (Wild4, Zeroth)
<http://en.wikipedia.org/wiki/Attenuation>
- attitude** – Faculty associated with multi-lectic (special term: Quadralectic second moment).
- Aufhebung** – See 'sublation'. Hegelian term for the process of the Dialectic.
<http://en.wikipedia.org/wiki/Aufhebung>
- Author** – Novel (special term: Quadralectic first moment).
- Autogenesis** 13 – Production of the Autopoietic System by self-bootstrapping. See [Reflexive Autopoietic Dissipative Special Systems Theory](#) by the author. See Csányi V, Kampis G. Autogenesis: the evolution of replicative systems. J Theor Biol. 1985 May 21;114(2):303-21.
- automorphism** – Isomorphism of something to itself.
<http://en.wikipedia.org/wiki/Automorphism>
- autopoietic** – Self-producing Cf. Maturana <http://en.wikipedia.org/wiki/Autopoietic>
- Autopoietic Symbiotic Special System** 6, 9, 14 – Related to the Quaternion Algebra. A holonomic system where the whole is exactly equal to the sum of its parts with no delay. A type of Special System that is both self-producing and symbiotic partially described in the theory of Maturana and Varela who see them as structurally closed systems that define viable life in formal terms. It is made up of two Dissipative Ordering Special Systems in a Symbiotic Relation and because of this pairing it is not unitary, but it does remain closed to inspection by an observer. Cf. Maturana and Varela See Maturana, Humberto R., and Francisco J. Varela. [Autopoiesis and Cognition: The Realization of the Living](#). (Boston Studies in the Philosophy of Science, v. 42. Dordrecht, Holland: D. Reidel Pub. Co, 1980). See also Mingers, John. [Self-Producing Systems: Implications and Applications of Autopoiesis](#). Contemporary Systems Thinking. (New York: Plenum Press, 1995). See also Thompson, Evan. [Mind in Life: Biology, Phenomenology, and the Sciences of Mind](#). (Cambridge, Mass: Belknap Press of Harvard University Press, 2007). See also Capra, Fritjof. [The Web of Life: A New Scientific Understanding of Living Systems](#). (New York, N.Y.: Anchor Books, 1997). See [Reflexive Autopoietic Dissipative Special Systems Theory](#) by the author for a unique formulation of this theory based on hyper-complex algebras.
- aVoid** – Neologism. Giving new meaning to avoidance, to be without the void. Since void is a nondual, avoidance means being at the level of the deeper nondual of manifestation.
- axiom** 3 – Axioms are fundamental statements upon which a formal system is based. They cannot be shown to be inconsistent with each other but are also minimally necessary to define the formal system such as in Logic or Mathematics.
<http://en.wikipedia.org/wiki/Axiom> Cf. Rescher [Cognitive Systematization](#).
- Axiomatic Platform** 6, 9 – The set of the axioms of Absolute Geometry that form a stable self-consistent basis for all three types of geometry. The set of axioms as a whole that form a platform for reasoning in a formal system. Because it is made up of separate axioms such as those of Geometry or Set Theory, the platform is fragmented and thus provides a consistent, but not unitary foundation for reasoning, which is the basis of a formal system derived from the set of axioms. (neologism).
- background** (of the system) 2 – In gestalts Forms have backgrounds where they remain in tension. This tension occurs between *what is perceived* and the *backdrop* of what is perceived. Similarly Systems have deeper background upon which they are seen. We call these Meta-Systems.
http://en.wikipedia.org/wiki/Gestalt_psychology
- Badiou, A.** – Wrote [Being and Event](#) a critique that forms the basis of the concept of Foundational Mathematical Categories developed in this research project. [Being and Event](#) uses the Set as the basis for ontology. To this is added the Multiple and the Event in order to produce a complete ontology.
http://en.wikipedia.org/wiki/Alain_Badiou
- Bataille, G.** – Wrote [The Accursed Share](#), which gives us the basic theory of the structure

- of the Meta-system. http://en.wikipedia.org/wiki/Georges_Bataille
- Baudrillard, J.** – Wrote Critique of the Economy of the Sign and The Mirror of Production, which influenced this work among other works. http://en.wikipedia.org/wiki/Jean_Baudrillard
- Bayesian Probabilities 8** – Subjective probabilities that change diachronically across time. The problem is to establish the initial probabilities. http://en.wikipedia.org/wiki/Bayesian_probability
- Becoming 6** – Dynamic Heraclitian Being. Also called Process Being. Related to Heidegger's Ready-to-hand in Being and Time. Cf. Plato Timaeus, which differentiates Static Being from the flux of becoming. <http://en.wikipedia.org/wiki/Heraclitus> <http://plato.stanford.edu/entries/spacetime-bebecome/>
- Behavior** – System for the moment of the multi-lectic (special term: Quadralectic second moment).
- Behavioral Target** – (special term: Quadralectic second moment).
- ~~**Being**~~ (crossed out) **7** – Cf. Heidegger's letter to Junger. Hyper Being Cf. Merleau-Ponty. Differance Cf. Derrida. Plato's Third kind of Being in the Timaeus. Cf. Sallis.
- Being** (Sein) **6** – Normal Projective Standings of Being of all Meta-levels made possible by Ontological Difference, i.e. the difference between Being and beings. Being withdraws in forgetfulness according to Heidegger in Being and Time. Standings of Being are Pure, Process, Hyper, Wild, and Ultra. Being is the opposite of Existence. It is the subject of Ontology. <http://ontology.buffalo.edu/> <http://plato.stanford.edu/entries/logic-ontology/> <http://en.wikipedia.org/wiki/Ontology>
- Being as Intelligibility 8** – Meaning of Being is the issue for Heidegger. See Being and Time. http://en.wikipedia.org/wiki/Being_and_Time
- being-in the-schema** – A generalization of being-in-the-world that can apply to any schema, not just the World schema.
- Being-in-the-system** – A focus on the System as Horizon, which is between Form and the World Horizon.
- being-in-the-world 2, 4** – Other name for Da-Sein. The pre-subject is completely immersed in the Horizon of the World. Dasein as embedded in the furthest horizon of experience, i.e., the World, which is a schema. <http://royby.com/philosophy/pages/dasein.html>
- Beyng** (Seyn) **6** – Dual of Being that does not differentiate Being from beings. Beyng is lost in oblivion. Cf. Heidegger Contributions to Philosophy and Mindfulness.
- Bija** (seed, traces) **13** – Seeds laid down in the Storehouse consciousness (alayavijana). From Buddhism, especially Hua Yen Buddhism. Cf. Awakening of Faith.
- blackhole 2** – Colloquialism for a Positive Feedback in a negative direction that destroys any system that gets sucked into it. A mythic example is Charybdis. http://en.wikipedia.org/wiki/Black_hole <http://en.wikipedia.org/wiki/Charybdis> http://en.wikipedia.org/wiki/Positive_feedback
- blindspot** – <http://en.wikipedia.org/wiki/Blindspots>
- body-without-organs 11** – Body as a virtualized whole without parts. Cf. Deleuze. http://en.wikipedia.org/wiki/Body_without_organs
- Bohm, D.** – Wrote Wholeness and the Implicate Order, which influenced this project. Bohm posited the difference between explicit and implicate order, which is taken to be one of the differences between the System and the Meta-System. http://en.wikipedia.org/wiki/David_Bohm
- boundable** – Able to be bounded.
- boundary 2** – Definitive edge of a Form, System, Meta-system, Domain, etc. [http://en.wikipedia.org/wiki/Boundary_\(topology\)](http://en.wikipedia.org/wiki/Boundary_(topology))
- Boundary Logic 11** – See also Laws of Form. <http://www.boundarymath.org/> Cf. Bricken. <http://www.wbricken.com/>

- Bourdieu, P.** – Wrote Logic of Practice, which influenced this work because of its analysis of the difference between theoretical and practical reason.
http://en.wikipedia.org/wiki/Pierre_Bourdieu
- bracketing 2** – A methodological move in Phenomenology to eliminate all interpretations that do not bear directly on phenomenal experience by exclusion. But this produces solipsism and isolation of the subject and thus become a major problem for Phenomenology. Cf. Husserl.
[http://en.wikipedia.org/wiki/Bracketing_\(phenomenology\)](http://en.wikipedia.org/wiki/Bracketing_(phenomenology))
- breather** – Combination of two solitons that together form a stable dynamic structure in which the two solitons fall into each other, each serving as the trough for the other. Related to the Autopoietic Special System.
<http://virtualmathmuseum.org/Surface/breather/breather.html>
- Breathers 14** – A positive and negative soliton of equal size creating a stationary formation in which the solitons fall into each other.
<http://en.wikipedia.org/wiki/Breather>
- Bystander** – Viewpoint on the Novel (special term: Pentalectic fifth moment).
- Calculus** – Mathematical technique invented by Newton and Leibniz that uses infinity to calculate areas and tangents to lines. <http://en.wikipedia.org/wiki/Calculus>
- Candidates** – Emergent Meta-system moment (special term: Quadralectic fourth moment).
- Cantor, G.** – His analysis of infinity is a major contribution to our understanding of Set Theory and Mathematics. He distinguishes between different levels of Mathematics especially between the infinity of natural and real numbers. He thought it would be possible to have cardinals of infinities but this does not seem to be the case. http://en.wikipedia.org/wiki/Georg_Cantor
- Cardinal numbers 3** – Differentiated from Ordinal Numbers. Cardinal Numbers are the names of the separate numbers without specifying their order. Ordinal Numbers specify the order of the numerals as the basis for distinguishing Number. Cardinality breaks down in transfinite numbers.
http://en.wikipedia.org/wiki/Cardinal_numbers
- Cartesian product** – Orthogonal combination of elements.
http://en.wikipedia.org/wiki/Cartesian_product
- Catastrophe Theory 13** – Theory that explains discontinuities in behavior in three-dimensional space by their relation to topologies in higher dimensional spaces. Those topologies are related to the Lie Algebras. Topological surfaces are folded and sometimes folded through each other. This produces discontinuities and singularities when objects follow those surfaces in higher space producing discontinuous behavior in lower dimensional space. Cf. Rene Thom
http://en.wikipedia.org/wiki/Catastrophe_theory
- category** – Design Field Element (Process2, Second) See Category Theory.
- Category Theory** – Way of describing mathematical objects based on mappings represented by arrows where elements are abstracted away, and where any operation is allowed that obeys the associative property.
[http://en.wikipedia.org/wiki/Category_\(mathematics\)](http://en.wikipedia.org/wiki/Category_(mathematics)). Category theory is the theory of the underlying structure of all possible mathematical categories.
http://en.wikipedia.org/wiki/Category_theory
- causation** Associated with multi-lectic – See formal, efficient, final, material.
- Certeau, M. de** – Wrote The Practice of Everyday Life, which influenced this study by giving an alternative to the view of Bourdieu.
http://en.wikipedia.org/wiki/Michel_de_Certeau
- Chaos** – Negative Fourfold (special term: Quadralectic first moment).
- Chaotic Systems 10** – Systems that have gone into a chaotic regime through a symmetry breaking series. Cf. Gleick Chaos http://en.wikipedia.org/wiki/Chaos_theory
- Character** – Viewpoint on the Novel (special term: Quadralectic second moment) .
- Chi (Qi) 16** – Subtle Energy in Ancient Chinese Medicine and Cosmology.
<http://en.wikipedia.org/wiki/Ch%27i>

- Chiasm, chiasmally** 6 and 16 – The difference between touch-touching itself.
Complementary chiasmic pairs, anti non-anti a and anti non a
<http://en.wikipedia.org/wiki/Chiasmus>
- Chomsky, N.** – Invented both Transformational Grammar and the ability to write computer programs in the syntax of programming languages.
http://en.wikipedia.org/wiki/Noam_Chomsky
- chora** 3 – Means place, or space in Plato's Timaeus. Often paired with the Receptacle (hupodoche). It is the place where the Forms are embodied appearing as geometrical elemental units, which are triangles of different kinds.
<http://en.wikipedia.org/wiki/Chora> See also Bianchi, Emanuela "Receptacle/chora: figuring the errant feminine in Plato's Timaeus." Hypatia Volume 21, Number 4, Fall 2006 pp. 124-146.
- Chreode** 10 – Worn pathways that are most likely to be followed by phenomena unfolding. Cf. Waddington. <http://en.wikipedia.org/wiki/Chreode> See Gilbert, Scott F. "Diachronic Biology Meets Evo-Devo: C. H. Waddington's Approach to Evolutionary Developmental Biology" The Society for Integrative and Comparative Biology. American Zoologist 2000 40(5):729-737; doi:10.1093/icb/40.5.729
- chronos** – Time. Related to Kairos, which is the time of the moment Also related to Cronus, the Greek god and Titan, son of Uranus and father of Zeus..
<http://en.wikipedia.org/wiki/Chronos> <http://en.wikipedia.org/wiki/Kairos>
<http://en.wikipedia.org/wiki/Cronus>
- Circumstance** – Meta-system for the moment of the multi-lectic (special term: Quadralectic first moment).
- circumstance** (as related to background interpretation) 7 – The contextual background interpretation for a sign's foreground interpretation as it is represented in the mind.
- circumstance** 7 – context of work, part of the process: circumstance – >means – >purpose. Cf. Hegel.
- Clearing in Being** 3 – The spacetime in which Dasein apprehends itself and other beings.
- Cleavage** 12 – Difference between Being and Beyng. The Abgrund/Abyss. Cf. Heidegger. In Contributions p. 172 section 127 Heidegger talks about the Cleavage between Being and Beyng.
- Co-Algebra** -- Dual of Universal Algebra. Related to the Object of Design, which Peirce calls the Immediate Object. <http://en.wikipedia.org/wiki/Co-algebra>
- Cobordism** – Mathematical relationship of shared borders at a higher level that encompasses Domain. <http://en.wikipedia.org/wiki/Cobordism>
- Cognitive dissonance** 2 – When different materials in cognition are incongruent.
http://en.wikipedia.org/wiki/Cognitive_dissonance
- Co-homology** 13 – "...cohomology is defined as the abstract study of cochains, cocycles, and coboundaries." <http://en.wikipedia.org/wiki/Cohomology> Cf. Baez compares Co-homology to N-Category theory. "Lectures on n-Categories and Cohomology" by John C Baez, Michael Shulman (16 Aug 2006)
<http://arxiv.org/abs/math/0608420>. See also
<http://groups.csail.mit.edu/mac/users/dae/notes/cohomology>
- Collective Unconscious** (Jung) 1 – Concept that the unconscious is not merely personal and individual but also social and intersubjective. Historically popularized by Jung contra Freud. cf. Jung http://en.wikipedia.org/wiki/Collective_unconscious
<http://en.wikipedia.org/wiki/Archetype>
- common language** 2 – Various social groups share language.
<http://en.wikipedia.org/wiki/Language>
http://en.wikipedia.org/wiki/Linguistic_relativity
- Common Notions** 6, 13 –Euclid's Elements give a definition of Equality, such as the definition of the Holoïdal. http://en.wikipedia.org/wiki/Euclidean_geometry The Elements also include the following five "common notions": *Things that equal the same thing also equal one another. If equals are added to equals, then the wholes are equal. If equals are subtracted from equals, then the remainders are equal.*

Things that coincide with one another equal one another. The whole is greater than the part.

- commutative property 13** – Lost mathematical property when we go from Complex to Quaternion Algebras that do not allow operations to be reversed simply.
<http://en.wikipedia.org/wiki/Commutativity>
- complementarity 2** – When opposites entail each other rather than exclude each other as do dualities. Complementarity may also mean that only one of two representations can be viewed at one time as in Quantum Physics.
[http://en.wikipedia.org/wiki/Complementarity_\(physics\)](http://en.wikipedia.org/wiki/Complementarity_(physics)) See also Arkady Plotnitsky [Complementarities](#).
- complementary, chiasmic pairs 6** – Complementarities are mutually implicative rather than exclusive (like dualities). Chiasmic pairs involve inversion and interchange.
<http://rhetoric.byu.edu/Figures/C/Chiasmus.htm>
- Complex Plane 8** – $ax+bi$ number plane composed of complex numbers and their conjugates. http://en.wikipedia.org/wiki/Complex_plane
http://en.wikipedia.org/wiki/Complex_conjugate
- Complex Systems Theory 1** – The part of Systems Science that studies complex phenomena in order to understand whether they have properties in aggregate that we can understand even if we cannot analytically follow every element within the complex system. It is a theory concerning how things that are very complex operate in general even if we do not know how each element within that complex system behaves at any given time. Example: All the Galaxies in the Universe are a complex system connected by Gravity. All the Stars in the Milky way with its blackhole at the center and its Dark Matter that allows it to continue to be a spiral is a complex system. All the species interacting on Planet Earth is a complex system. Global Economics is a complex system. Even things like the Human Body made of billions of cells can be seen as a complex system. Complex Systems Theory attempts to tell us what we can say in general about different types of complex phenomena at different scales.
http://en.wikipedia.org/wiki/Complex_systems See also
http://en.wikipedia.org/wiki/Highly_optimized_tolerance_and
http://en.wikipedia.org/wiki/Self-organized_criticality
- Complexion (complex numbers) 13** – Numbers generated by square root of negative one of the form $x+i$ that produces the complex plane with separate complex conjugates for each number unlike real numbers, which are their own conjugates.
http://en.wikipedia.org/wiki/Complex_numbers
- component** – Design Field Element (part) (being0, Fourth)
<http://en.wikipedia.org/wiki/Component>
- Concept** – Hyper Being (trace) (special term: Quadralectic first moment).
- Concept of Operations (ConOps)** – A specification document. Says how a system should generally work prior to architectural design.
- Conglomerate** – Special term. The nondual between extremes of Set (difference) and Mass (identity).
- conjoined** – Ordered pair http://en.wikipedia.org/wiki/Ordered_pair
- constellation** – Design Field Element (juxtaposition) (Process2, Sixth).
- Constructionism** – Sometimes called Social Constructivism. Approach that says that significant aspects of the world we live in are constructed by humans, even aspects that appear natural or physical. In extreme this view is nihilistic as opponents point out. The view here is that *much* of our notion of world and reality are constructed *but not all*. See Introjected Hyle.
http://carbon.ucdenver.edu/~mryder/itc_data/constructivism.html
http://en.wikipedia.org/wiki/Social_constructionism
- Content** – System for the moment of the multi-lectic (special term: Quadralectic fourth moment).
- content 7** – Elements within focus, normally qualia of the hyle contained by Form.
- Context** – Meta-system for the moment of the multi-lectic (special term: Quadralectic

- fourth moment).
- context 7** – Background to elements in focus, normally out of focus.
- Continental Philosophy 1** – The study of philosophy that includes philosophers born on the European Continent after Frege. It especially concentrates on the interpretations made by twentieth century French Intellectuals of Earlier German, French, and Greek Philosophy. It is concerned with broad themes such as literature, the unconscious, radical politics, and other subjects that go beyond philosophy proper. http://en.wikipedia.org/wiki/Continental_philosophy Opposite of Analytical Philosophy.
- continua 3** – Thirds are continuities that connect relationships to each other according to Peirce.
- continuity** – Design Field Element (Pure1, Third).
- Continuum hypothesis** – Real numbers for a continuum. Cf. Cantor. http://en.wikipedia.org/wiki/Continuum_hypothesis
- Convex regular 4-polytope** – Generalization of a platonic solid in four dimensions. See 8 cell, 16, cell, 24 cell, 120 cell, and 600 cell polytopes. http://en.wikipedia.org/wiki/Convex_regular_4-polytope
- Copenhagen convention 4** – Official demarcation between the macro and micro worlds that allows both interpretations to exist separately but independently. Physics is Newtonian and in a refinement Relativistic on the Macro-scale and is Quantum Mechanical on the microscale. This interpretation is a convention for the Standard Model in Physics. The other alternative to which we subscribe is the many worlds theory of Hugh Everett http://en.wikipedia.org/wiki/Copenhagen_interpretation See also http://en.wikipedia.org/wiki/Many_worlds_theory http://en.wikipedia.org/wiki/Hugh_Everett See also David Deutsch [Fabric of Reality](http://en.wikipedia.org/wiki/David_Deutsch). http://en.wikipedia.org/wiki/David_Deutsch
- correlate** – Design Field Element (Pure1, Sixth).
- Covering** – Negative Fourfold (special term: Quadralectic second moment).
- Cratylus** – Dialogue by Plato in which the extremes of naturalness and conventionality of words is discussed. Partial commentary on this dialogue appears on Author's research page.
- Creation** – Emergent Meta-system operation.
- creativity 10** – The production of innovations by human beings. Design is a creative act. Creative acts occasionally set off cascades of Emergent events. Sometimes Emergent Events occur as the result of external circumstances rather than as creative acts by humans. Emergence is an objective way to think about the results of creativity without having to psychologize. Cf. Koestler [The Act of Creation](#) (classic text).
- Cronos** – Greek god, also called Cronus. Father of Zeus and son of Uranus. See also kairos and chronos.
- crossing 8** – “*Crossing* means motion, and motion is a contradiction” Here the term crossing means crossing space through motion. http://en.wikipedia.org/wiki/Zeno_of_Elea [http://en.wikipedia.org/wiki/Motion_\(physics\)](http://en.wikipedia.org/wiki/Motion_(physics)) http://en.wikipedia.org/wiki/Graham_Priest Graham Priest studies Para-consistent Logics that can accommodate contradictions induced by motion.
- Cube** – Regular three-dimensional box shape. A Platonic solid. <http://en.wikipedia.org/wiki/Cube>
- cubo-octa-hedron** – Lattice that combines the cube and octahedron, which are duals.
- cycle of axiomatic interpretation 6** – Concept that axioms are only known by continually revisiting them in relation to the other axioms. Like the Hermeneutic circle applied to foundations of Mathematics. Cf. N. Rescher [Cognitive Systemization](#). <http://en.wikipedia.org/wiki/Rescher>
- Dasein 2** – Being-There, pre-subjectivity prior to the differentiation of subject/object, Cf. Heidegger. [Being and Time](#). <http://en.wikipedia.org/wiki/Dasein>

data – Real-time system view (special term: Quadralectic fourth moment).

Dataflows (objects) 9 – Shows movement of data through functions within Software. Dual of Objects in Object Oriented Software. http://en.wikipedia.org/wiki/Data_flow Represented by Dataflow diagrams. Rendered Taboo and excluded from UML and reintroduced as Functional Flow Diagrams in SysML.

decentered – Thrown off center, swerve.

Deconstruction 6 – Heidegger's avowed method adopted by Derrida and turned into a cult at the beginnings of Postmodernism. <http://en.wikipedia.org/wiki/Deconstructionism> <http://en.wikipedia.org/wiki/Postmodernism> http://en.wikipedia.org/wiki/List_of_thinkers_influenced_by_deconstruction See Norris, Christopher, and Terence Hawkes. Deconstruction: Theory and Practice. (London: Routledge, 2002).

Deduction 3 – Reasoning from abstractions down to concrete cases.

defects – Design Field Element (Wild4, Neganary).

de-jection Associated with multi-lectic – See opacity, obscuration, unclearing, See also sense, goal, vanishing point, pragmata, practice, performance.

Deleuze, Gilles – Wrote Difference and Repetition, Logic of Sense, and Anti-Oedipus, which are fundamental texts for this study.

Delta Logic 16 – Logic of Paradox. Cf. N. Hellerstein Delta Logic A simplification of Diamond Logic.

Demiurge 6 – Creator in Plato's Timaeus. [http://en.wikipedia.org/wiki/Timaeus_\(dialogue\)](http://en.wikipedia.org/wiki/Timaeus_(dialogue)) <http://en.wikipedia.org/wiki/Demiurge>

Derivative – See Calculus. See also Ian Thompson who wrote Philosophy of Nature and Quantum Reality, 1993 at <http://www.ianthompson.org/> for use of term based on Swedenborg See also <http://en.wikipedia.org/wiki/Derivative>

Design – Hyper Being (trace) (special term: Quadralectic fourth moment).

DeSign Engineering 9 – Engineering Design that emphasizes sign use Signs at the Third Meta-level of Hyper Being, which is an interconnected combinatoric field. Based on Sign Engineering, which is a term coined by Pieter Wisse. Design Engineering uses the Quadralectic as its means for producing Sign Representations of the Design and turning them into workable implementations.

Design Field 11 – The relationship of Philosophical Categories to Meta-levels of Being that defines the field of all possible elements of any Design. See Chapter 13.

Design Object (semiotic) 13 – The object produced by the Design Process, which is a semiotic representation and repetition normally based on the sub-schemas, i.e. pictures, plans, and models. As distinct from the Object of Design, which is the implemented artifact with emergent properties. Related to the "Immediate Object" defined by Peirce and Universal Algebra.

Design Self-knowledge of (its own design by a Designed Object) 13 – An object has knowledge of its own Design as a Designed Object, which is an Immediately Dynamical Object that combines both of the senses that Peirce distinguishes resulting in both a Design Object and an Object of Design simultaneously.

design verification – Checks the Object of Design back against the Design Object blueprint or requirements. Differences are designated to be “as built”. http://en.wikipedia.org/wiki/Verification_and_Validation See also Validation which is its opposite. Validation is checking the Object of Design against the environment or context of use.

Designed Object 13 – An Object of Design that has incorporated into it the semiotic Design Object thus giving knowledge of its own structure to the artifact. According to Peirce, both Immediate Object and Dynamic Object at the same time. An object that knows its own design as one of its Self-* properties: It has self-knowledge of its own ontology and viable implemented design. In Kantian terms this is both semiotic representing appearances and implementing represented *dis*-appearing (i.e. noumenal) simultaneously in the same object.

desiring machines 8 – A way to describe the pre-subject/pre-object based on Object Relations Theory seen in Anti-Oedipus by Deleuze and Guattari. Should add avoiding, disseminating, and absorbing machines as well. Instead of machines we should talk about Practices as Foucault does.
http://en.wikipedia.org/wiki/Desiring_machine

diachronic 2 – Changing with time, overall structure changes through time. See also synchronic. http://en.wikipedia.org/wiki/Historical_linguistics

Dialectics 1 – Dialectics is the study of how opposing and conflicting elements can be seen as a whole on a higher level of synthesis that encompasses the competing elements. Taken from the concept of formal dialogic argument in Greek Philosophy. Related to Pyrrhonism, which was a classical form of Skepticism represented by Sextus Empiricus. <http://en.wikipedia.org/wiki/Pyrrhonism>. Related to the Para-consistent logics described by Priest. <http://en.wikipedia.org/wiki/Paraconsistent>. Later, by Hegel and others as a way that opposing elements become reconciled as part of higher synthetic wholes through the process of their interaction. cf. Hegel <http://en.wikipedia.org/wiki/Dialectics> <http://en.wikipedia.org/wiki/Hegel> See Rescher, Nicholas. Dialectics: A Classical Approach to Inquiry. (Frankfurt: Ontos Verlag, 2007).

Diamond Logic 16 – Logic of Paradox. Cf. N. Hellerstein Diamond Logic.

dianoia – Discursive reasoning faculty <http://dictionary.reference.com/browse/dianoias>

differance 6, 7 – Differing and deferring, Derrida's name for ~~Being~~ (crossed out) from Heidegger. Hyper Being. Plato's Third kind of Being in the Timaeus. See Wood, David, and Robert Bernasconi. Derrida and Différance. (Evanston, IL: Northwestern University Press, 1988). Cf. Derrida, Heidegger, Merleau-Ponty. <http://en.wikipedia.org/wiki/Difference>

Difference – Negative Aspects (special term: Quadralectic first moment).

differing and deferring (of Difference) 9 – Expression of Differance in space and time. Cf. Derrida, Jacques. Margins of Philosophy. (Chicago: University of Chicago Press, 1982) p. 17.

Dimension – Orthogonal Conceptual or Spatial Region from any given Point, Line, Surface, Solid, Hunk (4 dimensional), etc. <http://en.wikipedia.org/wiki/Dimension>

Dionysian 1 – Related to the god Dionysus, which to Nietzsche meant immersion and fusion in oneness rather than differentiated by rationality and order, as opposed to Apollonian. <http://en.wikipedia.org/wiki/Dionysian>

di-remption – Tearing apart. Used in translating Hegel.

disconnects – Design Field Element (Pure1, Seventh).

discontinuities, discontinua 2 – Places in time or space where things change all of a sudden, without warning, and perhaps without rhyme or reason until we understand why that change exists.
http://en.wikipedia.org/wiki/Classification_of_discontinuities

discoveredness – Author's translation of Befindlichkeit from Heidegger's Being and Time.

disposition – Wild Being (flesh) (special term: Quadralectic second moment)

Dissipative Ordering Special System 4, 6, 14 – A nexus of negative entropy in a far from equilibrium environment, which has an expanding boundary of ordering into a new regime of the background that the dissipative ordering mechanism feeds off of. Related to Complex Numbers and the loss of the conjugations of Real numbers. Described by Prigogine as neg-entropic.
<http://en.wikipedia.org/wiki/Prigogine> <http://en.wikipedia.org/wiki/Negentropy>

Divided Line (Plato) 1 – Composed of Doxa which is either grounded and ungrounded opinion (appearance) and ratio, which is either representable (such as Mathematical objects) or non-representable such as the Forms.
http://en.wikipedia.org/wiki/Divided_line

Dodecahedron <http://en.wikipedia.org/wiki/Dodecahedron>.

dogma 5 – Dogmatic philosophies make claims about transcendentals that cannot be

shown to be true, and thus diverge prior to the advent of critical, i.e. self-critical philosophy that rejects dogma of any kind.

Domain 1 – A primary schema that is beyond the Meta-system, which is related to multiple perspectives and movement around the landscape such that a person can take another person's place and see things from their perspective, both literally and figuratively. Above a Meta-system and below a World in General Schemas Theory S-prime.

Domain Analysis 4 – Names for Software Reuse approaches. Also called Product Line Engineering. http://en.wikipedia.org/wiki/Domain_analysis

Doxa 1 – Opinion, or appearance, one side of Plato's Divided Line.

dreambody – Body as perceived in dream.

dreamspace – Also called dreamtime, realm of dream, but also the realm of human origin, mythic time.

duality 2 – When opposites are defined as reified incommensurables that form non-reducible but also radically dichotomous categories like mind and body, ego and extension. See Descartes.

dukkha – Dissatisfaction, suffering. Buddhist critique of reality. See also Schopenhauer who takes on this pessimism about human existence.

dunya – Illusion of the world. Called *the floating world* in Japan. Arabic term for the illusory nature of the world.

dynamic object 13 – Defined by Peirce as the reference of semiotic representations in external reality. In this dissertation it is called the Object of Design with the implementation of the Design. Related to Co-Algebras. Implemented as represented *dis*-appearing and thus quasi-noumenal in Kant's terms. See also Introjected Hyle.

efficient cause – causation (special term: Quadralectic second moment).

eidetic intuition 1 – Husserl's idea that we immediately intuit essences of things and that this is different from our construction of abstractions about them. Phenomenology is based on the idea that we can, in our imaginations, transform and manipulate essences to discover their limits, and thus learn about the nature of essences beyond our abstractions that are projected on phenomena.

eikasia – For Plato it is way of dealing with appearances
<http://en.wikipedia.org/wiki/Eikasia>

ejects 4 – Pre-objects that Dasein tries to hang onto to slow its fall into oblivion. (neologism, not part of Heidegger's philosophy).

ektaⁿ-stuff 13 – What is beyond structure and stuff in the First Category according to Baez. See "Lectures on n-Categories and Cohomology" by John C Baez, Michael Shulman (16 Aug 2006). <http://arxiv.org/abs/math/0608420>

element – Design Field Element (being⁰, Second).

Element – Relation⁰ = node, Lowest level categorical item, normally associated with a Set. See Category Theory.

eleven cell polytope – Anomalous non-regular polytope in four-dimensional space. 11-cell
<http://en.wikipedia.org/wiki/11-cell>

Elliptical Geometry 6 – Type of Non-Euclidian geometry, for example, convex mirrors.
http://en.wikipedia.org/wiki/Elliptical_geometry

Elohim – Name of God <http://en.wikipedia.org/wiki/Elohim>

embeddedness – Encompassed by something else and fit within what surrounds it.
http://en.wikipedia.org/wiki/Inclusion_map

Emergent Engineering 1 – Emergent Engineering is the practice of creating Emergent Systems. Normally we are thinking about Technological Systems with emergent properties but this could be extended to other types of systems that are artificial or social in nature that are "engineered" with the aim of bringing emergent properties into Being in the engineered system. (neologism)

Emergent Event. 8 – The production of new worlds as a context for new things whose

arising completely changes the entire context within which it arises. Cf. G.H. Mead Philosophy of the Future.

Emergent Eventivity 9 – A spacetime node or entity at the core of or produced from an Emergent Event. See eventivity.

Emergent Meta-system moments –Associated with the multi-lectic – See Seed, Monad, View, Candidates.

Emergent Meta-system operations –Associated with the multi-lectic – See Annihilation, Creation, Mutual Action, Schematization.

Emergent Science 1 – Emergent Science is the study of the phenomena of Emergence in all its forms. It answers the question as to how Emergence is possible, and why phenomena are not merely supervenient, i.e. merely built up with properties that can be predicted by the combination of the parts considered in isolation. Emergent. Cf. Holland, John H. Emergence: From Chaos to Order. (Reading, Mass: Addison-Wesley, 1998).

Emergent Systems – Emergent Systems are Systems with unexpected or new properties that are not predicted based on the knowledge of their parts. We consider that Systems are normally inherently emergent and that their dual is de-emergent meta-systems. De-emergent Meta-systems are systems that are taken apart and scattered out in the environment. The essential qualities of Emergent Systems cannot be predicted based on understanding their components. Emergence is summarized by the saying that a whole is greater than the sum of its parts. There is some surplus in a system that is emergent over what is merely supervenient supplied by the parts that make up the system. Cf. Johnson, Steven. Emergence: The Connected Lives of Ants, Brains, Cities, and Software. (New York: Scribner, 2001). See also Holland, John H. Hidden Order: How Adaptation Builds Complexity. (Reading, Mass: Addison-Wesley, 1995).

Emptiness 3 – The nature of consciousness where there are no thoughts or feelings although consciousness is the foundation of all thoughts and feelings. Emptiness is a surrounded nondual substrate at the heart of physical things known by consciousness and is considered nondual by the Buddhists.
<http://en.wikipedia.org/wiki/Emptiness>

enantiomorphic – right left symmetry, handedness. See Chirality
<http://en.wikipedia.org/wiki/Enantiomorphic>

Enframing, Ge-Stell 5 – Set of nihilistic opposites that are structurally irreconcilable and that define experience. Used by Heidegger to define technology.
<http://en.wikipedia.org/wiki/Gestell>

enigma 14 – A form of subjectivity related to Generalized Dasein in Wild Being.

Ennead 6 – Ninefold. Coined by Pieter Wisse to describe his foundation for Sign Engineering. Related to the Axiomatic Platform.

enowning – See Ereignis
[http://en.wikipedia.org/wiki/Contributions_to_Philosophy_\(From_Enowning\)](http://en.wikipedia.org/wiki/Contributions_to_Philosophy_(From_Enowning)) See Ereignis in http://en.wikipedia.org/wiki/Heideggerian_terminology

ensemble – Design Field Element (Wild4, Fourth).

ensign 7 – Process Sign. Sign-making. Second meta-level of the Sign in Process Being.

epigenetic landscape – Landscape of possible lines of genetic development with channels of least resistance. http://en.wikipedia.org/wiki/Epigenetic_landscape
<http://en.wikipedia.org/wiki/Epigenetics> See Sheldrake, Rupert. A New Life of Science. (Thriplow: Icon, 2009) p. 50. See
http://members.tripod.com/~Glove_r/Sheldrake.html

episteme – Used by Foucault in The Order of Things to talk about fundamental categories at different eras in the development of the Western tradition.
<http://en.wikipedia.org/wiki/Episteme>

equiprimordial, equiprimordiality – In Being and Time Heidegger calls the various modalities of being-in-the-world equiprimordial as are space and time. See Arisaka, Yoko. "Spatiality, Temporality, and the Problem of Foundation in Being and Time" *Philosophy Today* 40:1. Spring 1996. pp. 36-46.

<http://www.arisaka.org/heidegger.html>

- erasure** – Design Field Element (Hyper3, Neganary) Cf. Derrida, ~~Being~~, (crossed out).
- Ereignis** – Ownmost, happening, “opening the open for dis-closing”, and “clearing the clearing for showing”. It means “appropriating what appears”, and “owning what is there within the clearing of the clearing”, as well as an “occurrence within time-space”. Ereignis is not completely translatable, but in the first translation of Heidegger’s difficult book it has been referred to as “enowning”. See enowning [http://en.wikipedia.org/wiki/Contributions_to_Philosophy_\(From_Enowning\)](http://en.wikipedia.org/wiki/Contributions_to_Philosophy_(From_Enowning)) See Ereignis in http://en.wikipedia.org/wiki/Heideggerian_terminology
- Eros** – Negative Fourfold (special term: Pentalectic fifth moment).
- Essence** – Hyper Being (trace) (special term: Quadralectic second moment).
- essence perception vs. ideation** 1 – Essence perception is another term for eidetic intuition. It means the ability to immediately grasp the essence of phenomena regardless of our abstractions of it. The illusory continuities we project upon experience produce ideas. Ideas are the result of ideation, which is an abstraction cognition that is different from the apprehension of the differences between the kinds of things. Essence perception distinguishes significant differences that identify species (the what) while Abstraction is a form of ideation that looks at typifications and sees similarities in phenomena that normally suppress differences.
- Ethnomethodology** –Harold Garfinkle’s approach to Sociology, which emphasizes looking at underlying, assumed, and hidden social structures in concrete situations. <http://en.wikipedia.org/wiki/Ethnomethodology>
- Euclid’s Elements** 8 – Text book on Geometry and Algebra based on magnitudes. http://en.wikipedia.org/wiki/Euclid%27s_Elements
- Euclidean Geometry** 3, 6 – The Geometry defined by Euclid in his Elements and Data, which was the first formal system and the basis of the structuring of all subsequent formal systems. http://en.wikipedia.org/wiki/Euclidean_geometry
- Euler characteristic** 13 – The number 'two' in three dimensions for Platonic solids. Also, the number 'zero' in four dimensions for Platonic solids. Formula that relates points, lines, faces, and solids within a dimension. The same characteristic for all regular solids in each of these two dimensions. http://en.wikipedia.org/wiki/Euler_characteristic
- event** – Real-time system view (special term: Quadralectic second moment).
- eventity**, eventities 1 – entity + event as one thing. A spacetime locus of a phenomenon. See Emergent Eventity.
- exi-stance** (existence) 4 – Existence means standing outside of itself, which means what is beyond Being Also means ecstasy. Heidegger uses both of these meanings to define his existential philosophy of Dasein. <http://en.wikipedia.org/wiki/Existence>
- existential quantifier** 3 – Backwards E ‘ \exists ’ that symbolizes the existence of a quantity. Opposite the upside down A ‘ \forall ’ that signifies All. The difference is between ‘at least one exists’ and ‘all being encompassed’, which are the limits upon which proof and refutation hinge in Logical and Mathematical proofs. Introduced to Logic by Peirce. http://en.wikipedia.org/wiki/Existential_quantifier
- existentiells** – Human categories as opposed to the categories of the object in Kant. For Heidegger these are Befindlichkeit (Discoveredness), Verstehen (Understanding), and Rede (Talk) <http://en.wikipedia.org/wiki/Existentiell>
- existenz** – Existence in Jaspers. See [Reason and Existenz](#). Jaspers, K.
- explorability** – The ability to explore all the implicit horizons of an object. The more explorability there is, the more real the object is.
- expression** – Habitus (special term: Quadralectic fourth moment).
- Fa Tsang** 13 – Famous Theorist of Interpenetration in Hua Yen Buddhism. See his commentary on the [Awakening of Faith](#). http://en.wikipedia.org/wiki/Awakening_of_Faith_in_the_Mahayana See also http://en.wikipedia.org/wiki/Huayan_school See also

<http://www.angelfire.com/realm/bodhisattva/fa-tsang.html> See Lai, Whalen “The I-Ching and the Formation of the Hua-yen Philosophy” Journal of Chinese Philosophy V. 7 (1980) pp. 245-258 <http://ccbs.ntu.edu.tw/FULLTEXT/JR-JOCP/jc26754.htm>

Face of the World 15 – All the kinds of Being appearing together in an Emergent Event. In an emergent event transcendentals are withdrawn and become immanent in the things that embody all the kinds of Being together at the same time. (neologism)

Facet Schema 9 – Primary Schema at the bottom of the hierarchy of schemas of Negative One and Zeroth Dimensions (in the hierarchy of General Schemas Theory S-prime). The Facet Schema is beyond experience and below the Monad Schema in the hierarchy of the Schemas. It is like a Quark, where the phenomena is faceted and inseparable. A dual with the Pluriverse. The Facet and Pluriverse schemas are an image of Interpenetration.

facticity – Unavoidable conditions of human existence.

<http://en.wikipedia.org/wiki/Facticity>

faculties, associated with multi-lectic – See attention, attitude, memory, imagination.

fading apprehension 2 – Apprehensions of objects fade in our memory as they are replaced by new sensations of changing or new apprehensions of phenomena. See Husserl, Edmund. The Phenomenology of Internal Time-Consciousness. (Midland books; MB97. Indiana University Press, 1966).

fallingness – Fundamental condition of Dasein falling toward death and without ground for his existence. http://en.wikipedia.org/wiki/Heideggerian_terminology

family resemblance – Similarity between things. Cf. Wittgenstein.

http://en.wikipedia.org/wiki/Family_resemblance

Fate 16 – Old English Wyrð <http://en.wikipedia.org/wiki/Wyrð> A nondual within the Western Tradition between Existence and Non-Existence. Seen in Myth of ER in Plato’s Republic, which balances out Right or Justice at the beginning and the Good in the Middle. The book itself is about the laws or order of a city, thus the book encompasses all the nonduals at the core of the Western tradition.

Fibonacci sequence 3 – 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, . . . is a sequence of squares that define a spiral that conforms to the golden ratio.

http://en.wikipedia.org/wiki/Fibonacci_sequence

http://en.wikipedia.org/wiki/Golden_ratio

Fiction – Negative Aspects (special term: Quadralectic second moment).

Fifth Moment – Moment of the Pentalectic associated with the multi-lectic.

fifty-seven cell polytope - anomalous four-dimensional non-regular polytope. 57-cell

<http://en.wikipedia.org/wiki/57-cell>

final cause – Causation (special term: Quadralectic third moment).

finitudes (see also transcendentals); Finite differentiation of the meta-dimensions.

First Beginning 16 – Beginning of things dominated by Being. See Other Beginning. Cf. Heidegger Contributions The beginning of Metaphysics in the Western Tradition.

First Moment – The first moment of Quadralectic associated with the multi-lectic.

Firsts, firstness 13 – Isolata. Like points. Philosophical Category Cf. Peirce. Things in isolation without relation to each other. Like Monads, only as a philosophical principle. Never actually experienced except as surprise in the first advent.

Five Hsing 16 – Five Transformations from Chinese Medicine and Cosmology. Cf. H. Holbrook. Stone Monkey. http://en.wikipedia.org/wiki/Wu_Xing

Flatland 8 – Universe that is utterly two-dimensional.

http://en.wikipedia.org/wiki/Flat_Land

flaws – Design Field Element (Ultra5, Negantry).

Flesh 8, 16 – Chiasmic and reversibility of touch-touching in embodiment in Wild Being, Cf. Merleau-Ponty The Visible and the Invisible.

http://en.wikipedia.org/wiki/Maurice_Merleau-Ponty

flow 1, 2 – Dual of the gestalt. Where the background is brought to the foreground as a

dynamic flow and a reference point is projected to the background that stands in for the figure. Flows can only be discerned in a distinguishable fashion if a reference point, or what G. Klir calls a background variable, is provided.

Focus – Mediation (special term: Quadralectic first moment).

Focus 7 – Second order mediation between content and context. Cf. Wisse. Second order mediation within Quadralectic between representation (as content) and circumstance (as context).

fold 2 – When things bend back on themselves to produce topological structure in relation to themselves. See Deleuze [The Fold](#).

forgetfulnesses – Temporary loss of memory of some experience. See oblivion Striated member of a Pleroma pair.

Form Schema 1 – A primary Schema that is the central schema in the Western tradition, established as such by Plato and Aristotle and carried on through the tradition down to the Twentieth century. A form is the outline or envelope of an object isolated from its context. Form is between the schemas of Pattern and System. It is synonymous with shape. It is two or three-dimensional in General Schemas Theory S-prime. See http://en.wikipedia.org/wiki/Susanne_Langer

formal cause – Causation (special term: Quadralectic first moment).

Foundational Mathematical Categories 6 – Set of Categories that are the foundation for mathematics. Includes Singularity, Site/Event, Multiple, Set, Mass, Whole, Holon/Integra, Hoidal categories. Set and Mass are inverse duals. Other categories are either degenerate or excessive in relation to these to central categories. Three of these Categories are identified by Badiou in [Being and Event](#). The others are added by the author based on rival claims for the basis of mathematics, and on the Set/Mass duality.

Foundational Mathematical Categories associated with the multi-lectic – See Singularity, Multiple, Mass, Holon, Integra, SiteEvent, Set, Holid, Whole.

foundationalists, foundedness – Hilbert's Program.

four-dimensional space 3 – A hypothetical space we do not experience beyond the third dimension that can be known through geometrical reasoning using algebra and geometry together where there is a fourth axis passing through the origin of the coordinate system that is orthogonal to the three dimensions we experience. http://en.wikipedia.org/wiki/Fourth_dimension

Fourfold, Negative taken positively views associated with multi-lectic – See Order, Uncovering, Grounding, Lighting.

fourfolds – Positive and Negative fourfolds. Positive Fourfold comes from Socrates as a definition of the World and is revived by Heidegger. It is Heaven, Earth, Mortal, and Immortal. Negative Fourfold comes from Aristophanes and Hesiod These are Abyss, Covering, Night, and Chaos. If you take the positive view of the negative fourfold, then you have Grounding, Uncovering (Aletheia), Light, and Order, which are the fundamental characteristics of the worldview.

Fourth Moment – Moment of the Quadralectic associated with the multi-lectic.

Fourthness – It is Synergy, a trans-Peircean Philosophical Category demonstrated by B. Fuller in Synergetics.

Frege, G. – Critic of Husserl's dissertation who caused him to fundamentally change his philosophy prior to the development of Phenomenology. <http://en.wikipedia.org/wiki/Frege>

Freudenthal-Titts Magic Square 9 – relates to the Jordan, Lie, and Hyper Complex Algebras. There is speculation from the author that it underlies the Emergent Meta-system structure. Rene Thom's higher catastrophes are related to Lie Algebras, which are the elements in the square that appear in the relationship between the Jordan Algebras and the Hyper complex Algebras. http://en.wikipedia.org/wiki/Freudenthal_magic_square

F-theory – Twelve-dimensional higher order theory that encompasses M Theory which has two orthogonal timelines. <http://en.wikipedia.org/wiki/F-theory>

- fulfillment** – Meaning (special term: Quadralectic fourth moment).
- function** – Real-time system view (special term: Quadralectic first moment).
- Functor** 6, 13 – Second order relations between categories in which there are arrows between the arrows defined in Mathematical Category Theory. Relation² = mapping² between mathematical categories <http://en.wikipedia.org/wiki/Functor>
- Fundamental Particles** 9 – Emergent Ontic Level between Atoms and Quarks. See Standard Model of Physics. http://en.wikipedia.org/wiki/Elementary_particle
- fusions** – Design Field Element (Ultra5, Sixth).
- future moment** – Moments in time associated with the multi-lectic (special term: Quadralectic fourth moment).
- Fuzzy Possibilities** 6, 8 – Fuzzy numbers do not attempt to sum to one and thus are equivalent to holding onto various possible worlds simultaneously until one is actualized probabilistically. Probabilities are calculated after the actualizing event, while Fuzzy numbers are assigned prior to the actualizing event. <http://en.wikipedia.org/wiki/Fuzzification>
- gelassenheit** 4 – “releasement” Allowing something to be what it is on its own. <http://en.wikipedia.org/wiki/Gelassenheit#Gelassenheit>
- General Economy** 2, 6 – When one takes all the economic anomalies of all cultures on earth that are not considered rational and thinks of them as genuine economic phenomena, then you have the General Economy, which is the meta-system for all restricted economies that we consider rational. Analogous to the Meta-System. In summary, all possible economic relations no matter how bizarre. Cf. Bataille [Accursed Share](#).
- General Schemas Theory** 1 – General Schemas Theory is the study of Schemas. It assumes that there are various schemas that are used to pre-understand or render as experience intelligible on its most basic level, i.e. in terms of the way spacetime is broken up. General Schemas theory is the next level up of abstraction from General Systems Theory. It considers other schemas besides Systems, such as Pattern, Form, Meta-system, Domain, World. (neologism)
- Generalized Dasein** 12 – Subjectivity (Pure Being) across all the other kinds of Being, Nb. Dasein (Process Being), Query (Hyper Being), Enigma (Wild Being).
- Generalized Thing / Manifold** 13 – Appears in space and time and the Abstract Physical Categories. <http://en.wikipedia.org/wiki/Manifold> Cf. Kant [Critique of Pure Reason](#).
- geometry/topology** 3 – The mathematical disciplines that deal with continuities in mathematics as opposed to other algebraic or finite (or trans-finite) mathematical structures defined by numbers. <http://en.wikipedia.org/wiki/Geometry> See also Topology.
- gestalt** 1 – A perceptual whole comprised of figure and ground and the tension between them within a perception of something. http://en.wikipedia.org/wiki/Gestalt_psychology See also microgenetic transformation.
- Gestalt Theory** 1 – Theory of perception that recognizes that perceptions are wholes and not merely empirical fragments unified by the mind. cf. Kohler.
- Goal** – Projection associated with the multi-lectic (special term: Quadralectic second moment).
- Godel Proof** 10 – Shows that some statements are undecidable as to whether they are inside or outside a System. Proved by diagonalization in relation to Peano’s axioms of Arithmetic. Can be applied to other formal systems. Destroyed the dream of providing a complete derivation of Mathematics from Logic. http://en.wikipedia.org/wiki/G%C3%B6del%27s_incompleteness_theorems
- Gödel, K.** – Godel’s incompleteness theorem fundamentally challenged Hilbert’s program to provide foundations within the Western worldview. <http://en.wikipedia.org/wiki/Gödel>
- Godelian Statement** 6 – A statement that is formally undecidable. Used to differentiate

emergence from de-emergence of properties in a formal system.
http://en.wikipedia.org/wiki/G%C3%B6del%27s_incompleteness_theorems

Golden Fabric 16 – Golden Threads of significance, relevance, sense and meaning woven together. (neologism); Cf. Beyng.

golden section (in relation to the icosahedron) 3 – The icosahedron has many interesting properties. The golden section is a particular ratio that is considered to embody perfect proportion, which is 1.61803... which allows recursive embedding of a figure such as a rectangle into itself, and preserving proportion.
http://en.wikipedia.org/wiki/Golden_section

Golden Thread 12, 14 – Mythic image of Meaning, Significance, Relevance, Sense that connects different things via Beyng. (neologism)

Good 16 – A nondual within the Western Tradition between Having and Not Having. See Fate.

Greimas Square 6 – A and Not-A crossed with B and Not-B that mimics the square of contraries and contradictions. Used as a way to indicate the nature of the nondual and give access to the Meta-system.

Greimas, A. J. – Structuralist who used the square of contradiction and contraries from logic as a basis for analyzing narrative structures.
<http://en.wikipedia.org/wiki/Greimas>
http://en.wikipedia.org/wiki/Greimas'_rectangle

Grothendieck, A. – Formulator of Topoi Category Theory.
<http://en.wikipedia.org/wiki/Grothendieck>

Grounding – Positive view of Fourfold (special term: Quadralectic third moment).

Group – Mathematical Category. [http://en.wikipedia.org/wiki/Group_\(mathematics\)](http://en.wikipedia.org/wiki/Group_(mathematics))

Group representations – Various ways that groups can appear.
http://en.wikipedia.org/wiki/Group_representations

Gurevich Abstract State Machine 6 – Meta-method based on a generalization of the Turing Machine. <http://www.eecs.umich.edu/gasm/gurarticle.html>

Gurevich, Y. – Inventor of the Gurevich Abstract State Machine Method referred to earlier as Evolving Algebras. In this study the Gurevich Abstract State Machine is considered a meta-method. It uses Rules to represent the causal structure of an Abstract State Machine, which Gurevich proved was Turing Equivalent.
<http://research.microsoft.com/en-us/um/people/gurevich/>
<http://www.eecs.umich.edu/gasm/community.html>

Gurwitsch, A. – Phenomenologist who followed Husserl and introduced Gestalt concepts into Phenomenology. http://en.wikipedia.org/wiki/Aron_Gurwitsch

Habitus 10 – Habit, Habitude, Habituated. Technical term for the basis of practice beyond what theory can comprehend. An embodiment of Wild Being. Produces structural objective results without limiting actors to cultural rules or other determinate constraints of action that they are conscious of in the production of the variety of their behavior. Cf. Bourdieu Logic of Practice
[http://en.wikipedia.org/wiki/Habitus_\(sociology\)](http://en.wikipedia.org/wiki/Habitus_(sociology))

habitus –Associated with multi-lectic – See thought, action, perception, expression.

hadron A kind of physical particle, the other is the lepton, as in Large Hadron Collider
<http://en.wikipedia.org/wiki/Hadron>
http://en.wikipedia.org/wiki/Large_Hadron_Collider

handness = Chiral <http://en.wikipedia.org/wiki/Chiral>

happening thread (what's happening?) – Threads of meaning (special term: Quadralectic second moment).

HAVE/GIVE relationships 13 – If you are at a certain level of the design field and you have an extra property that is specified, then this gives the next higher level in the design field. This is a way of constructing an image of the Design field as a rough approximation. It is a way of talking about how emergence moves you to higher levels for each Philosophical Category within the Design Field. (neologism)

Hegelians 3 – Followers of Hegel who dominated the philosophy of the 1800s.
<http://en.wikipedia.org/wiki/Hegelianism>

Heidegger, M. See also for Heidegger's terminology
http://en.wikipedia.org/wiki/Heideggerian_terminology

Heraclitus 4 – Pre-Socratic Philosopher who believed that everything was in a state of Becoming and flux and that nothing permanent existed except the state of change. See Parmenides. <http://en.wikipedia.org/wiki/Heraclitus>

Hermeneutics 1 – Hermeneutics is the study of the meaning and interpretation of texts, as well as the analogy of the interpretation of things of any kind. Cf. Gadamer [Truth and Method](http://en.wikipedia.org/wiki/Truth_and_Method). <http://en.wikipedia.org/wiki/Hermeneutics>

heterarchies – Design Field Element (Process2, Seventh).

Heterarchy – Non-hierarchical network with multiple highest and lowest elements and complex non-regular links between elements.
<http://en.wikipedia.org/wiki/Heterarchy>

Heterochronic 10 – Multiple orthogonal timelines. Suggested by Dunne as a possibility. Breaks the strangle hold of Metaphysics. Suggested by F Theory and discovers orthogonal timelines at the twelfth and fourteenth dimensions. It is speculated that there are four orthogonal temporal dimensions in the sixteenth dimension. We hypothesize that Emergent Events are advents of the recognition of four-dimensional time in our worldview. In other words, four-dimensional time is the basic structure of time that we reify by reducing it to one-dimensional time conjuncted with three-dimensional space. (neologism) See also <http://en.wiktionary.org/wiki/heterochronic> for a different definition.

Heterochronicity 15 – Variety and variation within time, especially the intersection of different orthogonal time lines in the Emergent Event. (neologism)

higher level horizons 2 – Horizons are nested. Different schemas beyond the System have different indefinite horizons that are explorable in different ways.

holarchy – Design Field Element (Process2, Fifth).

holarchy 13 – Hierarchy or heterarchy of holons, Cf. Koestler
<http://en.wikipedia.org/wiki/Holarchy>

holistic picture 9 – Holonomic refers to the order of the whole, which can be more than, equal to, or less than the sum of the parts.

hologram 13 – Image imprint produced by a laser that has a trace of the whole in every part. <http://en.wikipedia.org/wiki/Hologram>

Holoid – Foundational Mathematical Category.

holoid, holoidal 3, 13 – A Foundational Mathematical Category that embodies interpenetration and intra-inclusion. George Leonards's neologism for a state of interpenetration In [The Silent Pulse](#). XJXJXJ

Holoidal Mathematical Category 6 – Represents interpenetration and intra-inclusion formally as a non-well-founded set mediated by the other. Cf. Aczel.

holon (moment) – Design Field Element (being0, Fifth).

Holon 13 – A part, which is also a whole at the same time. Cf. Koestler.
[http://en.wikipedia.org/wiki/Holon_\(philosophy\)](http://en.wikipedia.org/wiki/Holon_(philosophy))

Holon/Integra 9 – Associated Foundational Mathematical Categories (special term: Quadralectic fourth moment) A Foundational Mathematical Category based on Mathematical Category Theory that uses relationships to describe fusions through relationships that have structure where the elements themselves are forgotten. Related to Koestler' idea of the Holon which has Integrity.

Holonomic – The science of Wholes. Cf. Stamp.

homeomorphic, homeomorphism 3 – Similar shape, topological isomorphism
<http://en.wikipedia.org/wiki/Homeomorphism>
<http://en.wikipedia.org/wiki/Homeomorphic>

Homological algebra – Basis of topology
http://en.wikipedia.org/wiki/Homological_algebra

horizon 2 – An indefinite boundary of a Meta-system that is different from the boundary of a System, which is normally definite. Horizons suggest explorability rather than definability.

horizontal – Related to horizon.

horizontal boundary 2 – Indefinite explorable edge of Meta-System, Domain or World.

Hsing – Transformation. See Five Hsing or Wu Xing.

Hua Yen Buddhism 13 – Form of Buddhism that had a sophisticated theory of Interpenetration. Cf. Cook. http://en.wikipedia.org/wiki/Huayan_school

Hunk – Higher dimensional solid.

Husserl, E. – Founder of Phenomenology. Teacher and mentor of Heidegger. <http://en.wikipedia.org/wiki/Husserl>

Hyle 1 – Matter of experience, i.e. qualia that is operated upon by intention to give definition to experience within consciousness. cf. Husserl.

Hyper Being (trace) associated with multi-lectic – See Concept, Essence, Perspective, Design, Insight.

Hyper Being 6 – Indecisive possibilistic In-hand mode of Being. The third meta-level of Being.

Hyper Complex Algebra 13 – Algebras related to Hyper Complex Numbers. http://en.wikipedia.org/wiki/Hypercomplex_number
http://en.wikipedia.org/wiki/Cayley%E2%80%93Dickson_construction
<http://en.wikipedia.org/wiki/Sedenion> <http://en.wikipedia.org/wiki/Octonion>
<http://en.wikipedia.org/wiki/Quaternion>
http://en.wikipedia.org/wiki/Complex_number

Hyperbolic Geometry 6 – Type of Non-Euclidian geometry such as concave mirrors. http://en.wikipedia.org/wiki/Hyperbolic_Geometry

Hyperbolic knot 6 – Most knots are hyperbolic. Means that when the knot is extracted from its space the remaining space has negative curvature like a saddle point. http://en.wikipedia.org/wiki/Hyperbolic_knot
http://en.wikipedia.org/wiki/Knot_theory

hypercomplex – Beyond the complex numbers, related to weaker algebras called Quaternions, Octonion, and Sedenions.

Hyper-complex Numbers 13 – Imaginaries beyond the complex numbers, i.e. Quaternions and Octonion. http://en.wikipedia.org/wiki/Hypercomplex_number

hypercycles – Cycles of control Cf. M. Eigen. The Five Hsing is an example of a hypercycle system that can be expressed through the way Acupuncture works. See <http://pespmc1.vub.ac.be/HYPERC.html>

hypersphere 3 – Equivalent of the sphere in higher dimensional spaces. <http://en.wikipedia.org/wiki/Hypersphere>

hypertorus – Also 3-torus has four forms: super-torus of tori, cube with opposite sides identified, three links intertwined, and topology of cells based on 1-3-3-1 lattice. Acts as a bridge to the fourth dimension for the minimal system representations, extremely unstable as a phase of the steps into chaos. <http://www.dr-mikes-maths.com/4d-torus.html#pictures>

hypnogogic dream 5 – Lucid clear dream on the verge of sleep or waking, unlike normal REM dreams. <http://en.wikipedia.org/wiki/Hypnagogia>

I Ching – Chinese oracular system based on 64 hexagrams. http://en.wikipedia.org/wiki/I_ching

i+j+k+r – Quaternion imaginaries in conjunction with symmetry breaking.

Ibn al-Arabi (Shaykh al-Akbar) – Sufic Mystic. Wrote the [Fusus al Hikam](http://en.wikipedia.org/wiki/Fusus_al-Hikam) and [Mekkan Revelations](http://en.wikipedia.org/wiki/Mekkan_Revelations). <http://en.wikipedia.org/wiki/Ibn-al-Arabi>

icosa-dodeca-hedron – Lattice that contains the icosahedron and dodecahedron.

icosahedron 3 – A figure with twenty faces, thirty edges, and twelve vertices. Is a Platonic solid. <http://en.wikipedia.org/wiki/Icosahedron>

Icosaheptad ("27-ead") 6 – Next level up from in the WorldSoul structure from the Ennead. Associated with the Holoidal.

icosododeca-hedron 3 – The lattice of 1-20-30-12-1 which, when read one way is an icosahedron and when read the other way (assigning points, lines, and faces) becomes a dodecahedron.

Identity – Positive Aspects (special term: Quadralectic first moment).

Illusion – Negative Aspects (special term: Quadralectic third moment).

illusory continuities = ideas 1, 10 – Ideas are illusory continuities like those we see in cinema where separate images are flashed at 25 frames per second or greater. The continuity of the frames in a film as it is being shown is an illusion, but we see those continuities as if they were real. Ideations are seen as illusory continuities based on the production of repetitions, which make possible representations that are idealized glosses on experience. Similarly, ideas are abstractions that are glued together to form reified ideas that gloss over the abstrata.

Image – Mediation (special term: Quadralectic third moment).

Imaginal 5 – The visionary realm used by Corbin to describe the visions of Ibn al-Arabi.

imaginary 9 – Imaginary numbers open out from the square root of Negative One.
http://en.wikipedia.org/wiki/Imaginary_numbers

imagination – Faculty associated with multi-lectic (special term: Quadralectic fourth moment).

immanences – Embodied within. The opposite of transcendences. Usually meant in terms of God being pantheistic rather than transcendental.
<http://en.wikipedia.org/wiki/Immanence> We use the term in the way that Deleuze does in [Pure Immanence](http://en.wikipedia.org/wiki/Pure_immanence). http://en.wikipedia.org/wiki/Pure_immanence

immediate object 13 – Defined by Peirce as the semiotic representation of the external object. Related to Universal Algebra and the semiotic Object of Design. Semiotic representing appearances and thus phenomena in Kant's terms.

impenetrable – Design Field Element (Wild4, Seventh).

implicate order 2 – An intrinsic order of phenomena. cf. Bohm.
http://en.wikipedia.org/wiki/Implicate_order

import thread – Threads of meaning (special term: Quadralectic first moment).

impression – Leveraged effect (special term: Quadralectic first moment).

inclination – Wild Being (flesh) (special term: Quadralectic third moment).

incongruencies – Noticed anomalies that leads beyond schematizations.
http://en.wikipedia.org/wiki/Intersubjective_verifiability

Incorporation in Abraham and Torok 1 –Something that is *other* that is taken in by the personality, which is essentially alien and remains alien to the personality in the normal course of experience with external realities. This is the opposite of Introjection. Introjection produces a phantom in the ego and in the unconscious, a “thing” that cannot be incorporated. In the unconscious both incorporation and introjections are alien loci and cannot be assimilated into the personality according to the theory of Abraham and Torok. But, the difference is that there is acceptance and accommodation in Incorporation and lack of acceptance and accommodation in the Introjection of the foreign element into the personality by the external reality. http://en.wikipedia.org/wiki/Nicolas_Abraham

indefinables – What cannot be well defined. <http://en.wikipedia.org/wiki/Well-defined>

independences – Design Field Element (Hyper3, Seventh).

indistinguishability – What cannot be distinguished.
<http://en.wikipedia.org/wiki/Indistinguishability>

individual – Design Field Element (being0, First).

Indo-European Primal Scene 14 – The Well and Tree is the Primal Scene of the Indo-Europeans. See [Fragmentation of Being and the Path Beyond the Void](#) by the author. See Ned Lukacher, *Primal Scenes* (Cornell University Press, 1986), p. 24. See also Bauschatz, Paul C. [The Well and the Tree: World and Time in Early](#)

Germanic Culture. (Amherst: University of Massachusetts Press, 1982).

Induction 3 – Reasoning from cases toward abstract conclusions. See also Deduction and Abduction. http://en.wikipedia.org/wiki/Inductive_reasoning

Infinite Sets 1 – Matte Blanco proposed that the unconscious could be conceived as an infinite set. Cantor studied infinite sets of numbers and discovered that they have properties that are different from normal finite numbers. In fact there are three classes of numbers: countable, uncountable, and infinite, and there are various levels of infinity called transfinite numbers. The key point is that infinite numbers do not have the equivalent of cardinals. Thus, we cannot distinguish higher transfinite numbers from each other. The most basic transfinite number is Aleph which is the infinitude of the Real numbers. The power set of the real numbers cannot be distinguished from Aleph. cf. Cantor, Blanco.
http://en.wikipedia.org/wiki/Infinite_sets

inflection – Design Field Element (Wild4, Second).

in-hand 8, 16 – The modality of Hyper Being. Also related to bearing. A mode of being-in-the-world of Dasein in Wild Being (neologism).

Insight – Hyper Being (trace) (special term: Pentalectic, fifth moment).

instance – An element of a Mass.

integra – Something with the properties of integrity, i.e. integral.

Integra/Holon – Associated Foundational Mathematical Categories (special term: Quadralectic fourth moment).

Integral – A Philosophical Category defined by B. Fuller that goes beyond Synergy, which has the property of tensegrity, where pieces fit together in tension that is mutually supporting, which is more than the reuse and overdetermination of parts in synergy. <http://en.wikipedia.org/wiki/Integral>

integrity – Design Field Element (Hyper3, Fifth).

Intelligent Design 7, 15 – Means subtle and sophisticated meta-design. Design that is beyond Emergent Design, it is meta-emergent design. It is the equivalent of Autogenesis for Design, in relation to Autopoiesis of Emergent Design. It does not mean the design by God explicitly as that is left to faith. It is meta-design beyond normal emergent design. Can also be thought of as co-design.

Intentional Morphe 1 – Morphe means form. Intentional Morphe means the projection of form on the matter (hyle) of experience. In early Phenomenology every experience was considered "experience of something" and thus intentional. cf. Husserl.

Intentional Target (special term: Quadralectic third moment).

inter-dependence – Design Field Element (Pure1, Fourth).

Interpenetration 3, 6, 13 – The state of something that interfuses with itself in such a way that it preserves the difference and sameness at the same time. Supra-rational state in which many things are interlaced with each other without interfering with each other. Best example is higher dimensional solids (hunks). Also seen in superposition in probability waves prior to observation. The complementary opposite of intra-inclusion. Modeled by Facets conjuncted with Pluriverse. Often mentioned with intra-inclusion, which means contained within rather than merely moving through the other.

interpretant 7 – Interpretation of a sign. Cf. Peirce's theory of Sign.
<http://en.wikipedia.org/wiki/Interpretant>

interspace – Space between. In Arabic 'barzak'. The nondual can be thought of as an interspace or a barrier.

intersubjective – Mitsein. Combination of subjects. Social group.
<http://en.wikipedia.org/wiki/Intersubjective>

intersubjective horizon 2 – Horizon projected by the social group, Heidegger calls Mitsein, being-with.

intext (as related to Wisse's definition) 7 – Neologism of P. Wisse for the content within a context.

intra-inclusion 6, 13 – Intra-inclusion is a holographic inclusion of the whole in the part. Supra-rational state seen in the Hologram where things are included in each other in some way. The complementary opposite of Interpenetration.

introjected hyle – That part of the matter of experience of a particular phenomena that is inconsistent, or incoherent with respect to the Morphe imposed upon it by the organization of experience by consciousness. Term taken from Abraham and Torok. Introjected Hyle gives us whatever intimations we may have of the true nature of the noumena. (neologism, not used by Husserl).

introjection – To replicate within oneself something external to oneself.
<http://en.wikipedia.org/wiki/Introjection>

inviabile – Not viable. <http://en.wikipedia.org/wiki/Inviabile>

invisible control space or virtual ‘phase space’ of the singularity 13 – Singularities are seen as existing in virtual spaces, which warp actual space and thus produce strange behaviors in actual space that are otherwise inexplicable. See Rene Thom Catastrophe Theory.

iPhone – (trade marked) Apple Computer, portable computing and phone device.

ipsity – An element of a Conglomerate, which is nondual between particular and instance.

irony – Master trope (special term: Quadralectic fourth moment).

irony 13 – Something seems to be the same but is really something else. Most of Plato’s statements are ironic to the point that we do not know what he actually thinks about most things. Cf. Vico, Burke.

isolata, isolatedness 3, 7 – Firsts are Isolatable elements according to Peirce.

Iteration – Repetition in sequence normally as part of an algorithm.
<http://en.wikipedia.org/wiki/Iteration>

Joining /Juncture – System for the moment of the multi-lectic (special term: Pentalectic fifth moment).

joinings – moment of conjunction or juxtaposition in which there is attunement. There are six joinings in Heidegger’s moments of Ereignis: 1. Echo 2. Playing-Forth 3. Leap 4. Grounding 5. The Ones to Come 6. The Last God
[http://en.wikipedia.org/wiki/Contributions_to_Philosophy_\(From_Enowning\)](http://en.wikipedia.org/wiki/Contributions_to_Philosophy_(From_Enowning))

Judo – Martial art that uses the opponents force against him.
<http://en.wikipedia.org/wiki/Judo>

Juncture/Joining – System for the moment of the multi-lectic (special term: Pentalectic fifth moment).

junctures – Moment of conjunction or juxtaposition in which there is no attunement. See joinings.

kairos – Time of the moment <http://en.wikipedia.org/wiki/Kairos>

kata; See 'ana' – Directions in four-dimensional space.

Kind (essence, species) – Design Field Element (Hyper3, Second).

Kleinian bottle 3 – The joining of two mobius strips, it is a three-dimensional form that is non-orientable in which it is difficult to distinguish between the inside and outside. In three-dimensional space it crosses through itself, but this is not necessary in four-dimensional space. http://en.wikipedia.org/wiki/Klein%27s_bottle

Klir, G. – Wrote Architecture of Systems Problem Solving, which is a Structuralist view of Systems Theory. This is one of the most advanced books on Systems Theory. It is the basis of the view of the System given in this study.
http://en.wikipedia.org/wiki/George_Klir

knot 3 – A line that is joined to itself after crossing itself alternatively over and under itself to form a self-interference. The knot is the archetype of self-organization, i.e. organization of something against itself.

Knot Theory 6 – Theory of minimal knots with a given number of self-crossings. See archetype of self-organization. See knot. http://en.wikipedia.org/wiki/Knot_theory

Kosmos – A primary schema beyond experience higher in scope than the World, which is

the last experienceable schema. We feel we can know a whole world, even if we only see part of it, but we do not feel we can know the whole kosmos, which is the physical substrate of the world within which we live that stretches back to the Big Bang and out to the end of the universe. It is not that we do not experience things of the Kosmos but the idea that our concept of the Kosmos as 'a whole that can be known' is an illusion. Cosmic theories are proposed but the Kosmos itself cannot be known, least of all because of the limits of the speed of light on travel in the universe.

- Krisis** – Keyword in Husserl's book, on Crisis in the European Sciences.
- Kuhn, T.** – Developed the idea of a paradigm shift leading to a revolution in Science. http://en.wikipedia.org/wiki/Kuhn,_Thomas <http://en.wikipedia.org/wiki/Paradigm>
- Lacan, J.** – Applied semiotics to Freud's Theory of Psychoanalysis. See System and Structure by Wilden. http://en.wikipedia.org/wiki/Jacques_Lacan
- lacunae** (hole) 13 – Design Field Element (being0, Neganary). Places where things are missing, points to phenomena of Emptiness or Void.
- laminar flow** 16 – Perfect non-interfering flow of liquid. http://en.wikipedia.org/wiki/Laminar_flow See also Construtal Law. http://en.wikipedia.org/wiki/Constructal_law
- lattice** – Design Field Element (Process2, Fourth). Mathematical Category with greatest common element and lowest common element and all other elements connected to these through each other. Normally basis for understanding Partial Order. [http://en.wikipedia.org/wiki/Lattice_\(order\)](http://en.wikipedia.org/wiki/Lattice_(order)) http://en.wikipedia.org/wiki/Partial_order
- leisure** and play vs. work 5 – Huizenga wrote Homo Ludens to emphasize the importance of Play in human life, as opposed to productivity and work, towards which there is a cultural bias as described by Baudrillard in The Mirror of Production.
- leveraged effect** – Associated with multi-lectic – See impression, movement, positioning, sensation.
- lifeworld** 2 – For an individual there is a particular niche within the world that he/she inhabits. That niche is his/her lifeworld. Cf. Husserl Krisis <http://en.wikipedia.org/wiki/Lifeworld>
- Lighting** – Positive view of Fourfold (special term: Quadralectic fourth moment).
- lines of flight** 8, 9 – Directions of possible virtual movement if movement is allowed. See Deleuze and Guattari Anti-Oedipus. http://en.wikipedia.org/wiki/Gilles_Deleuze
- Logic** (reference to Charles Peirce) 3 – See standard reference books on Logic. Charles Peirce made major contributions to logic including the Existential operator and the move toward a symbolic logic. <http://en.wikipedia.org/wiki/Logic>
- Logocentrism** 5 – Underlying prejudice against writing and in favor of speech, even though writing carries cultural memory. <http://en.wikipedia.org/wiki/Logocentrism>
- Logos / Physis** (physis) 11 – Basic Duality between the Physical and Language and expressed as a basic duality in Greek Philosophy. Logos is the unfolding of Language, but extends to Ratio as well, i.e. the ordering of language.
- Luckmann, T.** See Berger, P. Social Construction of Reality in Bibliography.
- Luvah** – One of four Zoas in Blake's epic signifying Love.
- Magma** 8 – One way to describe Wild Being. Cf. Cornelius Castoriadis.
- malleable** – Design Field Element (Wild4, Third) Ductility <http://en.wikipedia.org/wiki/Ductility>
- Mandelbrot Set** 8 – Fractal intensities in the complex plane based on accelerations of lines of flight toward infinity by recursive iterations. In other words, it comes from taking points in a complex plane and recursively iterating their functions to determine escape velocities toward infinity, and then coloring according to acceleration. http://en.wikipedia.org/wiki/Mandelbrot_Set
- Manifestation** 8 – Deeper Nondual beyond Emptiness and Void.

manifold 12 – Design Field Element (Process2, Third) A thing that is differentiated into many qualities and associated quantities of attributes and ultimately rooted in its topology in space and time. Cf. Kant <http://en.wikipedia.org/wiki/Manifold>

map – Design Field Element (Pure1, Second).

marked point 6 – Point in space marked as distinct from the background of space, which is also different from the negative dimensional point necessary for superimposition of points.

markets (as compared to Meta-systems) 10 – See <http://bubblenomics.biz> Markets are good examples of Meta-systems although there does not seem to be any general theory of markets. Cf. Bataille.

Mass 6 – A Foundational Mathematical Category based on identical instances within a boundary of the Mass that forms a totality of instances of a given type. Inverse dual of the Set that has instances that are all identical within a boundary, instead of particulars that are all different. (special term: Quadralectic third moment).

master tropes associated with multi-lectic – See synecdoche, metonymy, metaphor, irony, simile.

material cause – causation (special term: Quadralectic fourth moment).

Material State 13 – Term used according to the way Hillary Lawson uses it in Closure as a partial closure with some openness within it. These closures can be complex material systems that combine energy, matter, entropy, and information in their positive and negative states.

mathesis – Science that particularly focuses on the ability to produce mathematical structures. http://en.wikipedia.org/wiki/Mathesis_universalis

matrix – Design Field Element (Hyper3, Zeroth).

Matrix Logic 6 – Invented by August Stern as a combination of Logic and Matrix mathematics.

Maturana, H. – Along with Varella, F. invented the Theory of Autopoiesis, which is a theory of the viability of the existential individual organism as opposed to the species.

Mead, G. H. 10 – [Philosophy of the Present](http://en.wikipedia.org/wiki/Philosophy_of_the_Present) articulates the concept of Emergence. Social Pragmatist Philosopher whose problematic, was the relationship of Evolution to Relativity Theory. His most famous work is a collection of class notes called “Mind, Self and Society” and is studied by Sociologists. http://en.wikipedia.org/wiki/George_Mead

meaning associated with multi-lectic – See significance, relevance, recognition, fulfillment, actuality.

Meaning target (special term: Quadralectic first moment).

means 7 – Mediation of work, part of the process: circumstance – >means – >purpose. Cf. Hegel. Mediation in the Trialectic.

Mediations associated with multi-lectic – See Focus, Object, Image, Signature, Nexus.

Meet 2, 11 – Term that means ‘fitting’. The fittingness to the operating environment. Old English term.

memory – Faculty associated with multi-lectic (special term: Quadralectic third moment).

Mendeleev's Table of the Elements 5 – Example of the structural method at work prior to the discovery of atoms. <http://en.wikipedia.org/wiki/Mendeleev>
http://en.wikipedia.org/wiki/Periodic_table

Mereology 6 – The study of parts of individuals. A rival for the foundation of Mathematics. <http://en.wikipedia.org/wiki/Mereology>

mereotopology – Combination of mereology and topology. <http://en.wikipedia.org/wiki/Mereotopology>

Merleau-Ponty, M. – Wrote [Phenomenology of Perception](http://en.wikipedia.org/wiki/Phenomenology_of_Perception), which attempted to understand Heidegger's modes of being-in-the-world psychologically. Also wrote [The Visible and Invisible](http://en.wikipedia.org/wiki/The_Visible_and_Invisible), which defined two more levels of being-in-the-world, which the author calls the In-hand (Hyper Being) and Out-of-hand (Wild Being).

Hyper-Being is defined as the meta-dialectic between Being and Nothingness.
Wild Being is defined as the flesh of chiasmic reversibility.

meso – Middle ground between micro and macro.

Meta-methods 12 – Methods that apply to all the Schemas. Gurevich Abstract State Machine and Wisse Metapattern method are considered meta-methods as distinct from Schema specific methods.

Metapattern method 6 – A meta-method of relating objects to their contexts in order to identify objects in systems analysis. Identity flows through context, not through the entities that move between contexts. Cf. Wisse.
<http://www.informationdynamics.nl/pwisse/>

metaphor 13 – Master trope (special term: Quadralectic third moment). Something IS actually something else, Odysseus is a Lion. Cf. Vico, Burke
<http://en.wikipedia.org/wiki/Metaphor>

Metaphysical Era 14 – Era of the rise of Science and the study of the Kosmos starting with Anaximander.

Metaphysics of Presence 5 – Underlying assumption that only what is fully present matters, and that absence, difference, illusion, and fiction are to be suppressed.
http://en.wikipedia.org/wiki/Metaphysics_of_presence

Meta-system 1 – A primary Schema. A Meta-System is the environment of a System to the horizon from a single location within the environment. A Meta-System is a primary schema for organizing experience. It is also called an Open-scape. The word "scape" means what is seen to the horizon from a single stationary point within the landscape. (neologism, different from other definitions of the term used by other authors) <http://en.wikipedia.org/wiki/Meta-system>. Meta-system is associated with multi-lectic – See circumstance, situation, surroundings, context, ambience.

Methodological Distinctions 12 – Unordered, Partially Ordered, Linear Order without Distance, Partial Order with Distance, and Fully Ordered. Used as a template to understand the relationship between the Minimal Methods and the Viewpoints on a Real-time System. Cf. Klir.

metis 6 – Cunning, basis of practical reason within the Western worldview since the Greeks. Exemplified by Odysseus.

metonymy 13 – Master trope (special term: Quadralectic second moment) Putting something for something else, Crown for the King. Cf. Vico, Burke
<http://en.wikipedia.org/wiki/Metonymy>

microgenetic transformation, Microgenesis – Looking at gestalt formation carefully. It was discovered that gestalts form discontinuously and that pre-gestalts can be very different from the final form of the gestalt. Cf. Talis Bachmann.

mimesis 4 – Mimicry, used by representations that attempt to be like the thing represented, but fail. <http://en.wikipedia.org/wiki/Mimesis>

miracles 2 – Colloquialism for a Positive Feedback in a positive direction, which has beneficial results but may be too much of a good thing.

Mithra 5 – Mithra was paired with Varuna who became Ahura Mazda in Zoroastrianism, who became the dual deity to Ahriman. Mithra became the leader of the forces of light in the continual war with the forces of darkness. Mithraism appears to be one of the sources of Christianity. It was the religion of the Roman Legions.
<http://en.wikipedia.org/wiki/Mithra>

Mitsein – Being with another. Source of inauthentic Dasein in Heidegger's Being and Time. http://en.wikipedia.org/wiki/Heideggerian_terminology

mobius strip 3 – A two sided figure, that is non-orientable and composed of a strip that is twisted 180 degrees in relation to itself and joined to itself. It has one side and one face and is an embodiment of the concept of nonduality because it is both two sided locally and one-sided globally at the same time.
http://en.wikipedia.org/wiki/Mobius_strip

Model Theory 3 – This is the combination of Logic and Mathematics into a mathematical discipline that considers all possible statements about mathematical categories and

- their logical relationships. http://en.wikipedia.org/wiki/Model_Theory
- Modification** – Relation⁴ = mapping⁴ between the Natural Transformations, See Category Theory.
- moment** (in relation to the Quadralectic) 7 – An eventuality in which a part of Quadralectic appears.
- moments in time** associated with multi-lectic – See present moment, mythic moment, past moment, future moment.
- Monad** – Emergent Meta-system moment (special term: Quadralectic second moment).
- Monad** 1, 2 – A Primary Schema. Monads are the smallest things that are discernable. This may be atoms, particles, or strings depending on the time period in science we are discussing. cf. Democritus. Leibniz.
- monadic hyle** 2 – Content is called Hyle. The smallest content that is distinguishable is idealized as being monads as either atoms, particles, strings etc. Monadic hyle are never seen in isolation, monadic hyle is an idealization, all we can really experience are patterns that we structurally analyze in order to posit the monads. Sometime later our technology may improve so that we may see those monadic hyle, but by that time what could be conceived of as a monad is different and equally inexperienceable. Monads are the illusory limits of the scale of experience at a given time.
- monochrony** – One Time. Linear time. The time of the metaphysical era.
- Monodology** 13 – Concept that everything is broken up into least discrete elements. Developed contra Spinoza for whom substance of nature was God. Stands in for all Atomism, all ideas of Fundamental Particles, etc. Cf. Leibniz.
- monolectic** – Root of the series that included Dialectic, Trialectic, Quadralectic, Pentalectic, etc.
- monothesis** – Single thesis or dogma not interacting with its antimony. See antimonies of Kant. <http://en.wikipedia.org/wiki/Antinomy>
- morphe** 1 – Form. cf. Husserl.
- Morse Theory** 13 – “According to the basic insights of Marston Morse, a differentiable function on a manifold will, in a typical case, reflect the topology quite directly. Morse Theory allows one to find CW structures and handle decompositions on manifolds and to obtain substantial information about their homology.” http://en.wikipedia.org/wiki/Morse_theory
- movement** – Leveraged effect (special term: Quadralectic second moment).
- M-theory** – Five-fold symmetry between various ten-dimensional string theories in the eleventh dimension. <http://en.wikipedia.org/wiki/M-theory>
- Multiple** 15 – A Foundational Mathematical Category that establishes the uncountable. Established by Badiou in Being and Event as a necessary addition to the Set. Prior to the arising of the One, the heterogeneous and differentiated without the possibility of being counted. Cf. Badiou. The Multiple is associated with the Foundational Mathematical Categories (special term: Quadralectic second moment).
- mutable** – Design Field Element (Ultra5, Third).
- Mutual Action** – Emergent Meta-system operation.
- mystery** 14 – (special term:) A form of subjectivity related to Generalized Dasein in Hyper Being.
- mythic moment** – Moments in time associated with the multi-lectic (special term: Quadralectic second moment).
- mythic time** 14 – Temporal moment broken off in transition from Mythopoeitic Era to the Metaphysical Era that by its absence allows time to appear linear. Time is actually four-fold, made up of moments of present/mythic-past-future, which has a different asymmetry that that of Old English which distinguishes time in terms of Incomplete and Complete.
- Mythopoeitic Era** 14 – Era of gods described in poetry and in myth prior to Metaphysical

Era.

- mythos 2** – Myth, stories about the world, traditional tales, normally about the relationships between mortals and immortals in the Greek tradition.
- Narrator** – Viewpoint on the Novel (special term: Quadralectic fourth moment).
- Natural Transformation** – Relation³ = mapping³ between mappings between categories.
- Naur, P.** – Computer Scientist. He created a way to define the syntax of a programming language such that it could be parsed. http://en.wikipedia.org/wiki/Peter_Naur
http://en.wikipedia.org/wiki/Backus-Naur_form
- N-Category Theory 13** – Takes Mathematical Category Theory up to N-levels. Crossing this with the Philosophical Principles and realizing that it represents the filling out of the Second Category allows a first order construction of an image of the Design Field, which specifies all possible elements that can be part of the Design Object. Cf. Baez.
- n-dimensional geometry 3** – Geometries where there are more than three orthogonal dimensions up to some uncountable number n.
- Neganary Category (-1) 3, 9** – This is a neologism that signifies the Negative First infra-Peircean category, which is the doorway to the Imaginary numbers. The Neganary has no operator or operand associated with it.
- negative dimensional superimposed point** – Opposite of the marked point necessary for anti-marking that makes super-imposition of points possible.
- negative entropy 13** – Increase in order that locally goes against global Entropy.
- Negative Fourfold** elements associated with multi-lectic – See chaos, covering, abyss, night, eros.
- nesting 2** – When objects fit inside each other like Russian Dolls.
- Net of Indra** – Image of interpenetration in which all things are like jewels that reflect each other in their facets. http://en.wikipedia.org/wiki/Net_of_Indra
- Newtonian world 4** – The worldview of Newtonian Physics overthrown by Relativity Theory and Quantum Mechanics. Cf. Kuhn. See http://en.wikipedia.org/wiki/Newtonian_mechanics
- Nexus¹** – Design Field Element (being⁰, Sixth).
- Nexus²** – Mediation (special term: Pentalectic fifth moment).
- Night** – Negative (special term: Quadralectic fourth moment) Fourfold.
- nihilism 4** – Defined by Stanley Rosen in his book called Nihilism as the realization that two duals are really the same thing. In that work it was the nihilism of Heidegger and Wittgenstein that was on display. But it is a central theme in the works of Nietzsche and Heidegger, First defined in Fathers and Sons by Turgenev. http://en.wikipedia.org/wiki/Fathers_and_Sons
- ninefold** – Ennead.
- noema 1** – That part of experience that is organized quantitatively and consists of qualia, which is closer to the idealization of the pure hyle. Cannot be separated from the Noesis. cf. Husserl.
- noematic nucleus 1** – The collection of hyle into a coherent external nexus that can be identified as an object. The concentration here is on the noema that makes up the phenomena, which is given some sort of unity, totality, or coherence, not the noesis, which is its interpretation or meaning to the individual who is experiencing the phenomena. cf. Husserl.
- noesis 1** – The part of experience that is laden with meaning, significance, relevance, sense, and semantic content but inseparable from the qualia and quantity of experience. Noesis is closer to the idealization of the Intentional Morphe. Cannot be separated from the Noema. cf. Husserl.
- non-degenerate Mathematical Categories 15** – Set and Mass categories are neither degenerate nor excessive from the set of Foundational Mathematical Categories.
- nondual 13** – Neither One nor Many. Sometimes used as Monisms as opposed to Dualism,

but this use is not made here. Meaning here is strictly something other than one or many (two). Cf. Loy.

- non-Euclidian geometry** 6 – Elliptical and Hyperbolic geometries that come from changing the parallel rule in geometry from that assumed by Euclid, i.e. parallel lines never cross.
- Nonion** – Discovered by Peirce. Basically, multiplication of Quaternion imaginaries with themselves to form ninefold matrix. In modern mathematics became Dyadic Tensors. Basis of Sign Categories. http://en.wikipedia.org/wiki/Dyadic_tensor
- non-routine (work)** 2 – Work that cannot be reduced to a formula, plan, program, rule of action.
- Nonstandard analysis** – Assumes infinitesimals exist as well as infinities. http://en.wikipedia.org/wiki/Nonstandard_analysis
- normal Turing Machine** 2 – Machine that does algorithmic work as defined by A. Turing.
- Norns** 12 (weaving the threads of Fate) – From Northern Indo-European Mythology, the Fates.
- no-target** (special term: Pentalectic fifth moment).
- noumena**, noumenal, noumenon 1 – Noumena are things-in-themselves, i.e. things as they are without the contribution of our experience of them. One might say: the Real Things as they are without human interaction or interference of any kind. We never experience noumena, because they (by definition) live outside of experience. Hegel calls these things ‘in and for themselves’ rather than ‘for others’ or ‘in relation to others’. Kant calls these Transcendental Objects. However, reality is something we confer, and so the noumena has some sort of status beyond the aspects of Being which are Identity, Truth, Reality and Presence. The noumenal is what is heard in the forest when a tree falls and no one is there. cf. Kant.
- Novel** – viewpoints associated with multi-lectic – See author, character, reader, narrator, bystander.
- nuance** – Design Field Element (Ultra5, Zeroth).
- object** (as related to essence) 7 – Object has behavior that reveals its essence when manipulated.
- Object Action** – Mediation (special term: Quadralectic second moment).
- Object of Design** (physical construct) 13 – The Physical Object that will be constructed based on the Design Object blueprint in the process of implementation.
- Object-oriented Design** 13 – Dual of functional oriented Design. Encoded into UML as the dominate Paradigm. http://en.wikipedia.org/wiki/Object-oriented_design
- Oblivion** – see Forgetfulness. Unstriated member of a Pleroma pair.
- Obscuration**, Opacity, Unclearing – de-jection (special term: Pentalectic fifth moment).
- Observer Mechanics** 6, 9 – Imitation of the formality of Quantum Mechanics at the macro level for all observers. A Formal Theory of Perception by Bruce M. Bennett, Donald D. Hoffman, Chetan Prakash “Observer Mechanics is an inquiry into the subject of perception. It suggests an approach to the study of perception that attempts to be both rigorous and general. A central thesis of Observer Mechanics is that every perceptual capacity (e.g., stereovision, auditory localization, sentence parsing, haptic recognition, and so on) can be described as an instance of a single formal structure: viz., an "observer." The first two chapters of Observer Mechanics develop this structure, resulting in a formal definition of an observer. The third chapter considers the relationship between observers and Turing machines. The fourth chapter discusses the semantics of observers. The next three chapters present a formal framework for describing an observer and its objects of perception, and then goes on to develop a perceptual dynamics. Using this dynamics, chapter eight defines conditions in which an observer may be said to perceive truly. Chapter nine discusses how stabilities in perceptual dynamics might permit the genesis of higher level observers. Chapter ten comments on the relationship between the formalisms of quantum mechanics and observer mechanics. Finally, the epilogue discusses the philosophical context and

implications of observer mechanics.”
<http://www.cogsci.uci.edu/personnel/hoffman/ompref.html>

- obsign 7** – Ultra Sign. Seal.
- Octahedron** <http://en.wikipedia.org/wiki/Octahedron>
- Octonion Algebra 14** – Algebra of the Octonion Numbers that lack both commutative and associative properties and have the form $x+i+j+k+l+m+n+E$.
- Octonion imaginaries 6** – Next level up from Quaternions discovered by Graves following Hamilton. Composed of conjunction $x+i+j+k+l+m+n+E$.
- Ogdonda-enead (81-ead)** – Next emergent level up from the Icosaheptead (27-ead), which is in the series of the WorldSoul beyond the Ennead. Equivalent to Matrix Logic of August Stern.
- Old English Roots of Being 13** – (sie/syn) Es/Er/Bheu/Wes/Wer, These are the roots of Being in Old English that go back to Proto-Indo-European.
- one hundred and twenty cell polytope 120-cell** – <http://en.wikipedia.org/wiki/120-cell>
- Onefold, onefoldness 12** – A complex topological manifold that is neither a unity nor a totality. Description of Beyng.
- Ontological Difference 12** – Difference between Being and beings, Cf. Heidegger.
- Ontological Monism 8, 12** – M. Henry criticizes Heidegger for this assumption that Being is One thing that can all be made manifest. He contrasts this with the Essence of Manifestation, which can never be made manifest. Henry takes his idea from M. Eckhart.
- Ontology 1** – Ontology is the science of Being. Ontology along with epistemology make up metaphysics, which is a branch of Philosophy. cf. Plato, Aristotle
- ontos** – Standing in Being. Ontology.
- Ontotheology, ontotheological 5** – Concept that there is a single unitary and totalizing organization of experience, one Being and One Supreme Deity that has Being. Ontotheology <http://en.wikipedia.org/wiki/Ontotheology>
- Opacity, Obscuration, Unclearing** – de-jection (special term: Pentalectic fifth moment).
- open of the openness 8** – the place of the manifestation of beings to the ecstatic being of DaSein.
- Open-scape 1** – Another name for the Meta-system. An X-scape is the panorama from a particular place in a landscape if you do not move. We talk about mindscapes, landscapes, seascapes. It is not natural to use the term Scape alone, so Open-scape is a neologism that allows the prefix to be variable.
- operationalized** – Made operational.
- Orc** – Spectre of Luvah in the four Zoas by Blake [http://en.wikipedia.org/wiki/Orc_\(Blake\)](http://en.wikipedia.org/wiki/Orc_(Blake))
- Order 16** – Nomos. A nondual within the Western Tradition between physis and logos. Related to Positive view of Fourfold (special term: Quadralectic first moment).
- orientable** – Able to be oriented. <http://en.wikipedia.org/wiki/Orientability>
- origin 2** – The place of origin, as with the zero point in a coordinate system, or the place where something originates in an arena within a Meta-system that is its ground zero point of appearance.
- originary** – Of the origin See E. Gans.
http://en.wikipedia.org/wiki/Generative_Anthropology#The_originary_event
http://en.wikipedia.org/wiki/Eric_Gans
- orlog 14** – The laying down of sediment in the Well, basis for experience of primal time among Indo-Europeans.
- orthogonal 3** – At right angles to something else. A fundamental property of space.
- Orthogonal Dimension 10** – Dimensionality is produced by Orthogonality, which is a fundamental mathematical property that produces the limits of three-dimensional space by the orthogonality of three axes. We hypothesize that there are n-dimensions via algebraic extrapolation of geometrical relations.

orthogonality – Independent, at right angles to something. Generates a new dimension.
<http://en.wikipedia.org/wiki/Orthogonality>

Other Beginning 16 – Alternative to the First Beginning dominated by Beyng as opposed to Being. See First Beginning. Cf. Heidegger.

out-of-hand 16 – The modality of Wild Being. Also overwhelming, encompassing.

overdetermination, overdetermined – Multiple causal interactions determine something.
<http://en.wikipedia.org/wiki/Overdetermination>

own-most 4 – What is essential to authentic Dasein, i.e. what is essential in the face of the fact of death.

Panarchy 11 – Concept of Natural Hierarchies very similar to Emergent Meta-system theory. <http://en.wikipedia.org/wiki/Panarchy>

paradox, paradoxicality – In sequence: contrary, contradiction, paradox, absurdity. The limit of doxa in the divided line of Plato. Opposite of the supra-rational, which is the limit of the ratio. <http://en.wikipedia.org/wiki/Paradox>
<http://en.wikipedia.org/wiki/Absurdism>

Pareto optima clustering 11 – Pareto Optima are the optima based on multiple criteria applied simultaneously. These optima may be optimal in different ways forming a cluster on the background of the sub-optimal possibilities.
http://en.wikipedia.org/wiki/Pareto_efficiency

Parmenides 4, 9 – Pre-Socratic Philosopher who believed that Being was static and self contained and did not admit change. Two other non-existent routes are denied, which are appearance and non-Being. See Heraclitus.
<http://en.wikipedia.org/wiki/Parmenides>

Particular – An element of a Set.

Pascal's triangle 5 – 1, 1-1, 1-2-1, 1-3-3-1, 1-4-6-4-1, and 1-5-10-10-5-1 etc. A series of lines of numbers generated from the previous line by the addition of the diagonal numbers on the previous line, giving the corresponding number in the next line.
http://en.wikipedia.org/wiki/Pascal_triangle

past moment – Moments in time associated with the multi-lectic (special term: Quadralectic third moment).

Pattern Schema 1, 5 – Pattern Schema is one of the primary schemas for organizing experience below the level of the form. Patterns organize the content of forms, or formless content in terms of internally coherent organizations. Content of forms are said to be organized into various patterns. Cf. Grenander.

Peano's System of Arithmetic 3 – Peano invented an axiomatic description of arithmetic, and Godel showed that it was undecidable. But other things like the real numbers are decidable and so it must be shown on a case by case basis what is decidable and what is not.

Peirce, C. S. – American Logician and Philosopher whom Pieter Wisse borrows from in order to produce the concept of the Ennead. Inventor of Semiotics. Independently developed Phenomenology. http://en.wikipedia.org/wiki/Charles_Sanders_Peirce

Pentachoron 15 – Another name for the Pentahedron.
<http://en.wikipedia.org/wiki/Pentachoron>

Pentahedron (pentahedral simplex polytope) 3 – Minimal Solid in the fourth-dimension composed of five points, ten lines, ten triangular faces, and five tetrahedrons with a lattice 1-5-10-10-5-1.

pentalectic – Five fold multi-lectic. Adds fifth moment to the Quadralectic. That fifth moment gains an unexpected degree of complexity and power, which essentially allows the co-design of Systems and Meta-systems.

perception – Habitus (special term: Quadralectic third moment).

perdures – Lasts. Term used by Heidegger to describe Being.

perfect numbers 6 – Numbers whose divisors add up to themselves like 6 and 28.

Performance, Pragmata, Practice, – Projection (special term: Quadralectic fourth moment).

personal unconscious (of Freud) 1 – The unconscious related directly to the individual person, and not considered historically beyond the life of the individual or beyond their personality. Propounded as dogma by Freud. Cf. Freud.

Perspective – Hyper Being (trace) (special term: Quadralectic third moment).

perspective painting 14 – Trick that allows a two-dimensional drawing or painting to appear three-dimensional. An illusion of three-dimensional form within a two-dimensional surface. Cf. Brunelleschi.

perspective, perspectival, perspectivized.

Perturbation – Relation⁵ = mapping⁵ between the modifications. See Category Theory.

Pervasion Logic 6, 11 – A Non-Traditional Logic that is the same as Boundary Logic, operates like a Venn Diagram, which is just as strong as traditional syllogistic logic. It is the dual of Syllogistic Logic from the Greek tradition. Was developed in the Indian logical tradition. It is the basic logic of Buddhism.

Petri-Nets 9 – Places, Transitions, and Makers. http://en.wikipedia.org/wiki/Petri_net

phenomenal field 12 – Field within which Phenomena arise in Consciousness with Being Based on Intention, which is based on their prior arising in Awareness as something found in Existence.

phenomenology – Slogan "To the Phenomena themselves." Sees all phenomena as happening in consciousness. Brackets all noumenal aspects of the world that cannot be directly experienced in consciousness. Invented in its modern form by Husserl, and transformed by Heidegger who went back to the proto-phenomenology of Hegel and Aristotle for inspiration. Also invented independently by C. S. Peirce.
[http://en.wikipedia.org/wiki/Phenomenology_\(philosophy\)](http://en.wikipedia.org/wiki/Phenomenology_(philosophy))

phenomenology of practice 12 – Phenomenology of the nature of practice as opposed to theory about it, in which it is converted into praxis, i.e. action based on theory, rather than the primordial and originary action prior to theory. Phenomenology of Practice attempts to get at the archaic, brute, or primordial nature of practical action normally misunderstood by theory.

philosopher's stone 3 – Imaginary entity that embodies the quintessence.

Philosophical Categories 3 – The highest concepts of thought that are differentiated. For Aristotle they have to do with possible propositions about states of affairs. For Kant they are the fundamental characteristics of universal objects studied by physics, such as causation. For Peirce they are the fundamental basis for logic and mathematics that are differentiable, like the elements of geometry. See also the categories of Ingvar Johansson for a more modern attempt to refine the concepts of Phenomenology.

Physis (physis) / Logos 8, 11 – Basic Duality between Physical and Language expressed as a basic duality in Greek Philosophy. Physis (physis) relates to Natural growth rather than just matter. <http://en.wikipedia.org/wiki/Physis>

place – Design Field Element (Pure1, Zeroth).

Platonic solids 3, 8 – tetrahedron, cube, octahedron, icosahedron, and dodecahedron. These are the regular solids that can exist in three-dimensional space. Seen in Timaeus and Euclid's Elements, these are the five regular solids in three-dimensional space, which is a unique organization constrained by the nature of space itself. Models of these have been found in prehistoric sites so they were known since the earliest times of the human race.
http://en.wikipedia.org/wiki/Platonic_solids

play – See leisure.

plenum / blank background vs. organized background 5 – A plenum is a blank, tabula rasa background of a form, or system, or other schema. It is the opposite of an organized background that interacts with the form or system, as in the relationship of a form to the background in a gestalt, or the system in relation to a meta-system. That backgrounds do not matter is one of the assumptions of Systems Theory that does not recognize its dual in meta-systems.

pleroma – neologism. Series of striated and unstriated pairs by which the structure of the

worldview is produced. Emptiness, Void. Being, Beyng. Forgetfulness, Oblivion; Clearing, Open, Local, Global; Immanence, Transcendence.

Plotnitsky, A. – Wrote Complementarity in which he combines the work of Bohr, Bataille, and Derrida to give a picture of the Meta-system as a General Economy.

Pluriverse 2, 8 – Primary Schema that represents multiple Kosmoi. Beyond Experience. Many Worlds Theory in Quantum Mechanics says that there must be many possible worlds that could all be real. Pluriverse is the limit beyond the Kosmos like the Facet is the limit beyond the Monad. Pluriverse and Facet is where our ability to conceptualize the order of our experience (at these scales) begins to breakdown.

point design 11 – A design in which the possibilities of design are not considered or measured against each other.

pointer register 9 – Within CPU where addresses of memory being manipulated are kept. See http://en.wikipedia.org/wiki/Pointer_register

poise – Design Field Element (Hyper3, Sixth).

polyhedra – Form with many sides or faces. Usually three-dimensional. <http://en.wikipedia.org/wiki/Polyhedra>

polytope – Higher dimensional generalization of the polyhedra. <http://en.wikipedia.org/wiki/Polytope>

positioning – Leveraged effect (special term: Quadralectic third moment).

possible, possibilistic – Not actual but could be actual having Being. See "adjacent possible" in S. Kauffman's Origins of Order. http://en.wikipedia.org/wiki/Possible_worlds

Post-modernism 6 – Various attempts to break the grip of Modernism on Philosophy in Continental Philosophy. Calls for the end of Metaphysics.

Post-Structural Schools 1, 6 – Structuralism after the effective criticism of Derrida who posited that structuralism had a hidden unity like Formalism. Derrida mounted a critique of Structuralism stating that it had the same fundamental features of Formalism in a veiled way. He undertook a radical critique that splintered the structural school over the issue as to whether structures need to be unified like formalisms or not.

practice 14 – Means first person actual human actions with concrete results. Cf. Bourdieu An irreversible series of actions. Opposite of Theory. Cf. Foucault for relation to Power.

Practice, Pragmata, , Performance – Projection associated with the multi-lectic (special term: Quadralectic fourth moment).

Pragmata 4, 9 – pragmatic means, hacks, work-arounds, trial and error tactics, solutions to constraints that are practical even if not supported by any theory or justification or method. Also Pragmata are things seen from the vantage point of praxis. "Yet why does Heidegger say that pragmata, referring to the "objects" of praxis, is an "appropriate term" for "things"? Presumably, the reason is that such things demand to be understood ontologically from out of praxis itself (and this means in terms of their proper worldly character), and not as independent subsisting entities, initially devoid of any worldly character. However, this, it seems is precisely what the Greeks did not accomplish. They left the "pragmatic" or praxis-like character of these things ontologically obscure. And this is, by implication, because they failed to achieve a sufficiently originary, ontological understanding of praxis in all its moments as is now well-known in light of the publication of the Marburg lecture courses from the period of Being and Time. This is inadequate interpretation of the ontological character of things, one that, deriving from the experience of craftsmanship, came to understand "things" in terms of the theoria deriving from techne, while (most rigorously in Aristotle) reserving praxis and its specific kind of knowledge (phronesis) for the realm of human ethico-political affairs. This derivation is corroborated by a marginal note Heidegger subsequently added to the expression "mere things" "Why? Edios – morphe – hule! Coming from techne, thus an "artisan" (kunstlerische) interpretation! If morphe not [interpreted] as edios, [then as] idea!" If the objects of praxis or concerned

activity were understood as “mere thing,” this occurred, on Heidegger’s account, because they are viewed essentially as though they were material (hyle) to be worked upon by a craftsman. Material, as a natural resource of techne, came to be regarded as mere material, yet to be given shape and form (morphē) by the craftsman who (in advance) visualizes the edios or visible look of the thing to be produced. Thus, ‘things’ come to be seen as “mere” things: the thing is only fully a thing when it has achieved its telos (the stamp of its eidōs) as the completion of its form. Taken in itself, the thing is deficient with regard to its proper form yet to be bestowed by human invention” McNeill, Wm. The Glimpse of the Eye: Heidegger, Aristotle, and the Ends of Theory (NY: SUNY, 1999) pp. 64-65. See also Practice, Performance – Projection (special term: Quadralectic fourth moment).

Pragmatic Target (special term: Quadralectic fourth moment).

Pragmaticism – Philosophy of C.S. Peirce and William James (Pragmatism). Emphasizes the practical, sees continuum between pure and practical reason, and between mind and matter in the universe. <http://en.wikipedia.org/wiki/Pragmaticism>

prana (shakti) 16 – Subtle Energy in Ancient Indian Medicine and Cosmology. <http://en.wikipedia.org/wiki/Prana> See also <http://en.wikipedia.org/wiki/Shakti>

praxis 14 – Means Action guided by Theory.

presence – An aspect of Being in which something is shown instead of hidden, the opposite of absence.

Presence – Positive Aspects (special term: Quadralectic fourth moment).

present moment – Moments in time associated with the multi-lectic (special term: Quadralectic first moment).

present-at-hand / abstract ideation 4, 8 – Defined by Heidegger in Being and Time and called by some the extant. It is a mode of Being projected by Dasein in which the projects of Dasein are carried out oblivious to the infrastructure that allows that to occur. It is associated with abstract ideation and Parmenides’ view of the Being as static and frozen. The things we are trying to express when writing with a pencil. See ready-to-hand. Sometimes translated as extant. Cf. Heidegger.

primordial time 14 – Time, with mythic time included. Deeper than either linear or circular time.

privation – Design Field Element (Pure1, Negatory).

problematic 6 – The framing of a problem. Deleuze says that problems are more important and fecund for thought than solutions.

Process Being 2, 6, 10 – Dynamic Ready-to-hand mode of Being. The second meta-level of Being. Dynamic type of Being similar to that defined by Heraclitus where all is flux. A standing in Being where everything is thought of as flowing flux that is constantly changing as proposed by Heraclitus, and taken up by Hegel and others who maintained that Becoming is dominant over Pure Static Being and that Static Being is in fact an illusion. See also Bergson.

Proclivities 8 – Embodiment of Wild Being.

proclivity – Wild Being (flesh) (special term: Pentalectic fifth moment).

product – A finished artifact from the development process. Could be an interim or final product.

Product Line Engineering 4 – Names for Software Reuse approaches. Also called Domain Analysis.

Projected hyle – That part of the matter that is made up or filled in or fabricated by consciousness to give coherence or consistency to experience that is missing in the actual source of the phenomena. (neologism. Husserl did not consider the idea that much of experience is illusion produced by the unconscious as the underpinning of consciousness).

Projection associated with multi-lectic – See sense, goal, Vanishing Point, Pragmata, Practice, Performance, Opacity, Obscuration, Unclearing, de-jection.

propensity 8 – Wild Being (flesh) (special term: Quadralectic fourth moment)

Embodiment of Wild Being.

property – Design Field Element (Pure1, First).

proto-flows 2 – Streams that contain flows that are flowing differentially in relation to each other, as in flows, within streams, within rivers, within oceans. In other words, there is a differentiation of flowing phenomena at various scales. Proto-flows organize the relationships between flows in the same way that proto-gestalts organize the transitions between gestalts.

proto-gestalt 2 – The context of a gestalt that connects a series of gestalts to each other in a coherent fashion.

pseudo-sphere 6 – Same surface and volume as a sphere, but mostly hyperbolic instead of spherical with vortices going to infinity in both directions and a circular singularity between the vortices. <http://en.wikipedia.org/wiki/Pseudosphere>

Psychoanalysis 1 – The precursor to psychology and psychotherapy inaugurated by Freud and developed by Jung, Adler, and others. Philosophy for some reason only recognizes Psychoanalysis and does not normally talk about the later more realistic theories of psychic phenomena. Presently, philosophy considers the theories of Jung and Abraham and Torok as well as certain theories from Gestalt Psychology.

Pure Being 2, 6 – Static Present-at-hand mode of Being. The first meta-level of Being. A standing in Being where everything is frozen as proposed by Parmenides and supported by the arguments of Zeno.

pure presence – The concept that something is only what appears and divorced from what is absent or hidden. cf. Heidegger. See Philosophy of Presence.

purpose 7 – Goal of work, part of the process: circumstance – >means – >purpose. Cf. Hegel.

quadragrams – In Tai Hsing Ching (Classic of the Great Dark), which has 81 quadragrams or tetragrams, there are four places with three possible values that make the 81 quadragrams. In the I Ching there are six places and two possible values (yin and yang) to give 64 hexagrams. The Tai Hsing Ching represents the states of Matrix Logic. Each Tetragram has nine possible states that it describes so that the entire system has 726 elements. Thus, in Matrix Logic there are 81 operators, sixteen for the positive logic and sixty-five for the negative logic. There are nine truth values, which are the values of the tetralemma plus the showing and hiding values (as in the game where you guess what is in someone's hands).

Quadralectic, Quadralectical – Extension of the Trialectic of Work in Hegel to the next possible emergent level, which has four moments, or the interaction of two dialectics. Series is extended to the pentalectic with one more moment.

qualia – Quality. Object of a Qualisign in Peirce's semiotics. Opposite of Quantity in Kant's categories. Attribute of an object perceived. For instance, Red. – Design Field Element (Hyper3, First).

quantum measurement 9 – Prior to Quantum Measurement there is a superposition within a probability wave of different outcomes that are differentiated out by Quantum Measurement. The probability wave describes the probable outcomes of the measurement after the superposition is broken.

quantum mechanical observation 6 – Produces probability distributions from superpositions.

Quantum Mechanics 4 – Branch of Physics that explores the oddities of micro-physical phenomena and its many strange properties. These properties, such as entanglement and super-position, have been shown to exist in many experiments but are not understood fully although they have been formally defined by physicists. http://en.wikipedia.org/wiki/Interpretation_of_quantum_mechanics

quantum world 4 – Micro phenomena with strange inexplicable properties. When Relativity Theory is applied to Quantum phenomena many absurdities result. Thus, Physics has two irreconcilable theories of phenomena one of which is global and macro and the other of which is local and micro in applicability. Both seem to be supported by experiment as long as they are not applied to the quantum world at the same time.

Quarks 9 – Emergent Ontic Level beneath Fundamental Particles that cannot be seen separately, which are the embodiment of the Facet Schema.

quasi-causal – Causation (special term: Pentalectic fifth moment).

Quaternion Algebra 14 – Algebra of Quaternion Numbers that lack the commutative property and have the form $x+i+j+k$.

Quaternion imaginaries, 6 – Next level up from complex numbers discovered by Hamilton. Composed of conjunction $x+i+j+k$.

Query 14 – A form of subjectivity related to Generalized Dasein in Hyper Being.

quintessence 3 – Defined here as the opposite of existence. Existence has neither aspect nor anti-aspect at the same time, while the quintessence has both aspect and anti-aspect at the same time.

radical work 7 – Creative work that either destroys old things or creates new things.

Reader – Viewpoint on the Novel (special term: Quadralectic third moment).

ready-to-hand 4, 8 – Defined by Heidegger in Being and Time and called by some the handy. It is a mode of Being projected by Dasein as the infrastructure that makes the projects of Dasein possible, which are normally hidden while we are in the midst of those projects. For example, the pencil in our hand that helps us express our thoughts in writing that we only notice when the pencil lead breaks. See present-at-hand. Cf. Heidegger.

Reality – Positive Aspects (special term: Quadralectic third moment).

realizability – The ability to be realized and actualized.
http://en.wikipedia.org/wiki/Multiple_realizability

realtime – Means that a software system reacts to input from the environment in time to effect consequences in the world at the pace that things happen in the real world. Normally realtime systems push the performance envelope of what can be done computationally (and in terms of communication between sensors and actuators).
http://en.wikipedia.org/wiki/Real-time_computing

recognition – Meaning (special term: Quadralectic third moment).

recognition, recognizability – To see something and know what it is. Normally based on schema access from memory. But occasionally one is recognizing something one has not seen before.. Recognizing what one has never experienced before is a very hard problem. Recognition plays a key role in an Emergent Event where one is recognizing a new order that no one has experienced, seen, or embodied previously. http://en.wikipedia.org/wiki/Recognition_memory

recursion, recursed – Self-calling function. <http://en.wikipedia.org/wiki/Recursion>

redesignated – Designated again.

refinements – Design Field Element (Wild4, First).

reflections – Design Field Element (Wild4, Sixth).

Reflexive Social Special System 6, 13 – Related to the Octonion Algebra. A special holonomic state where the part is exactly equal to the whole, only deferred. Social properties determined by loss of the associative property. A type of Special System, which is reflexive and social in nature and made up of two autopoietic symbiotic special systems or four dissipative ordering special systems. This is a type of partial organization that is a threshold along with the other special systems part way between the System and Meta-system.

register – Design Field Element (Process2, Zeroth).

relata 3 – Seconds are the relationships between isolatable elements according to Peirce.

Relativity Theory 3 – Posited by Einstein but with precursors that state that there are no absolute makers in time or space and that time and space is a continuum.

relevance – Meaning (special term: Quadralectic second moment).

REM sleep 5 – Rapid Eye Movement in sleep indicate dreaming, but dreams can also occur without REM associated with them.

repetition 4 – Opposite of Representation in Deleuze Difference and Repetition. Work is

how repetition can never repeat the original act of founding the obsessive compulsive acts of repetition. Sacrifice will never regain the wholeness prior to all sacrifice. Cf. Deleuze.

representamen (as related to sign) 7 – Representation of a sign.

Representation – System for the moment of the multi-lectic (special term: Quadralectic first moment).

representation 2 – To present again in a form that has less information than the original presentation. Normally thought of as an abstraction but may be from the original.

requirement – View (special term: Pentalectic fifth moment).

Rescher, N. – Wrote Cognitive Systematization along with many other interesting works of wide range within philosophy including subjects such as Risk. Cognitive systematization explains that one needs to circle in a hermeneutic spiral through one's axioms in order to understand them and see them in the context of the system one has deduced from them, and that it is this process that forms the foundation of thought. http://en.wikipedia.org/wiki/Nicholas_Rescher
<http://www.pitt.edu/~rescher/>

resign 7 – Wild Sign. Self-cancelling symbol.

response set 14 – The set of possible responses that is available.

Restricted Economy 2, 6 – Limited Economy based on the rationality of modern social systems. Analogous to the System. Rational individualistic economic relations are assumed by economists to be normal. Dual of the General Economy where these assumptions do not hold.

reversibility 16 – The fact that there is some opacity in touch-touching.

rhizome 8 – Heterarchy in Wild Being. <http://en.wikipedia.org/wiki/Rhizomes>

Ricci Flow 13 – ‘Topologically malleable topological structures’ Flows that have an intensity that gives them the ability to mutate from one topological structure into another. “In differential geometry, the Ricci flow is an intrinsic geometric flow—a process which deforms the metric of a Riemannian manifold—in this case in a manner formally analogous to the diffusion of heat, thereby smoothing out irregularities in the metric.” http://en.wikipedia.org/wiki/Ricci_flow

riddle 14 – A form of subjectivity related to Generalized Dasein in Process Being.

Right 16 – A nondual within the Western Tradition. Finite and infinite.

Risk 6 – Rationally taking chances on future events and attempting to navigate those waters, Cf. Rescher.

risk calculations – Normally, the Probability of Occurrence times Impact. Looks toward the impact of future events that have not happened yet.

romanticism 4 – A movement of intellectual and artistic reaction against the Enlightenment in Europe, which influenced Hegel and Nietzsche among others. Cf. Friedrich Schlegel.

Roots 16 – A nondual within the Western Tradition beyond Sources. For Roots of Being see Old English Roots.

routine, routinized (work) 2 – Work that can be reduced to a formula, plan, program, or rule of action.

Russell's Rule 6 – Sets may not be members of themselves. A rule for avoiding paradox.

Sallis, J. – Wrote the one of the very best commentaries on Plato's dialogs called Being and Logos. Of interest here is his work on the Timaeus, which is a design manual for the world in which the third kind of Being is mentioned by Plato, showing that ‘differance’ or ‘~~Being~~ crossed out’ was known by the ancients, thus validating its reoccurrence in post-modern Continental Philosophy. http://en.wikipedia.org/wiki/John_Sallis

Sameness, i.e., belonging together, family resemblances 10 – Heidegger defines Sameness as Belonging together in Identity and Difference. Wittgenstein has a similar idea in his reference to family resemblances. http://en.wikipedia.org/wiki/Heideggerian_terminology

http://en.wikipedia.org/wiki/Family_resemblance

satellite knots 6 – Knots within a torus.

scale 2 – Schemas differ by addressing phenomena of different scales (sizes or scopes).

Schemas 1 – In this work, schemas exclusively mean ‘the spacetime envelopes’ projected on experience that serve to organize it. Schemas also serve as templates of pre-understanding and intelligibility for phenomena at their most basic level as embodied in spacetime. Schemas have a wider meaning of pre-understanding from prior experience of anything at any level of experience. For this work schemas is a technical term that Umberto Eco calls "Mathematical and Geometrical Schemas" in [Kant and the Platypus](#). This occurs in his survey of the wider use of the term (severe restriction of the term).

Schemas Science 1 – The study of all the various Schemas within any discipline that uses schemas to organize the subject matter it studies and to identify packages of phenomena that it picks out to study in isolation from other phenomena. Schemas Science is the more abstract counterpart to Systems Science that generalizes beyond the system to cover all schemas that appear in any discipline, and attempts to understand the general nature of schemas as they are discovered by Systems Science, Patterns Science, Forms Science, etc.

Schematization – Emergent Meta-system operation.

Schlick, M. – Founder of Logical Positivism in Vienna and supporter of Wittgenstein. One of the analytical philosophers whose work is relied upon extensively in this paper because of the way that he imagines the conceptual system as self-referential in order to solve the problem of ‘reliance of percepts’. He followed Hilbert in this approach by producing a purely conceptual foundation for thought.
http://en.wikipedia.org/wiki/Moritz_Schlick

Schopenhauer, A. – Philosopher who based his philosophy on Buddhism. He is a major source of P. Wisse’s philosophical perspective. Lived at the same time as Hegel. Considered a pessimist.
http://en.wikipedia.org/wiki/The_World_as_Will_and_Representation

S-double or S-triple-prime Hypotheses 13 – Further extended Hypothesis in General Schemas Theory by the author that there may be up to five dimensions per schema and five schemas per dimension. This hypothesis attempts to push the limit of dimensional and schematic conjunction. This hypothesis is treated in working papers but not in the dissertation.

S-double-prime Theory 13 – Extended Hypothesis of General Schemas Theory as developed by the author: There may be three dimensions per schema and three schemas per dimension. This extended hypothesis attempts to cover the possible case of a three-dimensional pattern. In this case the third dimension is seen as unstable and that causes a collapse into the next higher schema. This happens with three-dimensional patterns when the elements of the pattern obscure each other. This hypothesis is treated in working papers but not in the dissertation.

Second Moment of Quadralectic is associated with the multi-lectic.

secondness – Philosophical Principle of Peirce concerning relationship. Here, it is called relata.

Sedenion Algebra 14 – Algebra of the Sedenion Numbers that lack the commutative, associative, and division properties and have x plus fifteen imaginaries. This algebra is not considered special because it has lost all interesting algebraic properties, and is the first of an infinite number of larger uninteresting algebras.

Seed – Emergent Meta-system moment (special term: Quadralectic first moment).

Sein, Being, Ontos – Being is the most general concept and the most empty. It is unique to Indo-European languages.

Self-* properties 10 – Self-organization, Self-maintenance, Self-repair and other self-related reflexive properties.

Self-interfering organization 6 – Knots are archetypes of self-organization via self-interfering relationships of ordering.

Self-knowledge of Design by a Designed Object 13 – An object has knowledge of its

own Design as a Designed Object, which is an Immediately Dynamical Object combining both senses that Peirce distinguishes, which is both a Design Object and an Object of Design simultaneously.

Semiotics 1 – The study or science of Signs, cf. F. de Saussure', C. Peirce Also called semiology.

sensation – Leveraged effect (special term: Quadralectic fourth moment).

Sense – Projection associated with the multi-lectic (special term: Quadralectic first moment).

Sequence Diagrams 9 – Shows worldliness and the relationships between them in terms of events occurring on different parallel worldliness. Also called Worldline and Scenario, where the scenario is the causal interaction across worldliness in terms of linked evens. http://en.wikipedia.org/wiki/Sequence_diagram

Set – A Foundational Mathematical Category that establishes the basis of mathematics in terms of different particulars grouped together in an arbitrary fashion. All of Set Theory can be produced using the empty set '∅' and the empty brackets '{}' as markers without any actual elements contained within the set.

Set Theory 3 – The theory of sets, which are seen as the simplest type of mathematical category. It is the zeroth category where functions are added in order to define all other categories. http://en.wikipedia.org/wiki/Set_Theory

sextalectic – If the Quadralectic and Pentalectic exist, then it could be that there are higher forms like the Sextalectic. But these are not explored in this study, even though they are mentioned as a possibility.

sextrahedron – Minimal solid in five dimensional-space.

Seyn, Beyng. Older style used by Hegel from High German. Used by Heidegger as an alternative to striated Being in his [Contributions to Philosophy](#). It is used in this study to attempt to solve the mystery of meaning.

Short-term memory – Seven plus or minus two things can be kept in memory simultaneously. This is called chunking. Gives an upper limit to the complexity of thoughts at any one time. Distinguished from Long-term memory. http://en.wikipedia.org/wiki/Short-term_memory

showing and hiding – The process by which things appear and disappear in experience. cf. Heidegger.

showing forth thread – Threads of meaning (special term: Quadralectic fourth moment).

Sieve of Eratosthenes 13 – Algorithm for finding primes. http://en.wikipedia.org/wiki/Sieve_of_Eratosthenes

Sign Engineering 15 – The creation of sign system representations of Designs in the process of developing of engineering implementations. Sign systems that represent the emergent properties of systems are engineered prior to actual implemented physical constructs. Cf. Wisse.

Signature – Mediation (special term: Quadralectic fourth moment).

signature 7 – Specific qualities of attributes that differentiate an instance.

significance – Meaning (special term: Quadralectic first moment).

signifier/signified 3 – Distinguished by F. de Saussure as the sign and the thing indicated by the sign. This view of semiotics is founded on a dualism rather than a three part relationship.

Signs 3 – Peirce saw a sign as being a three part relationship between a subject's interpretation, an objective circumstance and the objective marker of the relationship. A sign has to be seen as a sign by someone, as well as tied to a context or object. Signs are materially represented in many different forms. Peirce defines nine categories of signs. Signs are the carriers of incomplete meanings, senses, relevance, and significances that are the parts of emergent Symbols. Yet, signs can exist external to their fusion into symbols. The perfect example of a sign is a subscript on a variable. X1 is indicated to be different from X2 in some way by the subscript. Peirce uses the Wind Vane as the example of the sign. They are things in the external environment that indicate something about something by

reference within a certain context. The sign has no meaning in itself without its attachment to the variable. Thus, a sign out of context, without attachment to a form or some other carrier has no intrinsic meaning unless defined to have such meaning externally. A good example is a road sign indicating a curve ahead. Its placement prior to the curve gives it meaning that is useful, even though the symbol on the sign has a predefined meaning. That meaning is not realized unless it is tied to a context.

- simile** 13 – Master trope (special term: Pentalectic fifth moment). Something is like something else. Eg. "The nation is like a body of people". Cf. Vico, Burke.
- simultaneity** – Design Field Element (Ultra5, Fourth).
- Sine Gordon Equation** 14 – Solutions to the Sine Gordon Equations are sometimes Solitons.
- singular** – Design Field Element (being0, Seventh).
- Singularities** 2 – Design Field Element (Ultra5, Seventh) Points where rules, plans, programs, laws, and orders break down and unexpected discontinuous changes in phenomena occur. Normally thought to be a locus in a control space that causes the discontinuous change in the behavioral space. Cf. Thom.
- Singularity** – Associated Foundational Mathematical Categories (special term: Quadralectic first moment). A Foundational Mathematical Category in which all rules, laws, order fail.
- sink point** 2 – Dual of origin in the sense that it is the place where the system leaves the arena, which may be different from the origin point of the system within the boundary.
- Site / Event** (siteEvent) Category 6 – A Foundational Mathematical Category that establishes local spacetime. Added to Set theory by Badiou to produce a viable metaphysics. Site/Event is interpreted also as the production of Local Spacetime by observation as in Quantum Measurement.
- Situation** – Meta-system for the moment of the multi-lectic (special term: Quadralectic second moment).
- six hundred cell polytope** (600-cell) – One of the largest of the polytopes in four-dimensional space, dual of the 120-cell polytope. <http://en.wikipedia.org/wiki/600-cell>
- sixteen cell polytope** (16-cell) – One of the smaller polytopes in the fourth dimension that is a dual of the 8-cell. <http://en.wikipedia.org/wiki/16-cell>
- skepticism** 1 – Skepticism is a philosophy we know best from the works of Sextus Empiricus in late antiquity. It is a doubting of any dogma. A famous modern example is Hume who doubted Causality and other fundamentals assumed by Philosophy as givens, which gave Kant the impetus to formulate the Critique of Pure Reason as a response. Hegel was influenced by Ancient Skepticism in his development of modern dialectics. cf. Sextus Empiricus, Hume, Hegel.
- sociable numbers** 6 – Numbers in series, which form a circle whose members add up to each other in sequence.
- Social Constructivism** 1 – A type of Social Theory that advocates the idea that much of what we experience is constructed by us as we interact in social groups rather than given to us as immutable phenomena. It says we transform what we experience in the process of experiencing it, but as a social, not as an individual act of transformation. Therefore, it attempts to produce a theory that avoids solipsism but also does not fall into the extreme of radical realism that describes all given phenomena as immutable. cf. Berger and Luckmann.
- socius** – Used by Deleuze and Guattari in Anti-Oedipus as the other extreme from the desiring machine one of which is below the level of the individual and the other of which is beyond the level of the individual. The socius is conceived of as a rhizome of desiring machines.
- Solitons** – Waves that act as particles and (to some extent) defy entropy locally.
- source** 2 – Singularity from which the arena and everything in it arises within a Meta-system.

Sources 16 – A nondual within the Western Tradition beyond Fate.

spacetime – In the Special Relativity Theory of Einstein, the four-dimensional frozen block of time and space are fused.

Special Systems 6 – Systems that have special ultra-efficacious properties such as the Dissipative Ordering, Autopoietic Symbiotic, and Reflexive Social partial systems and partial meta-systems.

specious present (definition from William James) 8 – Takes time for something to appear.

spectra – Design Field Element (structure) (Process2, First).

Spectrum – Range of values whose quality or quantities change as one moves through the possible values. <http://en.wikipedia.org/wiki/Spectrum>

spinor – In four-dimensional space one needs to spin to stand still, but the spin is 720 degrees before re-entry into itself, as opposed to the 360 degree self-returning path of a circle. Cf. R. Penrose. <http://en.wikipedia.org/wiki/Spinor>

spot – Design Field Element (being0, Zeroth).

S-Prime Hypothesis of General Schemas Theory 2, 13 – The first hypothetical theory produced by the author when formulating a specific theory within General Schemas Theory. This theory is open to refutation that there are only ten schemas and that there are two dimensions per schema and two schemas per dimension. Later, other theories were developed that added dimensions to each schema called S-double-prime and S-triple-prime, which gave three and five dimensions per schema and explored the result of the addition of dimensional scope to individual schemas.

Stance – System for the moment of the multi-lectic (special term: Quadralectic third moment).

standing 1 – We approach things based on various standings. Consciousness produces illusory continuities that obscure as well as reveal and spotlight specific phenomena. Awareness is related to existence rather than Being. It is the apprehension of phenomena with minimal projection. We take a stance toward things when we ascribe Being to them, as opposed to their existence, which is their nature as they are found without excessive projection. A “standing toward things” is an approach to phenomena. Four approaches are considered canonical in this work: Being, Existence, Manifestation, and the Amanifest. There are five meta-levels of Being each of which is considered a standing, so, in all, there are seven standings when we consider that Ultra Being is a form of Existence. The standings are Pure, Process, Hyper, Wild and Ultra Being, Existence composed of Emptiness and Void beyond Ultra Being, and Manifestation, which is prior to the distinction between Emptiness and Void. Beyond the Manifest and Non-Manifest there is the A-manifest, which is the deepest conceivable nondual beyond Manifestation. It is a deeper nondual than either Emptiness or Void. This series of nonduals is neither immanent nor transcendent but something else unspecified as a definite alternative beyond the logical alternatives. A Standing is a metaphysical term that connotes the status of a phenomena. Phenomena that are dualistic and constructed from illusory continuities are seen as having Being. Phenomena that are nondual are seen as either being empty or void and thus have existence because they are outside the illusory continuities manufactured or fabricated by the unconscious that gives coherence to consciousness. The depths of possible nondualities is unknown. The Amanifest is posited as an ideal limit. There must be some nondual deeper than the complementarity of the nonduals emptiness and void.

State Machines 9 – States, Events, Actions and Transition diagrams. See “Real Time UML”, Werner Van Belle. Tom Toutenel, Viviane Jonckers, <http://werner.yellowcouch.org/Papers/seescoa-d2.1/index.html>

Static Being 6 – Parmenidian Being. Pure Being, present-at-hand, pointing.

Striated – One of the pairs within the Pleroma, which is the opposite of the unstriated element. Striated means internally differentiated while unstriated means undifferentiated. Examples are Being and Beyng, Emptiness and Void, Clearing and Open, Forgetfulness and Oblivion. The first in each pair is striated and the

second is unstriated. These pairs are the basic structures out of which the worldview is socially constructed.

String theory – Physical Theory that sees physical phenomena being unitized in higher dimensional space in at least ten dimensions in most cases.

http://en.wikipedia.org/wiki/String_theory

Structuralism 1, 5 – Theories concerning the structures of content, regardless of form. A school that studied phenomena based on discovering sets of oppositions that had specific relationships to each other beneath the formal level of organization. Cf. Piaget, Levi-Strauss.

subjective probability 6 – Probabilities assigned by the subject with no objective criteria. Cf. Bayesian.

sublate, sublation, subsumption 6 – Aufhebung in German, raising to a higher whole competing theses by producing a synthesis that embraces the conflict at the lower level of abstraction or embodiment. <http://en.wikipedia.org/wiki/Sublation>

subtleties – Design Field Element (Ultra5, First).

Sun of the Good 16 – Source of Variety of the Forms. Cf. Plato. Republic.

superposition / entanglement 4 – The two extreme phenomena that together make quantum phenomena incomprehensible. Also very similar to the limits of Plato's divided line. Paradox is like entanglement and Supra-rationality is like superposition.

supervenience – Assumes that higher order phenomena needs an isomorphic base in lower level phenomena. Opposite of Emergence, which assumes that the relationships between higher and lower order phenomena are homeomorphic not isomorphic. <http://plato.stanford.edu/entries/supervenience/>

Supra-rational 4, 16 – Holding two opposite things together at the same time without their being in conflict. Opposite of Paradoxical. Other limit of the Divided line. Taking two opposite things together at the same time without mixture. Like the qubit in Quantum computation that is both one and zero at the same time, but still will be separable if one or the other is observed. The one and zero are both descriptive of the state of the qubit at the same time without mixture. Observation will probabilistically choose one or the other as the outcome of the observation at the end of the computation.

Surgery 13 – Way of producing new topologies by cutting and gluing manifolds within space. http://en.wikipedia.org/wiki/Surgery_theory

Surroundings – Meta-system for the moment of the multi-lectic (special term: Quadralectic third moment).

Syllogistic Logic 6, 11 – Traditional Logic based on the Syllogism. Associated with Set Theory.

symbiosis – Design Field Element (Wild4, Fifth).

Symbiotic Autopoietic Special System 6 – Related to Quaternions and the loss of the commutative property.

Symmetry Breaking 9 – Symmetry breaking is the production of an asymmetrical discontinuity that is a catastrophe. Cf. R. Thom, Catastrophe Theory.

synchronic 2, 3 – A slice of time at a moment, or within a narrow period that has its own structure within that time period. See diachronic.

http://en.wikipedia.org/wiki/Synchronic_analysis

synchronic gestalt 2 – Most Gestalts are single apprehensions in a moment in time and thus are naturally synchronic.

Synecdoche 13 – Master trope (special term: Quadralectic first moment). Substitution of a part for the whole. All hands on deck. Cf. Vico, Burke.

Synergy, synergetics 3 – Design Field Element (Hyper3, Fourth). Synergy is a principle beyond continuity adduced by B. Fuller that we can add to the Philosophical Categories of Peirce. This is the first clearly trans-Peircean category. It is based on Geometry and not Logic. Peirce's categories are all that are necessary for Logic to exist, but for Geometry to Exist a further Category is necessary. This is seen most

clearly in Higher dimensional objects but also apparent in three-dimensional solids as studied by B. Fuller in Synergetics.

SysML – New standard for Systems Engineering representations. It extends UML.
<http://en.wikipedia.org/wiki/Sysml>

System 1 – A system is a set of objects or forms as well as their relationships within a definitive boundary. A system is a primary schema for organizing experience. cf. Bertalanffy, Klir. Associated with the moment of the multi-lectic – See Representation, Behavior, Stance, Content, Juncture/Joining.

Systems Engineering 1 – Systems Engineering is the practice of building whole systems that work in actual environments. Traditionally the role of Systems Engineering is to take responsibility for the viability of the entire system end to end both in space and time, i.e. across the lifecycle from one boundary of the system to the opposite boundary in every respect. cf. INCOSE.

Systems Science 1 Systems Science is the study of the nature of systems within various disciplines across a range of possible systemic phenomena in nature, within society, and even within individuals. But, outside the discipline, Systems Science refers to the interdisciplinary comparison between different types of systems (from different disciplines) in order to understand Systems in general, and this includes the ranges from Simple to Complex, and from Non-emergent to Emergent.

Systems Theory 1 – Systems Theory is a theoretical vision of the nature of Systems as generalized across all phenomena. cf. Bertalanffy, Klir (also related are systemhood, systemism, systemicist).

Syzygy 13 – Alignment, conjunction <http://en.wikipedia.org/wiki/Syzygy>

tacit knowledge 2 – Our understanding of phenomena that overflows what is possible to say. Cf. M. Polanyi.

Target associated with multi-lectic – See Meaning target, Behavioral Target, Intentional Target, Pragmatic Target, no-target.

techné – Art of producing cultural items that have properties that things in nature do not necessarily possess. A more general term than technology.

telos – Purpose, goal. The teleology of Aristotle is contrasted to the ‘teleonomic’ in which the goal is produced in the process of evolution. Cf. J. Monod.

temporal gestalt 1 – A gestalt that does not appear all at once but appears over time as a whole temporal phenomena. Like a Baseball Game that is different from the final score, or the picture of the team. Linked to G.H. Mead’s idea that things take time to be what they are and also linked to the "specious present" of William James. Cf. James, Mead.

temporal, temporalized, temporality – Related to time. See Phenomenology of Internal Time Consciousness by Husserl, and edited by Heidegger. Fundamental idea of Being and Time is to understand Being in terms of Time.

Ten Mysteries of interpenetration/intra-inclusion 13 – Different modes of Interpenetration and Intra-inclusion.

Tendency 8, 16 – Embodiment of Wild Being (flesh) (special term: Quadralectic first moment). See also Disposition, Inclination, Propensity, Proclivity 16 – Various names for the quality of Wild Being in its embodiment.

tensegrity – Proposed by B. Fuller as a way to create rigid structures with some non-rigid parts through the distribution of tension within the structure. Model for Integrity.
<http://en.wikipedia.org/wiki/Tensegrity>

Tesseract – Four-dimensional analog of a cube that is also called the eight-cell polytope.
<http://en.wikipedia.org/wiki/Tesseract>

Testing Environment 15 – Adding Reality gives three more properties over and above those of the Formal System, which are verification, validation, and coherence.

Tetrahedron 3 – The minimal solid in the third dimension composed of four points, six lines, four triangular faces with a lattice 1-4-6-4-1.
<http://en.wikipedia.org/wiki/Tetrahedron>

Tetralemma 6, 13 – Four statements: A exists, A does not exist. A both exists and does not

exist. A neither exists nor does not exist. Last statement contains a double negative in which each negation means something different and thus does not cancel.

- Tharmas.** Zoa in Blake's epic "The Four Zoas", Related to Instinct and Nature. We have talked about Wille and Trieb in this study, which is related to this Zoa.
<http://en.wikipedia.org/wiki/Tharmas>
- Theater of the Mind** 14 – A way of relating the third dimensional character of the Psyche to the fourth dimension. Cf. David Grove Cf. Yates.
- thematize** – In Phenomenology when we take something as something else. It is what lies behind the master tropes, such as simile, or metaphor, or metonymy, or irony. We must thematize before we apply the master trope to some topic.
- Theorizing** 9 – Theorizing is the production of a vision of the "edios" that explains a phenomena. http://en.wikipedia.org/wiki/Theory_of_Forms Cf. Blum.
- Theory** 14 – An observer's view of things, and actions and results. Cf. Bourdieu Theory contemplates the reversibility of those actions. Opposite of Practice.
- Theory of Higher Logical Types** 11 – The production of meta-levels by taking a phenomena to the next power. Higher logical types are the opposite of meta-levels. Theory was introduced in Principia Mathematica. Cf. Russell, Cf. Copi.
- Theory of Relativity** – Theory of Einstein, which assumes that space and time form a single interval of four-dimensional spacetime in which different reference frames see various phase representations between space and time dimensions.
http://en.wikipedia.org/wiki/Theory_of_relativity
- There-Being** 8 – DaSein Cf. Heidegger, being-in-the-world.
- Thing** 8 – Old English meaning Social Group. See Heidegger's What is a Thing.
- Third Moment** of the Quadralectic, associated with the multi-lectic.
- Thirds**, thirdness 13 – Continua. Philosophical Category of Peirce.
- thought** – habitus (special term: Quadralectic first moment).
- Threads of Difference** 12 (absence, illusion, fiction) – Beyng is the difference between the aspect and anti-aspect. Therefore the anti-aspects are important to understand the aspects and should not be suppressed.
- Threads of meaning** associated with multi-lectic – See import thread, happening thread, tracking thread, showing fourth thread.
- thrown-ness** 4 – Being already in and engaged in the world when one realizes oneself is alive and has a world but that one is heading toward death.
- Timaeus** – Dialogue of Plato in which the Demiurge creates the World. First Design book about the nature of design, which mentions Pure, Process and Hyper Being explicitly. Cf. J. Sallis commentary.
[http://en.wikipedia.org/wiki/Timaeus_\(dialogue\)](http://en.wikipedia.org/wiki/Timaeus_(dialogue))
- Timespace** – Minkowski version of 'spacetime' <http://en.wikipedia.org/wiki/Minkowski>
- Time-Space**, see Heidegger Contributions. Means matrix of spacetime/timespace.
- TINSIT** 7 – tendency in a situation Cf. Coutu. Coutu was one of the first to produce a dispositional theory of human action in social situations.
- Topoi Category** 3 – The Mathematical Category that defines Logical Systems. It has a subtype classifier such as true and false and gives mathematical definition to Logical systems.
- Topology** 13 – Design Field Element (Hyper3, Third). Mathematics of the ways in which geometrical objects can be deformed in space such that the structure of space is made understandable. <http://en.wikipedia.org/wiki/Topology>
- Topos theory** – Category for Logics. http://en.wikipedia.org/wiki/Topos_theory
- torus knots** 6 – Knots wrapped around a torus.
- torus**, tori 3 – A donut shape. <http://en.wikipedia.org/wiki/Torus>
- touch-touching** 8, 16 – Nature of Wild Being and its opacity to itself. Chiasmic reversibility in perception. Cannot touch and be touched by oneself at the same

time, cannot tickle oneself.

tracking thread – Threads of meaning (special term: Quadralectic third moment).

Transcendental Idealism 6 – Kant and Hegel's basic approach to philosophy that assumes that there are transcendental ideals or absolutes that govern experience that are beyond experience.

Transcendental Phenomenological Philosophy 1 – Transcendental refers to what is beyond Experience. But in Husserl all Transcendentals that are not phenomenologically presentable are bracketed, and thus it comes to mean in Phenomenology those things that are beyond immediate experience, and are thus a priori in the Kantian sense but within experience, like reason, number etc.

transcendentals (See also finitudes) – The worldview is composed of layers of transcendentals according to idealists in the tradition. The number of transcendentals are themselves finite and called finitudes because they bind human existence as existentially finite.

Trialectic (the relationship between three things rather than two) 9 – Only known prior use is Oscar Ichazo. This use is different from the trialectics that Hegel develops in Phenomenology of Spirit in the context of work in his transition from Reason to Spirit. http://en.wikipedia.org/wiki/Oscar_Ichazo. Trialectics is where there are three theses that are related in a triality relationship, and where there is proactive mediation of foreground and background elements.

Triality 6, 9 – Property that appears in Octonions where there is three-way symmetry, very rare in mathematics and even in nature. Three-way complementarity. Also seen in the relationship between the three imaginaries of the Quaternion. Very rare phenomena. Predicted to exist by Arkady Plotnitsky in Complementarities.

trianary – Three-way.

Trichomous Sign 6 – Three part structure of the sign recognized by Peirce. Also Threefold nature of the Sign assumed to have the property of Triality.

Trieb 1 – German word Freud used that was translated as instinct, but also has a deeper meaning including desire, passion, and other higher motives beyond base instincts. Self-realization was reintroduced by Maslow because it was realized that human beings cannot be reduced to basic instincts such as the drives of hunger, thirst, and sex that Freudian translations into English suggested. This translation of ‘Trieb’ by instinct set the stage for behaviorism. For a critique of Behaviorism see The Structure of Behavior by Merleau-Ponty. Using Trieb is an attempt to about basic human motivations in a none-reductive way.

trope cross 14 – Crossing Metaphor and Metonymy, or any two of the master tropes. Cf. Jacobson.

Truth – Positive Aspects (special term: Quadralectic second moment).

twenty four cell polytope (24-cell) – Unique Platonic Solid in four-dimensional space. No analog in any other space. <http://en.wikipedia.org/wiki/24-cell>

two-way route 13 – Ascent and descent of the Hierarchy of the Schemas that produces representation going down and repetition going up. Separation of these two routes allows the sub-schemas to be differentiated.

Type theory – See Higher Logical Types. http://en.wikipedia.org/wiki/Type_theory

typification – Making into a type. See A. Schutz social phenomenology.

ultra-one 6 –Badiou’s term for the arising of the one that covers up the possibility and actuality of the multiple.

unbeckoned – Term that tries to describe aspects of reality that present themselves although we have not imagined previously. In other words, they are not projected beforehand.

unbreachable – Impenetrable boundary.

Unclearing, Opacity, Obscuration – de-jection (special term: Pentalectic fifth moment).

unconnectable – Impossible to relate.

Uncountable 15 – Multiple. Not countable nor infinite.

Uncovering – Positive view of Fourfold (special term: Quadralectic second moment).

uncrossable – Distances that cannot be crossed.

Undecidability Proof, undecidable 3 – Proof by Godel that some statements cannot be decided to be inside or outside a given formal system, like Peano's arithmetic. Proved by diagonalization, mould $X^?X^?X^?$, which is similar to the way that irrational numbers are discovered in Geometry. Both irrational numbers and undecidability of statements in formal systems shows that systems cannot be used directly to measure themselves. Cf. Godel.

unfoldings – See The Fold by Deleuze. Catastrophe theory is about folded control surfaces in the control space. In micro-genesis gestalts unfold in a discontinuous manner.

unhewn – In the series unhewn, rough hewn, hewn, cut, filled like a brick mould. Unhewn is when the distinctions are at their most porous and that means that the introjected hyle can have the most effect on our projections.

Unified Modeling Language (UML) – Representational Language for Software Methods and techniques, which have become a standard through the work of the Object Management Group (OMG).
http://en.wikipedia.org/wiki/Unified_Modeling_Language
http://en.wikipedia.org/wiki/Object_Management_Group

union – Design Field Element (Ultra5, Fifth).

Universal Algebra 16 – Most general type of Algebra of things and relationships. Related to the Design Object and the Immediate Object of Peirce. See also Co-Algebra.
http://en.wikipedia.org/wiki/Universal_algebra

Universal Turing Machine 2 – Turing Machine that reads other Turing Machines from tape and executes them. Could be thought of as a Meta-Turing machine.

unKnot – circular line (or string) with no crossings that cannot be undone without cutting the line.

unrepresentable, unrepresentability – Higher dimensional figures are impossible to represent in lower dimensional space without a loss of information about relationships between elements and distortions or warpages.

unschematizable, unschematized – what cannot be schematized.

unstriated – opposite of striated. See striated and pleroma.

unsynchronizable – impossible to synchronize.

untethered – unlinked, disconnected.

unthinkability – impossible to think conceptually. Supra-rational.

Urizen – Zoa who represents Reason in Blake's epic featuring the Four Zoas. The Zoa whose shadow, spectre, and emanation are the divided line of Plato. This suggests that there are three other divided lines represented by the other Zoas that are submerged in our tradition.

Urthona – Zoa who represents the Earth in Blake's epic concerning the Four Zoas.

Use Case, mappings 9 – Shows mapping of Agent actions to Functions in a System. Part of UML. http://en.wikipedia.org/wiki/Use_case

Vanishing Point – Projection associated with the multi-lectic (special term: Quadralectic third moment).

vaporware 10 – Non-existent software that is advertised to have all the features that the consumer desires.

Varella, F. – Co-founder with Maturana of Autopoietic Theory. Cf. [The Embodied Mind](#).

Variety Producers (Humans as ...) 9 – Humans are variety producers such that no structural, formal, or systemic theory can completely capture the variety that humans produce. Cf. Stafford Beer.

Vico, G. – Wrote a history of humanity in which he posited that human culture was organized by the Master Tropes. http://en.wikipedia.org/wiki/Giambattista_Vico These were picked up by Kenneth Burke. This is part of the history of the Quadralectic.

View – Emergent Meta-system moment (special term: Quadralectic third moment).

views of realtime systems associated with multi-lectic – See function, event, agent, data.

Virtual Layered Machine 9 – A simulation of a machine structure in Software that is hierarchically organized. Cf. Shumate, Ken
<http://portal.acm.org/citation.cfm?id=339991>

virtuality – Not real but almost. <http://en.wikipedia.org/wiki/Virtual> Fundamental concept for Deleuze. Cf. M. Delanda
<http://www.protevi.com/john/Postmodernity/IntensiveScienceOutline.html>

V-Model – Model of the Development Lifecycle. <http://en.wikipedia.org/wiki/V-Model>

Void 3 – The nature of space in Nature where there is no matter. The universe is mostly made up of empty space within which matter exists in a vacuum. Empty space surrounds everything. It is considered the ultimate nature of Nature and in Taoism is considered to have a nondual nature. It exists but it has no matter in it. Plato calls it the receptacle or the chora in the [Timaeus](#).

void point 6 – Empty space of points that is the background for the drawing of figures in geometry.

Voloshinov, V. – Marxist Semiotician that appears often in the dissertation of P. Wisse
<http://en.wikipedia.org/wiki/Voloshinov>

Vortices (Gyres) – Produced by Positive Feedback in a negative or positive direction that appear as ‘tornado like’ funnels within the Meta-system that can destroy the viability of a System. Related to the hyperbolic nature of the pseudo-sphere.

warpage – the act of warping, the result of warping.

Well and Tree (Yddrasil) 14 – Primal Scene of Indo-Europeans. Cf. Bauschatz.

wellfounded – A set is well founded if it cannot be a member of itself and is not well founded if it can. Interpenetration is modeled by the special case where a set can be a member of itself by indirection if it is included in one of the members of the set but not the set itself.

wesung – German word for Essence used by Heidegger especially in [Contributions](#) where it is translated as sway.

whatness – essence, kind.

Whole – Foundational Mathematical Category. A Foundational Mathematical Category based on mereology where the relationships between part and whole are considered in terms of hierarchies of individuals that are either parts or wholes.

Wicked Problems 10 – Sorts of problems whose cure is worse than the disease. Problems that are intrinsically almost impossible to solve.
http://en.wikipedia.org/wiki/Wicked_problems

Wild Being 6 – Propensities that are Out of hand as a mode of Being. The fourth meta-level of Being. Associated with the idea of Flesh in Merleau-Ponty. It is associated with multi-lectic – See tendency, disposition, inclination, propensity, proclivity.

Wild Systems 10 – Systems Seen in the light of Wild Being.

Will to Power 10 – Key term usually contrasted to Eternal Return, which is a basic idea of Nietzsche. It is interpreted various ways by different interpreters of Nietzsche. But it means something like the Will to impose your own values rather than accept traditional values since the free spirit transvalues all values and establishes its own values. It also means the will to become ascendant by the exercise of power in order to conquer.

Will to Will 10 – Heidegger’s interpretation of “Will to Power” in Nietzsche. Cf. Heidegger on Nietzsche.

Wille 4 – *Wille* in German, has broader meaning than the English term Will. Has connotations of desire not just self control. It is what Schopenhauer sees as the thing-in-itself (noumena) within us.

Wisse, Pieter, Wissian – Pieter Wisse wrote his dissertation on Sign Engineering and this has become the basis for my own work through critique and refinement. He defined the Ennead to which I add a moment of perspective to achieve the

Quadralectic. I call his use of Peirce's categories Wissian because, in my opinion he is not true to the meaning Peirce had in mind. But his own categories allow for the precise definition of the structure of the moments of the Quadralectic.

work 6 – According to Hegel determined by the trialectic of circumstance, means purpose.

world 2, 5 – A primary schema that contains all possible perspectives of a human group that form a society and a culture in a given historical epoch however brief or extended. One of the primary schema. At the limit of what is experienceable by an individual within a society with a given culture at a given time.

world horizon 2 – The explorable boundary of a world. The backdrop within which everything within a world takes place but is not part of the Kosmos.

World Tree (Yddrasil) 12 – Image of the Pluriverse made up of all the species, both seen and unseen.

world view 2 – A view or vision of the wholeness of the world and its structure, different from the phenomenal world itself. It is an idea about the world and its structure rather than its phenomenal reality.

worldline – A path through SpaceTime.

Worldline and Scenario Minimal Method 12 – Separate Worldlines of Tasks with their events and the scenario of causation or information flow between worldlines.

WorldSoul 6 – Plato's moving image of eternity, the combination of Being and Becoming that appears as having the nature of Hyper Being.

Writing under Erasure 13 – A way to express Differance, i.e. ~~Being~~ (crossed out) Cf. Derrida, Heidegger.

Wu Xing – See also Hsing. Means Five Hsing or five control and production nodes in the circulation of Chi. http://en.wikipedia.org/wiki/Wu_Xing

Wyrd – Fate in Old English.

x-lectics – Mono, Dia, Tria, Quadra, Penta, etc.

x-scape – OpenScape as a generalization of SeaScape, LandScape, MindScape, etc.

Yddrasil – World Tree's name in Norse Myth. See World Tree.

Zeno 9 – Produced paradoxes related to movement supporting Parmenides' view of the Static nature of Being. Movement inherently produces contradiction from this point of view of Logic. See Lynds, Peter (2003) Zeno's Paradoxes: A Timely Solution. <http://philsci-archive.pitt.edu/archive/00001197/>

Zeroth, operator (operand) 9 – The Zeroth Operator has no Operand.

Zeroth, Zeroness – trans-Peircean Philosophical Principle of Background.

Zoas, Cf. Blake Four Zoas. Principles of Life.

Bibliography

This is a list of referenced and consulted works.

Important works for this research project are marked '**' and more significant works are marked '***'.

- Abbott, Edwin Abbott. Flatland: a Romance of Many Dimensions. New York: Barnes & Noble, 1963.
- Abbott, Edwin Abbott, and Ian Stewart. The Annotated Flatland : A Romance of Many Dimensions. Cambridge, Mass.: Perseus Pub., 2002.
- Abian, Alexander. Boolean Rings. Boston: Branden Press, 1976.
- Abraham, Nicolas, Nicholas T. Rand, and Maria Torok. Rhythms : On the Work, Translation, and Psychoanalysis. Stanford, Calif.: Stanford University Press, 1995.
- Abraham, Nicolas, and Maria Torok. The Wolf Man's Magic Word : A Cryptonymy. Theory and History of Literature, V. 37. Minneapolis: University of Minnesota Press, 1986.
- Abraham, Nicolas, Maria Torok, and Nicholas T. Rand. The Shell and the Kernel : Renewals of Psychoanalysis. Chicago: University of Chicago Press, 1994.*
- Abraham, Ralph. Chaos, Gaia, Eros : A Chaos Pioneer Uncovers the Three Great Streams of History. San Francisco: Harper, 1994.
- Abram, David. The Spell of the Sensuous : Perception and Language in a More-Than-Human World. New York: Pantheon Books, 1996.
- Aczel, Amir D. Entanglement : The Greatest Mystery in Physics. New York: Four Walls Eight Windows, 2002.
- Aczel, Peter. Non-Well-Founded Sets. C.S.L.I. Lecture Notes, No. 14. Stanford, CA: Center for the Study of Language and Information, 1988.*
- Adams, Colin Conrad. The Knot Book : An Elementary Introduction to the Mathematical Theory of Knots. New York: W.H. Freeman, 1994.*
- Adams, Ernest W. Surfaces and Superposition. Stanford, Calif.: CSLI Publications, 2001.*
- Adams, Richard Newbold. The Eighth Day : Social Evolution as the Self-Organization of Energy. Austin, Tex.: University of Texas Press, 1988.
- Adler, Irving. Groups in the New Mathematics; an Elementary Introduction to Mathematical Groups through Familiar Examples. New York: John Day Co., 1968.
- Adorno, Theodor W. Against Epistemology : A Metacritique : Studies in Husserl and the Phenomenological Antinomies. Studies in Contemporary German Social Thought. Cambridge, Mass.: MIT Press, 1983.
- . Negative Dialectics. New York: Seabury Press, 1973.*
- Adorno, Theodor W., and Rolf Tiedemann. Kant's Critique of Pure Reason (1959). Stanford, Calif.: Stanford University Press, 2001.
- Agamben, Giorgio. The Signature of All Things : On Method. New York; Cambridge, Mass.: Zone Books ; MIT Press, 2009.
- Agha, Gul A. Actors : A Model of Concurrent Computation in Distributed Systems. The MIT Press Series in Artificial Intelligence. Cambridge, Mass.: MIT Press, 1986.
- Albert, David Z. Quantum Mechanics and Experience. Cambridge, Mass.: Harvard University Press, 1992.

- Albertazzi, Liliana. Shapes of Forms : From Gestalt Psychology and Phenomenology to Ontology and Mathematics. Synthese Library, V. 275. Dordrecht; Boston: Kluwer Academic, 1999.*
- . Unfolding Perceptual Continua. Advances in Consciousness Research, V. 41. Amsterdam; Philadelphia, PA: John Benjamins Pub., 2002.
- Aleksander, Igor, and F. K. Hanna. Automata Theory : An Engineering Approach. Computer Systems Engineering Series. New York: Crane Russak, 1976.
- Aleksandrov, A. D. Convex Polyhedra. Springer Monographs in Mathematics. Berlin; New York: Springer, 2005.
- Aleksandrov, P. S. Combinatorial Topology. Rochester, N.Y.: Graylock Press, 1956.
- Alexander, Christopher. Notes on the Synthesis of Form. Cambridge, Mass.: Harvard University Press, 1964.*
- . The Timeless Way of Building. New York: Oxford University Press, 1979.*
- Alexander, Christopher, Sara Ishikawa, and Murray Silverstein. A Pattern Language : Towns, Buildings, Construction. New York: Oxford University Press, 1977.*
- Alexander, Jeffrey C. The Civil Sphere. Oxford; New York: Oxford University Press, 2006.
- Alexander, Samuel. Space, Time, and Deity : The Gifford Lectures at Glasgow 1916-1918. Gifford Lectures, 1916-1918. New York: Dover Publications, 1966.
- Ali al-Jamal, Sidi, Aisha Abd al-Rahman, and Darqawi Institute. The Meaning of Man. Norwich: Diwan Press, 1977.*
- Al-Khalili, Jim. Black Holes, Wormholes & Time Machines. Bristol, UK ; Philadelphia, PA: Institute of Physics Pub, 1999.
- Allan, D. J. The Philosophy of Aristotle. London; New York: Oxford U.P., 1970.
- Allmendinger, Philip. Planning Theory. Houndmills, Basingstoke, Hampshire; New York: Palgrave, 2002.
- Allworth, S. T. Introduction to Real-Time Software Design. New York, NY, USA: Springer-Verlag, 1984.
- Alter, Orly, and Yoshihisa Yamamoto. Quantum Measurement of a Single System. New York: Wiley, 2001.
- Altmann, Simon L. Rotations, Quaternions, and Double Groups. Oxford Science Publications. Oxford UK; New York: Clarendon Press ; Oxford University Press, 1986.
- Alvesson, Mats. Consensus, Control, and Critique : Three Paradigms of Work Organization Research. Aldershot, Hants, England; Brookfield, VT., USA: Avebury, 1987.
- Anderson, Douglas R. Creativity and the Philosophy of C.S. Peirce. Martinus Nijhoff Philosophy Library, V. 27. The Hague; Boston: M. Nijhoff ; Kluwer Academic Publishers, 1987.
- Andersson, Daniel. The Nothing That Is : The Structure of Consciousness in the Poetry of Wallace Stevens. Uppsala, Sweden: Uppsala Universitet, 2006.
- Anderson, Perry. The Origins of Postmodernity. London; New York: Verso, 1998.
- Andrew, A. M. Continuous Heuristics. Ellis Horwood Series in Artificial Intelligence. Chichester; New York: Ellis Horwood ; Wiley, 1990.
- Ansell-Pearson, Keith. Germinal Life : The Difference and Repetition of Deleuze. London; New York: Routledge, 1999.
- . Philosophy and the Adventure of the Virtual : Bergson and the Time of Life. London; New York: Routledge, 2002.
- Applewhite, E. J. Cosmic Fishing : An Account of Writing Synergetics with Buckminster Fuller. New York: Macmillan, 1977.
- Arbib, Michael A., and Ernest G. Manes. Arrows, Structures, and Functors : The Categorical Imperative. New York: Academic Press, 1975.*
- Archer, Margaret Scotford. Structure, Agency, and the Internal Conversation. Cambridge, UK; New York: Cambridge University Press, 2003.
- Arguelles, Jose,. The Transformative Vision : Reflections on the Nature and History of Human Expression. Berkeley, Calif.; New York: Shambhala ; Random House, 1975.*
- Aristotle, and Hugh Lawson-Tancred. De Anima (On the Soul). Penguin Classics. Harmondsworth, Middlesex, England; New York, N.Y., U.S.A.: Penguin Books, 1986.
- Armour, Frank, and Granville Miller. Advanced Use Case Modeling : Software Systems. Addison-Wesley

- Object Technology Series. Boston: Addison-Wesley, 2001.
- Armstrong, Nancy. How Novels Think : The Limits of British Individualism from 1719-1900. New York: Columbia University Press, 2005.
- Artificial Life II : Proceedings of the Workshop on Artificial Life : Held February 1990 in Santa Fe, New Mexico. 1992. Addison-Wesley.
- Artmann, Benno. Euclid : The Creation of Mathematics. New York: Springer, 1999.
- Ash, Avner, and Robert Gross. Fearless Symmetry : Exposing the Hidden Patterns of Numbers. Princeton: Princeton University Press, 2006.
- Ashmore, Malcolm. The Reflexive Thesis : Wrighting Sociology of Scientific Knowledge. Chicago, Ill.: University of Chicago Press, 1989.*
- Ashton, Paul, A. J. Bartlett, and Justin Clemens. The Praxis of Alain Badiou. Anamnesis. Seddon, Melbourne, Australia: re.press, 2006.
- Aspray, William, and Philip Kitcher. History and Philosophy of Modern Mathematics. Minneapolis, MN: University of Minnesota Press, 1988.
- Assoun, Paul-Laurent. Freud and Nietzsche. London; New Brunswick, NJ; Somerset, N.J.: Athlone Press 2000. Transaction Publishers.
- Aste, Tomaso, and D. L. Weaire. The Pursuit of Perfect Packing. Bristol, PA: Institute of Physics Pub., 2000.
- Asterberg, Dag. Metasociology : An Inquiry into the Origins and Validity of Social Thought. Scandinavian Library. Oslo; New York: Norwegian University Press ; Oxford University Press, 1988.
- Asuncion, Gomez-Perez, Oscar Corcho, and Fernandez-Lopez Mariano. Ontological Engineering : With Examples from the Areas of Knowledge Management, E-Commerce and the Semantic Web. Advanced Information and Knowledge Processing. London : Springer, 2004.
- Asvaghosa, and Yoshito S. Hakeda. The Awakening of Faith : Attributed to Asvaghosha. New York: Columbia University Press, 1967.*
- Athey, Thomas H. Systematic Systems Approach : An Integrated Method for Solving Systems Problems. Englewood Cliffs, N.J.: Prentice-Hall, 1982.
- Atlan, Henri. Enlightenment to Enlightenment : Intercritique of Science and Myth. Albany: State University of New York Press, 1993.
- Augros, Michael Anthony. Euclid's Fifth Postulate and the Nature of Geometrical Truth. Boston, MA.: Thesis (Ph. D.)--Boston College, 1995.
- Ault, Donald D. Narrative Unbound : Re-Visioning William Blake's the Four Zoas. The Clinamen Studies Series. Barrytown, N.Y.: Station Hill Press, 1987.*
- Austin, Norman. Meaning and Being in Myth. University Park: Pennsylvania State University Press, 1990.*
- Auyang, Sunny Y. Foundations of Complex-System Theories : In Economics, Evolutionary Biology, and Statistical Physics. Cambridge, U.K.; New York: Cambridge University Press, 1998.
- . How Is Quantum Field Theory Possible? New York: Oxford University Press, 1995.
- Babbage, Charles, and Martin Campbell-Kelly. Charles Babbage : Passages from the Life of a Philosopher. New Brunswick, NJ; Washington, D.C.: Rutgers University Press ; IEEE Press, 1994.
- Bachelard, Suzanne. A Study of Husserl's Formal and Transcendental Logic. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston Ill.: Northwestern University Press, 1968.
- Badiou, Alain. Being and Event. London; New York: Continuum, 2005.**
- . Deleuze : The Clamor of Being. Theory out of Bounds, V. 16. Minneapolis: University of Minnesota Press, 2000.
- . Manifesto for Philosophy : Followed by Two Essays: "The (Re)Turn of Philosophy Itself" and "Definition of Philosophy". Albany, N.Y.: State University of New York Press, 1999.
- Badiou, Alain, Ray Brassier, and Alberto Toscano. Theoretical Writings. London; New York: Continuum, 2004.
- Baez, John. An Introduction to N-Category Theory. Berlin; New York: Springer, 1997.*
- Baez, John, and James Dolan. "Categorification." arXiv:math/9802029v1 [math.QA], 1998.
- Bahm, Archie J. Metaphysics; an Introduction. New York: Barnes & Noble Books, 1974.

- Bailey, Alan. Sextus Empiricus and Pyrrhonian Scepticism. Oxford; Oxford; New York: Clarendon Press ; Oxford University Press, 2002.
- Bak, P. How Nature Works : The Science of Self-Organized Criticality. New York, NY, USA: Copernicus, 1996.
- Bakhtin, T. Microgenetic Approach to the Conscious Mind. Advances in Consciousness Research, V. 25. Amsterdam; Philadelphia: John Benjamins Pub. Co., 2000.*
- Bakhtin, M. M., et al. The Bakhtin Reader : Selected Writings of Bakhtin, Medvedev, and Voloshinov. London; New York: E. Arnold, 1994.
- Balaban, Oded. Subject and Consciousness : A Philosophical Inquiry into Self-Consciousness. Savage, MD : Rowman & Littlefield, 1990.
- Baldwin, Carliss Y., and Kim B. Clark. Design Rules. Cambridge, Mass.: MIT Press, 2000.
- Baldwin, John D. George Herbert Mead : A Unifying Theory for Sociology. Masters of Social Theory, V. 6. Newbury Park, Calif.: Sage Publications, 1986.
- Balint, Michael. The Basic Fault: Therapeutic Aspects of Regression. London: Tavistock Publications, 1968.
- Ballard, Edward G. Principles of Interpretation. Series in Continental Thought, 5. Athens, Ohio: Ohio University Press, 1983.
- Banchoff, Thomas. Beyond the Third Dimension : Geometry, Computer Graphics, and Higher Dimensions. Scientific American Library Series, V. 33. New York: Scientific American Library : Distributed by W.H. Freeman, 1990.
- Banzhaf, Wolfgang. Genetic Programming : An Introduction on the Automatic Evolution of Computer Programs and Its Applications. San Francisco, Calif.; Heidelberg: Morgan Kaufmann Publishers ; Dpunkt-verlag, 1998.
- Barbaras, Renaud. The Being of the Phenomenon: Merleau-Ponty's Ontology. Studies in Continental thought. Bloomington, IN: Indiana University Press, 2004.
- Barbour, Julian B. The End of Time : The Next Revolution in Physics. Oxford; New York: Oxford University Press, 2000.
- Barfield, Owen. Poetic Diction, A Study in Meaning. London: Faber and Faber, 1952.
- Barker, Jason. Alain Badiou : A Critical Introduction. Modern European Thinkers. London; Sterling, VA: Pluto Press, 2002.
- Barney, Rachel. Names and Nature in Plato's Cratylus. New York; London: Garland, 2001.
- Barnouw, Jeffrey. Odysseus, Hero of Practical Intelligence : Deliberation and Signs in Homer's Odyssey. Lanham, MD : University Press of America, 2004.
- Barnsley, M. F. Fractals Everywhere. Boston: Academic Press, 1988.
- Bar-On, Abraham Zvie. The Categories and the Principle of Coherence : Whitehead's Theory of Categories in Historical Perspective. Nijhoff International Philosophy Series, V. 26. Dordrecht; Boston; Hingham, MA, USA: M. Nijhoff ; Kluwer Academic, 1987.
- Barr, Avron, Edward A. Feigenbaum, and Paul R. Cohen. The Handbook of Artificial Intelligence. Stanford, Calif.: HeurisTech Press, 1981.
- Barrett, Derm, and Inc NetLibrary. The Paradox Process Creative Business Solutions, Where You Least Expect to Find Them. New York AMACOM, 1998.
- Barrow, John D. Pi in the Sky : Counting, Thinking, and Being. Oxford; New York: Clarendon Press ; Oxford University Press, 1992.
- Barry, James. Measures of Science : Theological and Technological Impulses in Early Modern Thought. Evanston, Ill.: Northwestern University Press, 1996.
- Barwise, Jon. The Situation in Logic. CSLI Lecture Notes, No. 17. Stanford, CA: Center for the Study of Language and Information, 1989.*
- Barzilai, Shuli. Lacan and the Matter of Origins. Stanford, Calif.: Stanford University Press, 1999.
- Basalla, George. The Evolution of Technology. Cambridge History of Science. Cambridge UK; New York: Cambridge University Press, 1988.*
- Bass, Len, Paul Clements, and Rick Kazman. Software Architecture in Practice. SEI Series in Software Engineering. Reading, Mass.: Addison-Wesley, 1998.*
- Bataille, Georges. The Accursed Share : An Essay on General Economy. 3 vols. New York; London: Zone ;

- MIT., 1988.*
- . On Nietzsche. European Sources. New York: Paragon House, 1992.
- Bateson, Gregory. Mind and Nature : A Necessary Unity. New York: Dutton, 1979.*
- . Steps to an Ecology of Mind; Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology. San Francisco: Chandler Pub. Co., 1972.**
- Baudrillard, Jean. For a Critique of the Political Economy of the Sign. St. Louis, MO.: Telos Press, 1981.*
- . The Mirror of Production. St. Louis MO: Telos Press, 1975.*
- . The System of Objects. Latin American and Iberian Studies Series. London; New York: Verso, 1996.
- Baudrillard, Jean, and Jim Fleming. Fatal Strategies. New York; London: Semiotext(e) ; Pluto, 1990.
- Baudrillard, Jean, and Marc Guillaume. Radical Alterity. Semiotext(e) Foreign Agents Series. Los Angeles, Calif.; London: Semiotext(e); MIT, 2008.
- Baudrillard, Jean, and Sylvère Lotringer. Forget Foucault. Semiotext(e) Foreign Agents Series. New York, NY: Semiotext(e), 1987.
- Bauschatz, Paul C. The Well and the Tree : World and Time in Early Germanic Culture. Amherst: University of Massachusetts Press, 1982.*
- Bayley, Stephen, and Terence Conran. Design : Intelligence Made Visible. Buffalo, NY: Firefly Books, 2007.
- Bear, Mark F., Barry W. Connors, and Michael A. Paradiso. Neuroscience : Exploring the Brain. Baltimore, MD: Lippincott Williams & Wilkins, 2001.
- Bebek, Borna. The Third City : Philosophy at War with Positivism. London; Boston: Routledge & K. Paul, 1982.
- Beck, Douglas. Merleau-Ponty's Last Vision a Proposal for the Completion of the Visible and the Invisible. Evanston, Ill: Northwestern University Press, 2000.
- Beckmann, Petr. A History of π (Pi). New York: St. Martin's, 1974.
- Beer, Stafford. The Heart of Enterprise. Managerial Cybernetics of Organization, 2. Chichester UK; New York: Wiley, 1979.*
- Behnke, Heinrich. Fundamentals of Mathematics. Cambridge, Mass.: MIT Press, 1974.
- Beistegui, Miguel de. Heidegger & the Political : Dystopias. Thinking the Political. London; New York: Routledge, 1998.
- . The New Heidegger. Continuum Studies in Continental Philosophy. London; New York: Continuum, 2005.
- Bell, Jeffrey A. The Problem of Difference : Phenomenology and Poststructuralism. Toronto Studies in Philosophy. Toronto; Buffalo: University of Toronto Press, 1998.
- Belsey, Catherine. Post-Structuralism : A Very Short Introduction. Very Short Introductions, 73. Oxford; New York: Oxford University Press, 2002.
- Beniger, James R. The Control Revolution : Technological and Economic Origins of the Information Society. Cambridge, Mass.: Harvard University Press, 1986.
- Benjamin, Walter, et al. Selected Writings. Cambridge, Mass.: Belknap Press, 1996.*
- Benn, I. M., and R. W. Tucker. An Introduction to Spinors and Geometry with Applications in Physics. Bristol; Philadelphia: A. Hilger, 1987.
- Bennett, Bruce M., Donald D. Hoffman, and Chetan Prakash. Observer Mechanics : A Formal Theory of Perception. San Diego: Academic Press, 1989.*
- Bennett, Douglas W. Designing Hard Software. Greenwich: Manning, 1997.
- Bentley, G. E., The Stranger from Paradise : A Biography of William Blake. New Haven: Yale University Press (Paul Mellon Centre for Studies in British Art), 2001.
- Berg, Irwin August. Response Set in Personality Assessment. Chicago: Aldine Pub. Co., 1967.
- Berger, Peter & Luckmann, Thomas. The Social Construction of Reality. New York: Anchor Books, 1967.*
- Berger, Peter L., Brigitte Berger, and Hansfried Kellner. The Homeless Mind; Modernization and Consciousness. New York: Random House, 1973.
- Bergson, Henri. Creative Evolution. Macmillan, 1964.*

- Bermúdez, osé Luis. The Paradox of Self-Consciousness. Representation and Mind. Cambridge, Mass.: MIT Press, 2000.*
- Bernardo, J. M., and Adrian F. M. Smith. Bayesian Theory. Wiley Series in Probability and Mathematical Statistics. Chichester, Eng.; New York: Wiley, 1994.
- Bernhard, Banaschewski. "Excluded Middle Versus Choice in a Topos." Mathematical Logic Quarterly (Berlin : Wiley-VCH Verlag) 51.3 (2005): 282-84.
- Bernstein, J. M. Adorno : Disenchantment and Ethics. Modern European Philosophy. Cambridge, UK; New York: Cambridge University Press, 2001.
- Bertalanffy, Ludwig von. General System Theory : Foundations, Development, Applications. New York: Penguin, Braziller, 1968, 1973.
- Bertens, Johannes Willem. The Idea of the Postmodern : A History. London; New York: Routledge, 1995.
- Bertin, Jacques. Semiology of Graphics. Madison, WI: University of Wisconsin Press, 1983.
- Bewes, Timothy. Reification, or, the Anxiety of Late Capitalism. London; New York: Verso, 2002.
- Bhattacharyya, S. P. and L. H. Keel. Control of Uncertain Dynamic Systems: A Collection of Papers Presented at the International Workshop on Robust Control, San Antonio, Texas, March 1991. Boca Raton: CRC Press, 1991.
- Bidney, Martin. Blake and Goethe : Psychology, Ontology, Imagination. Columbia: University of Missouri Press, 1988.
- Bijker, Wiebe E., Thomas Parke Hughes, and T. J. Pinch. The Social Construction of Technological Systems : New Directions in the Sociology and History of Technology. Cambridge, Mass.: MIT Press, 1987.*
- Bintz, Neil Frederick. "The Concepts of Existence and Ecstasy." Drew University, Thesis, 1958.
- Bishop, Paul. The Dionysian Self : C.G. Jung's Reception of Friedrich Nietzsche. Monographien Und Texte Zur Nietzsche-Forschung, Bd. 30. Berlin; New York: W. de Gruyter, 1995.
- Bittner, Kurt, and Ian Spence. Use Case Modeling. Boston, MA: Addison Wesley, 2003.
- Blaut, James M. The Colonizer's Model of the World : Geographical Diffusionism and Eurocentric History. New York: Guilford Press, 1993.
- Bloch, Ernst. The Principle of Hope. Studies in Contemporary German Social Thought. Cambridge, Mass.: MIT Press, 1986.
- Bloom, Harold. The Anxiety of Influence: a Theory of Poetry. New York: Oxford University Press, 1973.
- . John Milton's Paradise Lost. Modern Critical Interpretations. New York: Chelsea House Publishers, 1987.
- . A Map of Misreading. Oxford ; New York: Oxford University Press, c1975, 1980.*
- Bloomfield, Brian P. Modelling the World : The Social Constructions of Systems Analysts. Oxford UK; New York, NY, USA: B. Blackwell, 1986.
- Blum, Alan, and Peter McHugh. Friends, Enemies, and Strangers : Theorizing in Art, Science, and Everyday Life. Norwood, N.J.: Ablex Pub. Corp., 1979.
- . Self-Reflection in the Arts and Sciences. Atlantic Highlands, N.J.: Humanities Press, 1984.
- Blum, Alan F. Socrates, the Original and Its Images. London; Boston: Routledge and K. Paul, 1978.
- . Theorizing. London: Heinemann, 1974.**
- Blundell, Barry, and Adam J. Schwarz. Volumetric Three-Dimensional Display Systems. New York: Wiley, 2000.
- Boeder, Heribert, and Marcus Brainard. Seditions : Heidegger and the Limit of Modernity. SUNY Series in Contemporary Continental Philosophy. Albany: State University of New York Press, 1997.
- Boer, Karin de. Thinking in the Light of Time : Heidegger's Encounter with Hegel. SUNY Series in Contemporary Continental Philosophy. Albany, NY: State University of New York Press, 2000.*
- Bohm, David. Wholeness and the Implicate Order. London ; Boston: Routledge & Kegan Paul, 1981.**
- Bohm, David, and F. David Peat. Science, Order, and Creativity. Toronto; New York: Bantam Books, 1987.
- Bohner, Martin, and Allan C. Peterson. Dynamic Equations on Time Scales : An Introduction with Applications. Boston: Birkhauser, 2001.

- Bolander, Thomas, Vincent F. Hendricks, and Stig Andur Pedersen. Self-Reference. CSLI Lecture Notes, No. 178. Stanford, Calif.: Center for the Study of Language and Information, 2006.*
- Bonhoeffer, Dietrich. Act and Being. New York: Harper, 1962.
- Bonnington, C. Paul, and Charles H. C. Little. The Foundations of Topological Graph Theory. New York: Springer, 1995.
- Bonola, Roberto, Janos Bolyai, and N. I. Lobachevskii. Non-Euclidean Geometry; a Critical and Historical Study of Its Development. New York: Dover Publications, 1955.*
- Bonta, Mark, and John Protevi. Deleuze and Geophilosophy : A Guide and Glossary. Edinburgh UK: Edinburgh University Press, 2004.
- Booch, Grady. Object-Oriented Analysis and Design with Applications. The Benjamin/Cummings Series in Object-Oriented Software Engineering. Redwood City, Calif.: Benjamin/Cummings Pub. Co., 1994.
- Book, Ronald V., and Friedrich Otto. String-Rewriting Systems. Texts and Monographs in Computer Science. New York: Springer-Verlag, 1993.
- Boole, George. An Investigation of the Laws of Thought : On Which Are Founded the Mathematical Theories of Logic and Probabilities. New York; London: Dover ; Constable, 1854.
- Borel, Armand. Intersection Cohomology. Modern Birkhäuser Classics. Cambridge, MA: Birkhäuser Boston, 2008.
- Börger, E., and Robert F. Stark. Abstract State Machines : A Method for High-Level System Design and Analysis. Berlin; New York: Springer, 2003.*
- Bosnak, Robert. Tracks in the Wilderness of Dreaming : Exploring Interior Landscape through Practical Dreamwork. New York: Delacorte Press, 1996.
- Bothamley, Jennifer. Dictionary of Theories. London; Detroit: Gale Research International, 1993.
- Boud, David, Rosemary Keogh, and David Walker. Reflection, Turning Experience into Learning. London; New York: Kogan Page ; Nichols Pub., 1985.*
- Bourdieu, Pierre. Distinction : A Social Critique of the Judgement of Taste. Cambridge, Mass.: Harvard University Press, 1984.
- . The Logic of Practice. Stanford, Calif.: Stanford University Press, 1990.*
- . Outline of a Theory of Practice. Cambridge Studies in Social Anthropology, 16. Cambridge, UK; New York: Cambridge University Press, 1977.*
- Bourdieu, Pierre, and Loïc J. D. Wacquant. An Invitation to Reflexive Sociology. Chicago: University of Chicago Press, 1992.*
- Bourgeois, Patrick L., and Sandra B. Rosenthal. Thematic Studies in Phenomenology and Pragmatism. Amsterdam: Gruner Pub. Co., 1983.
- Bowen, Kenneth Crewdson, and Janet I. Harris. Research Games : An Approach to the Study of Decision Processes. London; New York: Taylor and Francis; Halsted Press, 1978.
- Brady, Geraldine. From Peirce to Skolem : A Neglected Chapter in the History of Logic. Studies in the History and Philosophy of Mathematics, V. 4. Amsterdam; New York: North-Holland/Elsevier Science BV, 2000.*
- Brandom, Robert. Making It Explicit : Reasoning, Representing, and Discursive Commitment. Cambridge, Mass.: Harvard University Press, 1994.
- Brann, Eva T. H. What, Then, Is Time? Lanham, MD: Rowman & Littlefield, 1999.
- Bransford, John D., et al. How People Learn Brain, Mind, Experience, and School. Washington, DC: National Acad. Press, 2001.
- Brennan, Andrew. Thinking About Nature. Athens: University of Georgia Press, 1988.
- Brent, Joseph. Charles Sanders Peirce : A Life. Bloomington: Indiana University Press, 1993.
- Bricken, William. "Syntactic Variety in Boundary Logic." Lecture notes in computer science (Berlin ; New York : Springer-Verlag). Issue 4045 (2006): 73-87.
- Brisson, David W. Hypergraphics : Visualizing Complex Relationships in Art, Science, and Technology. Boulder, Colo.: Westview Press (American Association for the Advancement of Science), 1978.
- Bristow, William F. Hegel and the Transformation of Philosophical Critique. Oxford; New York: Clarendon Press; Oxford University Press, 2007.

- Brockelman, Thomas P. The Frame and the Mirror : On Collage and the Postmodern. Philosophy, Literature, and Culture. Evanston, Ill.: Northwestern University Press, 2001.
- Bronk, William. Vectors and Smoothable Curves : Collected Essays. San Francisco: North Point Press, 1983.
- Bronk, William. Life Supports: New and Collected Poems. Jersey City, NJ: Talisman House, 1997.
- Brooke, Roger. Jung and Phenomenology. London; New York: Routledge, 1991.*
- Brown, Brian Edward. The Buddha Nature : A Study of the Tathagatagarbha and Alayavijñāna. Buddhist Traditions, 11. Delhi: Motilal Banarsidass Publishers, 1991.
- Brown, J. R. Minds, Machines, and the Multiverse : The Quest for the Quantum Computer. New York: Simon & Schuster, 2000.
- Brown, Stuart C., Diane Collinson, and Robert Wilkinson. Biographical Dictionary of Twentieth-Century Philosophers. Routledge Reference. London; New York: Routledge, 1996.
- Bruce, J. W., and P. J. Giblin. Curves and Singularities : A Geometrical Introduction to Singularity Theory. Cambridge, UK; New York: Cambridge University Press, 1984.*
- Brugman, Claudia. Mental Spaces and Constructional Meaning. La Jolla, CA: Center for Research in Learning, University of California San Diego, 1992.*
- Brumbaugh, Robert Sherrick. Unreality and Time. SUNY Series in Philosophy. Albany, N.Y.: State University of New York Press, 1984.*
- Bruner, Jerome S. Beyond the Information Given: Studies in the Psychology of Knowing. New York: Norton, 1973.
- Brunning, Jacqueline, and Paul Forster. The Rule of Reason : The Philosophy of Charles Sanders Peirce. Toronto Studies in Philosophy. Toronto; Buffalo: University of Toronto Press, 1997.
- Bruzina, Ronald. Edmund Husserl & Eugen Fink : Beginnings and Ends in Phenomenology, 1928-1938. New Haven CT: Yale University Press, 2004.
- Buchanan, Ian, and Gregg Lambert. Deleuze and Space. Deleuze Connections. Edinburgh: Edinburgh University Press, 2005.
- Bucur, Ionel, Aristide Deleanu, and Peter John Hilton. Introduction to the Theory of Categories and Functors. London; New York: Wiley, 1968.
- Buede, Dennis M. The Engineering Design of Systems Models and Methods. New York: Wiley, 2000.
- Buitenen, J. A. B. v. The Mahabharata. Chicago, University of Chicago Press, 1973.
- Bundy, Alan. Catalogue of Artificial Intelligence Techniques. Symbolic Computation. Berlin; New York: Springer-Verlag, 1990.
- . The Computer Modelling of Mathematical Reasoning. London; New York: Academic Press, 1983.
- Bunge, Mario Augusto. Emergence and Convergence : Qualitative Novelty and the Unity of Knowledge. Toronto Studies in Philosophy. Toronto; Buffalo: University of Toronto Press, 2003.*
- Bunn, James H. The Dimensionality of Signs, Tools, and Models : An Introduction. Advances in Semiotics. Bloomington, IN: Indiana University Press, 1981.
- Bunt, Harry C. Mass Terms and Model-Theoretic Semantics. Cambridge, MA; New York: Cambridge University Press, 1985.*
- Burbidge, John W. On Hegel's Logic : Fragments of a Commentary. Atlantic Highlands, N.J.: Humanities Press, 1981.
- Burke, Kenneth. A Grammar of Motives. Berkeley: University of California Press, 1969.*
- Burkhardt, Hans, and Barry Smith. Handbook of Metaphysics and Ontology. Munich; Philadelphia: Philosophia Verlag, 1991.
- Buschmann, Frank. Pattern-Oriented Software Architecture : A System of Patterns. Chichester; New York: Wiley, 1996.
- Bushev, Mikhail. Synergetics : Chaos, Order, Self-Organization. Singapore; River Edge, NJ: World Scientific, 1994.
- Butchvarov, Panayot. Being Qua Being : A Theory of Identity, Existence, and Predication. Bloomington: Indiana University Press, 1979.*
- Butler, Rex. Jean Baudrillard : The Defence of the Real. Core Cultural Theorists. London; Thousand Oaks, Calif. : Sage, 1999.

- Bynum, Caroline Walker. Metamorphosis and Identity. New York; Cambridge, Mass.: Zone Books ; MIT Press, 2001.
- Canetti, Elias. Crowds and Power. New York: Viking Press, 1962.*
- Capra, Fritjof. The Web of Life : A New Scientific Understanding of Living Systems. New York: Anchor Books, 1996.
- Caputo, John D. The Mystical Element in Heidegger's Thought. Athens: Ohio University Press, 1978.
- . Radical Hermeneutics : Repetition, Deconstruction, and the Hermeneutic Project. Studies in Phenomenology and Existential Philosophy. Bloomington, IN: Indiana University Press, 1987.
- Caraher, Brian. Intimate Conflict : Contradiction in Literary and Philosophical Discourse : A Collection of Essays by Diverse Hands. SUNY Series, the Margins of Literature. Albany: State University of New York Press, 1992.
- Carbone, Mauro. The Thinking of the Sensible : Merleau-Ponty's a-Philosophy. Evanston, Ill.: Northwestern University Press, 2004.
- Carlson, David. A Commentary to Hegel's Science of Logic. Basingstoke UK: Palgrave Macmillian, 2007.
- Carroll, Lewis, and Martin Gardner. The Annotated Alice: Alice's Adventures in Wonderland & Through the Looking Glass. New York: C.N. Potter, 1960.
- Casati, Roberto and Varzi, Achille C. Holes and Other Superficialities Cambridge, Mass.: MIT Press, 1994.*
- Cassirer, Ernst. The Philosophy of Symbolic Forms. 3 Volumes. New Haven: Yale University Press, 1953.
- Casti, J. L. Connectivity, Complexity, and Catastrophe in Large-Scale Systems. International Series on Applied Systems Analysis, 7. Chichester UK; New York: J. Wiley, 1979.
- Castoriadis, Cornelius. Crossroads in the Labyrinth. Cambridge, Mass.: MIT Press, 1984.
- . The Imaginary Institution of Society. Cambridge, Mass.: MIT Press, 1987.*
- Castoriadis, Cornelius, and David Ames Curtis. World in Fragments : Writings on Politics, Society, Psychoanalysis, and the Imagination. Stanford, Calif.: Stanford University Press, 1997.*
- Castrigiano, Domenico P. L. and Sandra A. Hayes. Catastrophe Theory. Reading, Mass.: Addison-Wesley Pub. Co., Advanced Book Program, 1993.
- Cataldi, Sue L. Emotion, Depth, and Flesh : A Study of Sensitive Space : Reflections on Merleau-Ponty's Philosophy of Embodiment. Albany, N.Y.: State University of New York Press, 1993.
- Cavendish, Richard. The Powers of Evil in Western Religion, Magic, and Folk Belief. New York: Putnam, 1975.
- Cederberg, Judith N. A Course in Modern Geometries. Undergraduate Texts in Mathematics. New York: Springer, 2001.
- Certeau, Michel de. The Practice of Everyday Life. Berkeley: University of California Press, 1984.**
- Chadarevian, Soraya de, and Nick Hopwood. Models : The Third Dimension of Science. Writing Science. Stanford, Calif.: Stanford University Press, 2004.*
- Chafe, Wallace L. Meaning and the Structure of Language. Chicago: University of Chicago Press, 1970.
- Chalmers, David J. The Conscious Mind : In Search of a Fundamental Theory. Oxford: Oxford University Press, 1998.*
- Chandler, Daniel. Semiotics : The Basics. London; New York: Routledge, 2002.
- Chandler, Jerry L. R., and Gertrudis van de Vijver. Closure : Emergent Organizations and Their Dynamics. Annals of the New York Academy of Sciences, V. 901. New York, NY: New York Academy of Sciences, 2000.
- Chang, Chen Chung, and H. Jerome Keisler. Model Theory. Studies in Logic and the Foundations of Mathematics, V. 73. Amsterdam; New York; New York, NY, U.S.A.: North-Holland ; Elsevier Science Pub. Co., 1990.*
- Chang, Chin-Liang, and Richard Char-Tung Lee. Symbolic Logic and Mechanical Theorem Proving. Computer Science and Applied Mathematics. New York: Academic Press, 1973.
- Chang, Garma C. C. The Buddhist Teaching of Totality : The Philosophy of Hwa Yen Buddhism. London: Routledge, 2008.*
- Chang, Ruth. Incommensurability, Incomparability, and Practical Reasoning. Cambridge, Mass.: Harvard University Press, 1997.

- Charles, S. R. The Emergent Metaphysics in Plato's Theory of Disorder. Lanham, MD: Lexington Books, 2006.
- Checkland, Peter. Systems Thinking, Systems Practice. Chichester UK; New York: J. Wiley, 1981.*
- Chellas, Brian F. Modal Logic: An Introduction. Cambridge UK: Cambridge University Press, 1980.
- Chen, Jason, and Adam Pash. How to Do Everything with Your Iphone®. New York: McGraw-Hill, 2008.
- Cheng, E., and N. Gurski. "The Periodic Table of N-Categories for Low Dimensions I and II: Degenerate Categories and Degenerate Bicategories and Tricategories." Streetfest Conference in honour of Ross Street Proceedings. arXiv:0708.1178v1 [math.CT] in Categories in Algebra, Geometry and Mathematical Physics Providence, RI: American Mathematical Society 2007.
- Cheng, Zhongying. New Dimensions of Confucian and Neo-Confucian Philosophy. SUNY series in philosophy. Albany, N.Y.: State University of New York Press, 1991.
- Cherniakov, A. G. The Ontology of Time : Being and Time in the Philosophies of Aristotle, Husserl, and Heidegger. *Phaenomenologica*, 163. Dordrecht; Boston: Kluwer Academic, 2002.
- Chiesa, Lorenzo. Subjectivity and Otherness : A Philosophical Reading of Lacan. Short Circuits. Cambridge, Mass.: MIT Press, 2007.
- Chittick, William C. The Sufi Path of Knowledge : Ibn Al-'Arabi's Metaphysics of Imagination. Albany, N.Y.: State University of New York Press, 1989.
- Chow, Bennett, and Dan Knopf. The Ricci Flow : An Introduction. Providence, R.I.: American Mathematical Society, 2004.
- Chrissis, Mary Beth, Mike Konrad, and Sandy Shrum. CMMI : Guidelines for Process Integration and Product Improvement. SEI Series in Software Engineering. Upper Saddle River, NJ: Addison-Wesley, 2007.
- Christensen, F. M. Space-Like Time : Consequences of, Alternatives to, and Arguments Regarding the Theory That Time Is Like Space. Toronto Studies in Philosophy. Toronto; Buffalo: University of Toronto Press, 1993.*
- Chukwu, Peter M. Competing Interpretations of Husserl's Noema : Gurwitsch Versus Smith and McIntyre. New York: Peter Lang, 2009.
- Chung Ying, Cheng. "On Harmony as Transformation: Paradigms from the I Ching." Journal of Chinese Philosophy (Oxford UK: Blackwell Publishers) 16.2 (1989): 125-58.
- Chung-Ying, Cheng. "Confucian Onto-Hermeneutics: Morality and Ontology." Journal of Chinese Philosophy (Oxford UK: Blackwell Publishers) 27.1 (2000): 33-68.
- . "Toward Constructing a Dialectics of Harmonization: Harmony and Conflict in Chinese Philosophy." Journal of Chinese Philosophy (Oxford UK: Blackwell Publishers) 33.s1 (2006): 25-59. also in Cheng, Zhongying New Dimensions of Confucian and Neo-Confucian Philosophy.*
- Churchill, Winston, and Winston S. Churchill. Never Give In! : The Best of Winston Churchill's Speeches. New York: Hyperion, 2003.
- Churchman, C. West. The Design of Inquiring Systems: Basic Concepts of Systems and Organization. New York: Basic Books, 1971.
- . The Systems Approach. New York: Delacorte Press, 1968.*
- . The Systems Approach and Its Enemies. New York: Basic Books, 1979.
- Cilliers, Paul. Complexity and Postmodernism : Understanding Complex Systems. London; New York: Routledge, 1998.
- Clark, James Midgley. Meister Eckhart : An Introduction to the Study of His Works, with an Anthology of His Sermons. London: Nelson, 1957.
- Clausewitz, Carl von, Michael Eliot Howard, and Peter Paret. On War. Princeton, N.J.: Princeton University Press, 1976.
- Clayton, Philip. Mind and Emergence : From Quantum to Consciousness. Oxford UK; New York: Oxford University Press, 2006.
- Cleary, Thomas F. Entry into the Inconceivable : An Introduction to Hua-Yen Buddhism. Honolulu: University of Hawaii Press, 1984.*
- Clements, Paul. Documenting Software Architectures : Views and Beyond. SEI Series in Software Engineering. Boston: Addison-Wesley, 2003.*

- Close, Charles M., and Dean K. Frederick. Modeling and Analysis of Dynamic Systems. Boston: Houghton Mifflin, 1978.
- Coad, Peter, and Edward Yourdon. Object-Oriented Design. Yourdon Press Computing Series. Englewood Cliffs, N.J.: Yourdon Press, 1991.
- Cockcroft, W. H. Complex Numbers: A Study in Algebraic Structure. Chapman and Hall Mathematics Series. London: Chapman and Hall, 1972.
- Cohen, I. Bernard. Revolution in Science. Cambridge, Mass.: Belknap Press of Harvard University Press, 1985.
- Cohen, Jack, and Ian Stewart. The Collapse of Chaos : Discovering Simplicity in a Complex World. New York: Viking, 1994.
- Cohen, Paul J. Set Theory and the Continuum Hypothesis. New York: W. A. Benjamin, 1966.
- Cohn, P. M. Universal Algebra. Dordrecht; Boston; Hingham, MA: D. Reidel Pub. Co.; Boston: Kluwer, 1981.
- Colapietro, Vincent Michael and Thomas M. Olshewsky. Peirce's Doctrine of Signs : Theory, Applications, and Connections. Charles, S. Peirce Sesquicentennial International Congress. Berlin: Mouton de Gruyter, 1996.
- Colebrook, Claire. Gilles Deleuze. London ; New York: Routledge, 2002.
- . Philosophy and Post-Structuralist Theory : From Kant to Deleuze. Edinburgh: Edinburgh University Press, 2005.
- Coles, Peter. Cosmology : A Very Short Introduction. Very Short Introductions, 51. Oxford; New York: Oxford University Press, 2001.*
- Collin, Finn. Social Reality. London; New York: Routledge, 1997.
- Conklin, E. Jeffrey. Dialogue Mapping : Building Shared Understanding of Wicked Problems. Chichester, England; Hoboken, NJ: Wiley, 2006.
- Connolly, Bob, and Robin Anderson. First Contact. New York, N.Y., U.S.A.: Viking, 1987.*
- Consigny, Scott Porter. Gorgias, Sophist and Artist. Columbia, S.C.: University of South Carolina Press, 2001.*
- Conway, John Horton. On Numbers and Games. London; New York: Academic Press, 1976.*
- Conway, John Horton, and Derek Alan Smith. On Quaternions and Octonions : Their Geometry, Arithmetic, and Symmetry. Natick, Mass.: AK Peters, 2003.
- Conze, Edward. Buddhism : Its Essence and Development. Birmingham: Windhorse, 2001.
- Cook, Francis Harold. Hua-Yen Buddhism : The Jewel Net of Indra. Religions Institute for Advanced Studies of World. University Park: Pennsylvania State University Press, 1977.*
- Cooper, John Xiros. T.S. Eliot and the Ideology of Four Quartets. Cambridge; New York: Cambridge University Press, 1995.
- Copeland, B. Jack. The Essential Turing. Oxford: Oxford University Press, 2002.
- Copi, Irving Marmer. Symbolic Logic : 5th Ed. New York: Macmillan, 1954; New York: Macmillan, 1979.
- Copi, Irving M. The Theory of Logical Types. London: Routledge and K. Paul, 1971.**
- Corballis, Michael C. From Hand to Mouth : The Origins of Language. Princeton: Princeton University Press, 2002.
- Corbin, Henry. Alone with the Alone : Creative Imagination in the Sufism of Ibn `Arabi. Princeton/Bollingen Paperbacks. Princeton, N.J.: Princeton University Press, 1998.
- Corlett, William S. Community without Unity : A Politics of Derridian Extravagance. Post-Contemporary Interventions. Durham, NC: Duke University Press, 1989.
- Corradi Fiumara, Gemma. The Metaphoric Process : Connections between Language and Life. London; New York: Routledge, 1995.*
- . The Other Side of Language : A Philosophy of Listening. London; New York: Routledge, 1990.
- Coutu, Walter. Emergent Human Nature : A Symbolic Field Interpretation. Charlottesville, Va.: Teleprint Pub., 1985.*
- Coveney, Peter, and Roger Highfield. The Arrow of Time : A Voyage through Science to Solve Time's Greatest Mystery. New York: Fawcett Columbine, 1991.

- Cox, Ronald R. Schutz's Theory of Relevance : A Phenomenological Critique. Phaenomenologica, 77. The Hague: Nijhoff, 1978.
- Critchley, Simon. Very Little-- Almost Nothing : Death, Philosophy, Literature. London; New York: Routledge, 2004.
- Critchley, Simon. Things Merely Are : Philosophy in the Poetry of Wallace Stevens. London; New York: Routledge, 2005.
- Critchlow, Keith. Order in Space: A Design Source Book. New York: Viking Press, 1970.
- Croce, Benedetto. The Philosophy of Giambattista Vico. New Brunswick, N.J.: Transaction Publishers, 2002.
- Cromwell, Peter R. Knots and Links. Cambridge, UK; New York: Cambridge University Press, 2004.
- . Polyhedra. Cambridge, U.K.; New York, NY, USA: Cambridge University Press, 1997.
- Crook, Stephen. Modernist Radicalism and Its Aftermath : Foundationalism and Anti-Foundationalism in Radical Social Theory. London; New York: Routledge, 1991.
- Cross, Nigel. Engineering Design Methods : Strategies for Product Design. Chichester: Wiley, 2008.
- Crossley, Nick. The Social Body : Habit, Identity and Desire. London; Thousand Oaks, Calif.: SAGE, 2001.
- Crowe, Michael J. A History of Vector Analysis; the Evolution of the Idea of a Vectorial System. Notre Dame: University of Notre Dame Press, 1967.
- Crowell, Steven Galt. Husserl, Heidegger, and the Space of Meaning Paths toward Transcendental Phenomenology. Evanston, Ill.: Northwestern University Press, 2001.
- Culler, Jonathan D. Deconstruction : Critical Concepts in Literary and Cultural Studies. London; New York: Routledge, 2003.
- . On Deconstruction : Theory and Criticism after Structuralism. Ithaca, N.Y.: Cornell University Press, 1982.
- Cunningham, Conor. Genealogy of Nihilism : Philosophies of Nothing and the Difference of Theology. Radical Orthodoxy Series. London; New York: Routledge, 2002.
- Curtis, Gregory. The Cave Painters : Probing the Mysteries of the World's First Artists. New York: Knopf, 2006.
- Czarniecki, Krzysztof, and Ulrich Eisenacker. Generative Programming : Methods, Tools, and Applications. Boston: Addison Wesley, 2000.*
- Dainton, Barry. Time and Space. Montreal: McGill-Queen's University Press, 2001.
- Dallas, Ian. The Book of Strangers. New York: Pantheon Books, 1972.
- Dallas, Ian, and O. J. O. Ferreira. Collected Works. Erasmus, Pretoria: Budget Press, 2005.
- Dallmayr, Fred R. Twilight of Subjectivity : Contributions to a Post-Individualist Theory of Politics. Amherst: University of Massachusetts Press, 1981.
- Damasio, Antonio R. Descartes' Error : Emotion, Reason, and the Human Brain. New York: Putnam, 1994.
- . The Feeling of What Happens : Body and Emotion in the Making of Consciousness. New York: Harcourt Brace, 1999.*
- . Looking for Spinoza : Joy, Sorrow, and the Feeling Brain. Orlando, Fla.: Harcourt, 2003.
- Damon, S. Foster. A Blake Dictionary; the Ideas and Symbols of William Blake. Providence: Brown University Press, 1965.
- Danesi, Marcel. The Quest for Meaning : A Guide to Semiotic Theory and Practice. Toronto Studies in Semiotics and Communication. Toronto: University of Toronto Press, 2007.
- Danesi, Marcel. Vico, Metaphor, and the Origin of Language. Bloomington, IN: Indiana University Press, 1993.
- Dang, Yumei, Louis H. Kauffman, and Daniel J. Sandin. Hypercomplex Iterations : Distance Estimation and Higher Dimensional Fractals. K & E Series on Knots and Everything, V. 17. Singapore; River Edge, NJ: World Scientific, 2002.
- Dauenhauer, Bernard P. Silence, the Phenomenon and Its Ontological Significance. Studies in Phenomenology and Existential Philosophy. Bloomington: Indiana University Press, 1980.
- Daverman, Robert J., and R. B. Sher. Handbook of Geometric Topology. Amsterdam: Elsevier, 2002.
- Davies, Duncan, Tom Banfield, and Ray Sheahan. The Humane Technologist. Science and Engineering

- Policy Series. London: Oxford University Press, 1976.
- Davis, Martin. The Undecidable: Basic Papers on Undecidable Propositions, Unsolvability Problems and Computable Functions. Hewlett, N.Y.: Raven Press, 1965.
- Davis, Morton D. Game Theory; a Nontechnical Introduction. Science and Discovery. New York: Basic Books, 1970.
- Davis, Philip J., and Reuben Hersh. The Mathematical Experience. Boston: Birkhauser, 1981.
- De Landa, Manuel. Intensive Science and Virtual Philosophy. Transversals. London; New York: Continuum, 2002.**
- De Morgan, Augustus, and Peter Lauchlan Heath. On the Syllogism, and Other Logical Writings. New Haven: Yale University Press, 1966.
- De Nooy, Juliana. Derrida, Kristeva, and the Dividing Line : An Articulation of Two Theories of Difference. New York: Garland Pub., 1998.
- Deleuze, Gilles. Bergsonism. New York: Zone Books, 1988.
- . Desert Islands and Other Texts, 1953-1974. Semiotext(e) Foreign Agents Series. Los Angeles, CA; Cambridge, Mass.: Semiotext(e) ; MIT Press, 2004.
- . Difference and Repetition. New York: Columbia University Press, 1994.**
- . Empiricism and Subjectivity : An Essay on Hume's Theory of Human Nature. European Perspectives. New York: Columbia University Press, 1991.
- . Expressionism in Philosophy : Spinoza. New York; Cambridge, Mass.: Zone Books ; MIT Press, 1990.*
- . The Fold : Leibniz and the Baroque. Minneapolis: University of Minnesota Press, 1993.*
- . The Logic of Sense. European Perspectives. New York: Columbia University Press, 1990.**
- . The Movement-Image. London: Athlone Press, 1986.
- . Nietzsche and Philosophy. London: Athlone Press, 1983.
- . Spinoza, Practical Philosophy. San Francisco: City Lights Books, 1988.
- . The Time-Image. London: Athlone, 1989.
- Deleuze, Gilles, and Anne Boyman. Pure Immanence : Essays on a Life. New York; Cambridge, Mass.: Zone Books ; MIT Press, 2001.
- Deleuze, Gilles, and Felix Guattari. Anti-Oedipus : Capitalism and Schizophrenia. Minneapolis: University of Minnesota Press, 1983.**
- . A Thousand Plateaus : Capitalism and Schizophrenia. University of Minnesota Press, 1987; London; New York: Continuum, 2004.*
- . What Is Philosophy? London: Verso, 1994.**
- Deleuze, Gilles, and David Lapoujade. Two Regimes of Madness : Texts and Interviews 1975-1995. Semiotext(e) Foreign Agents Series. Los Angeles, CA; Cambridge, Mass.: Semiotext(e) ; MIT Press, 2006.
- Deleuze, Gilles, and Claire Parnet. Dialogues II. New York: Columbia University Press, 2002.
- DeMarco, Tom. Structured Analysis and System Specification. Prentice-Hall Software Series. Englewood Cliffs, N.J.: Prentice-Hall, 1979.
- Dembski, William A. The Design Revolution : Answering the Toughest Questions About Intelligent Design. Downers Grove, Ill.: IVP Books, InterVarsity Press, 2004.
- . Intelligent Design: The Bridge between Science & Theology. Downers Grove, Ill.: InterVarsity, 1999.
- Dembski, William A., and James M. Kushiner. Signs of Intelligence : Understanding Intelligent Design. Grand Rapids, Mich.: Brazos Press, 2001.
- Derbyshire, John. Unknown Quantity : A Real and Imaginary History of Algebra. Washington, D.C.: Joseph Henry Press, 2006.*
- Derrida, Jacques. Dissemination. Chicago: University Press, 1981.
- . Margins of Philosophy. Chicago: University of Chicago Press, 1982.
- . Of Grammatology. Baltimore: Johns Hopkins University Press, 1976.**
- . Of Spirit : Heidegger and the Question. Chicago: University of Chicago Press, 1989.

- . On Touching. Jean-Luc Nancy. Stanford, Calif.: Stanford University Press, 2005.
- . Speech and Phenomena, and Other Essays on Husserl's Theory of Signs. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston: Northwestern University Press, 1979.**
- . Writing and Difference. Chicago: University of Chicago Press, 1978.**
- Derrida, Jacques, and Stefano Agosti. Spurs : Nietzsche's Styles = Eperons : Les Styles De Nietzsche. Chicago: University of Chicago Press, 1979.
- Derrida, Jacques, Alan Bass, and Henri Ronse. Positions. Chicago: University of Chicago Press, 1981.
- Derrida, Jacques, and John D. Caputo. Deconstruction in a Nutshell : A Conversation with Jacques Derrida. Perspectives in Continental Philosophy. New York: Fordham University Press, 1997.
- Derrida, Jacques, and Edmund Husserl. Edmund Husserl's Origin of Geometry, an Introduction. Stony Brook, N.Y.; Boulder, Colo.: N. Hays ; Great Eastern Book Co., 1978.*
- Desan, Wilfrid. A Noetic Prelude to a United World. First ed. Washington, D.C.: Georgetown University Press, 1961.
- . The Planetary Man. Second ed. New York: Macmillan, 1972.
- Desjardins, Rosemary. Plato and the Good : Illuminating the Darkling Vision. Philosophy of History and Culture, V. 21. Leiden; Boston: Brill, 2004.
- Detienne, Marcel, and Jean Pierre Vernant. Cunning Intelligence in Greek Culture and Society. European Philosophy and the Human Sciences. Hassocks UK; Atlantic Highlands, N.J.: Harvester Press ; Humanities Press, 1978.**
- Deutsch, David. The Fabric of Reality : The Science of Parallel Universes-- and Its Implications. New York: Allen Lane, 1997.*
- Devall, Bill. Simple in Means, Rich in Ends : Practicing Deep Ecology. Salt Lake City: Peregrine Smith Books, 1988.*
- Devaney, Robert L., Linda Keen, and Kathleen T. Alligood. Chaos and Fractals : The Mathematics Behind the Computer Graphics. Providence, RI: American Mathematical Society, 1989.
- Devlin, Keith J. Mathematics : The New Golden Age. New York: Columbia University Press, 1999.
- Dijkstra, Edsger W. A Discipline of Programming. Prentice-Hall Series in Automatic Computation. Englewood Cliffs; London: Prentice-Hall, 1976.
- Dillon, M. C. Merleau-Ponty's Ontology. Evanston, Ill.: Northwestern University Press, 1997.
- Dilthey, Wilhelm, Rudolf A. Makkreel, and Frithjof Rodi. Selected Works of Wm. Dilthey. Princeton, N.J.: Princeton University Press, 1985.
- Dixon, Geoffrey M. Division Algebras : Octonions, Quaternions, Complex Numbers, and the Algebraic Design of Physics. Dordrecht; Boston: Kluwer Academic Publishers, 1994.*
- Doets, Kees. Basic Model Theory. Studies in Logic, Language, and Information. Stanford, Calif.; Dordrecht: CLSI Publications ; FoLLI, 1996.
- Donaldson, S. K., and P. B. Kronheimer. The Geometry of Four-Manifolds. Oxford Mathematical Monographs. Oxford; New York: Clarendon Press ; Oxford University Press, 1997.*
- Donnellan, Thomas. Lattice Theory. Commonwealth and International Library. Oxford; New York: Pergamon Press, 1968.
- Donnelly, Maureen. Layered Mereotopology. Leipzig: Ifomis, 2003.
- Donnelly, Maureen, and Barry Smith. "Layers: A New Approach to Locating Objects in Space." Lecture Notes in Computer Science. Issue 2825 (2003): 46-60.
- Dorn, Edward. Slinger. Berkeley, Calif.: Wingbow Press : Bookpeople, 1975. (long poem)
- Dosse, Francois. History of Structuralism. 2 Volumes. Minneapolis, Minn.: University of Minnesota Press, 1997.
- Doueihi, Milad. The Metis of the Greeks. Diacritics, v. 16, no. 2 (Summer 1986). Baltimore, MA: The Johns Hopkins University Press, 1986.
- Douglas, Mary Tew. Purity and Danger: An Analysis of Concepts of Pollution and Taboo. London: Routledge & K. Paul, 1970.*
- Douglass, Bruce Powel. Real-Time Design Patterns : Robust Scalable Architecture for Real-Time Systems. The Addison-Wesley Object Technology Series. Boston, MA: Addison-Wesley, 2003.

- Dowling, Paul. The Sociology of Mathematics Education Mathematical Myths, Pedagogic Texts. London ; Washington, D.C. : Falmer Press, 1998.
- Draaisma, D. Metaphors of Memory : A History of Ideas About the Mind. Cambridge, U.K.; New York: Cambridge University Press, 2000.
- Dransfield, Peter. Engineering Systems and Automatic Control. Englewood Cliffs, N.J.: Prentice-Hall, 1968.
- Drexler, Jerome. Discovering Postmodern Cosmology : Discoveries in Dark Matter, Cosmic Web, Big Bang, Inflation, Cosmic Rays, Dark Energy, Accelerating Cosmos. Boca Raton, Fla.: Universal Publishers, 2008.
- Dreyfus, Hubert L. "Wild on Heidegger: Comments" The Journal of Philosophy (New York City : F.J.E. Woodbridge : W.T. Bush) Vol. 60.No. 22 (Oct. 24, 1963): pp. 677-80.
- Dreyfus, Hubert L., Paul Rabinow, and Michel Foucault. Michel Foucault, Beyond Structuralism and Hermeneutics. Chicago: University of Chicago Press, 1983.
- Du Val, Patrick. Homographies, Quaternions, and Rotations. Oxford Mathematical Monographs. Oxford: Clarendon Press, 1964.
- Dubin, Joel. The Little Black Book of Computer Security. Loveland, CO: 29th Street Press, 2005.
- Dubin, Robert. Theory Building. New York: Free Press, 1969.
- Dubois, Didier and Prade, Henri. "Rough Fuzzy Sets and Fuzzy Rough Sets." International Journal of General Systems (London, UK: Taylor & Francis) Vol. 17.No. 2 (1990).
- DuBois, Page. Torture and Truth. New York: Routledge, 1991.*
- Duerr, Hans Peter. Dreamtime : Concerning the Boundary between Wilderness and Civilization. Oxford, UK; New York, NY: B. Blackwell, 1985.
- Dummett, Michael A. E. The Logical Basis of Metaphysics. The William James Lectures, 1976. Cambridge, Mass.: Harvard University Press, 1991.
- Dunne, J. W. An Experiment with Time. Classics in Consciousness. Charlottesville, VA: Hampton Roads, 2001.*
- Dunne, John William. The Serial Universe. London: Faber, 1934.*
- Durham, Frank, and Robert D. Purrington. Frame of the Universe : A History of Physical Cosmology. New York: Columbia University Press, 1983.
- Durkheim, Emile. The Elementary Forms of the Religious Life. New York: Free Press, 1965.
- Durrant, Michael, and Aristotle. Aristotle's De Anima in Focus. Routledge Philosophers in Focus Series. London; New York: Routledge, 1993.
- Ebeling, Werner, Manfred Peschel, and Wolfgang Weidlich. Models of Selforganization in Complex Systems: MOSES. Mathematical research, Bd. 64. Berlin: Akademie Verlag, 1991
- Eckhart, Ludwig. Four-Dimensional Space. Bloomington: Indiana University Press, 1968.*
- Eco, Umberto. Kant and the Platypus : Essays on Language and Cognition. New York: Harcourt Brace, 2000.**
- . A Theory of Semiotics. Advances in Semiotics. Bloomington, IN: Indiana University Press, 1976.*
- Eco, Umberto, and Thomas A. Sebeok. The Sign of Three : Dupin, Holmes, Peirce. Advances in Semiotics. Bloomington: Indiana University Press, 1983.
- Eddington, Arthur Stanley. The Philosophy of Physical Science. Ann Arbor: University of Michigan Press, 1958.
- Edgar, Andrew, and Peter R. Sedgwick. Cultural Theory : The Key Concepts. Routledge Key Guides. London: Routledge, 2004.
- Edmondson, Amy C. A Fuller Explanation : The Synergetic Geometry of R. Buckminster Fuller. Design Science Collection. Boston: Birkhauser, 1987.
- Edwards, A. W. F. Pascal's Arithmetical Triangle : The Story of a Mathematical Idea. Baltimore: Johns Hopkins University Press, 2002.*
- Ehrig, Hartmut. Universal Theory of Automata : A Categorical Approach. Stuttgart: Teubner, 1974.
- Eigen, Manfred, and Ruthild Winkler. Laws of the Game : How the Principles of Nature Govern Chance. New York: Knopf : Random House, 1981.*
- Eilan, Naomi, Rosaleen A. McCarthy, and Bill Brewer. Spatial Representation : Problems in Philosophy and

- Psychology. Oxford, UK; Cambridge, Mass.: Blackwell, 1993.
- Elkins, James. The Poetics of Perspective. Ithaca, N.Y.: Cornell University Press, 1994.
- Ellenberger, Henri F. The Discovery of the Unconscious; the History and Evolution of Dynamic Psychiatry. New York: Basic Books, 1970.
- Eliot, T. S. The Complete Poems and Plays, 1909-1950. San Diego: Harcourt Brace Jovanovich, 1971.
- Ellis, Ralph D. An Ontology of Consciousness. Martinus Nijhoff Philosophy Library, V. 18. Dordrecht; Boston; Hingham, MA, USA: M. Nijhoff ; Kluwer Academic Publishers, 1986.
- Elster, Jon. Logic and Society : Contradictions and Possible Worlds. Chichester; New York: Wiley, 1978.
- Elte, Emanuel Lodewijk. "The Semiregular Polytopes of the Hyperspaces." Groningen : Gebroeders Hoitsema, 1912. Thesis.
- Emad, Parvis. On the Way to Heidegger's Contributions to Philosophy. Madison, WI: University of Wisconsin Press, 2007.
- Embree, Lester E. Gurwitsch's Relevancy for Cognitive Science. Contributions to Phenomenology, 52. Dordrecht: Springer, 2004.
- Emmer, Michele. The Visual Mind 2. Cambridge, Mass.: MIT Press, 2005.
- . The Visual Mind : Art and Mathematics (1). The Leonardo Book Series. Cambridge, Mass.: MIT Press, 1993.
- Erickson, Jon. Hacking : The Art of Exploitation. San Francisco: No Starch Press, 2003.
- Erneling, Christina E. "The Learnability of Language Going Beyond Information Given." Ottawa : National Library of Canada, 1991. Thesis.
- Etherington-Smith, Meredith. The Persistence of Memory : A Biography of Dali. New York: Random House, 1992.
- Euclid, Thomas Little Heath, and J. L. Heiberg. The Thirteen Books of Euclid's Elements. Cambridge: The University Press, 1908.*
- Evans, Fred, and Leonard Lawlor. Chiasms : Merleau-Ponty's Notion of Flesh. SUNY Series in Contemporary Continental Philosophy. Albany, NY: State University of New York Press, 2000.
- Evans, Fred J. Psychology and Nihilism : A Genealogical Critique of the Computational Model of Mind. Albany, NY: State University of New York Press, 1993.
- Falk, Richard A. A Study of Future Worlds. New York: Free Press, 1975.
- Fandozzi, Phillip R. Nihilism and Technology : A Heideggerian Investigation. Washington, D.C.: University Press of America, 1982.*
- Farber, Marvin. Naturalism and Subjectivism. Albany, NY: State University of New York Press, 1959. C. C. Thomas.
- Farias, Victor, Joseph Margolis, and Tom Rockmore. Heidegger and Nazism. Philadelphia: Temple University Press, 1989.
- Fauconnier, Gilles. Mappings in Thought and Language. Cambridge, U.K.; New York, NY, USA: Cambridge University Press, 1997.
- . Mental Spaces : Aspects of Meaning Construction in Natural Language. Cambridge; New York, NY, USA: Cambridge University Press, 1994.*
- Fauconnier, Gilles, and Eve Sweetser. Spaces, Worlds, and Grammar. Cognitive Theory of Language and Culture. Chicago: University of Chicago Press, 1996.
- Fauconnier, Gilles, and Mark Turner. The Way We Think : Conceptual Blending and the Mind's Hidden Complexities. New York: Basic Books, 2002.*
- Fauvel, John. Let Newton Be! Oxford UK; New York: Oxford University Press, 1988.
- Fauvel, John, Raymond Flood, and Robin J. Wilson. Mobius and His Band : Mathematics and Astronomy in Nineteenth-Century Germany. Oxford; New York: Oxford University Press, 1993.
- Feffer, Melvin. Radical Constructionism : Rethinking the Dynamics of Development. New York: New York University Press, 1988.
- Feibleman, James Kern. Ontology. New York: Greenwood Press, 1968.
- Fensel, Dieter. Ontologies : A Silver Bullet for Knowledge Management and Electronic Commerce. Berlin; New York: Springer, 2001.

- Ferber, Jacques. Multi-Agent Systems : An Introduction to Distributed Artificial Intelligence. Harlow: Addison-Wesley, 1998.
- Ferguson-Smith, Anne C., Robert A. Martienssen, and John M. Grealley. Epigenomics. Springer EBooks. Dordrecht: Springer Netherlands, 2009.
- Fernandez, James W. Beyond Metaphor : The Theory of Tropes in Anthropology. Stanford, Calif.: Stanford University Press, 1991.
- Fernández-Solís, J. L. Is Building Construction Approaching the Threshold of Becoming Unsustainable? A System Theoretic Exploration Towards a Post-Forrester Model for Taming Unsustainable Exponentialoids. Publisher: VDM Verlag Dr. Mueller e.K, 2008. <http://hdl.handle.net/1853/14127>
- Fernandez-Solis, J., T. Ferris, K. Palmer. Theoretical Approach to the Interaction between the Meta-System Schemas of the Artificial (Built) Environment and Nature. Towards the Foundation of Theory for the Built Environment. 2007. School of the Built Environment; Univerity of Salford.
- Ferreiras Domanguez, Josa. Labyrinth of Thought : A History of Set Theory and Its Role in Modern Mathematics. Science Networks Historical Studies, V. 23. Basel, Switzerland; Boston: Birkhauser Verlag, 1999.*
- Ferris, T.L.J. "Foundation For Medical Diagnosis and Measurement", University of South Australia, 1997. PhD thesis.
- Ferris, T.L.J. "Exploration of the application of 'Ready-to-hand' and 'Present-at-hand' in the design of systems", 9th ANZSYS Conference, 18-20 November 2003, Melbourne, CD-ROM proceedings.
- Feyerabend, Paul. Philosophical Papers. Cambridge; New York: Cambridge University Press, 1981.
- Feyerabend, Paul K. Against Method. London UK: Verso, 2000.**
- . Three Dialogues on Knowledge. Oxford: Blackwell, 1991.
- Feyerabend, Paul K., and John Preston. Knowledge, Science, and Relativism : 1960-1980. Cambridge, UK; New York, NY: Cambridge University Press, 1999.
- Fiadeiro, José Luis. Algebra and Coalgebra in Computer Science. Lecture Notes in Computer Science, 4624. New York: Springer-Verlag Berlin Heidelberg, 2007.
- Filman, Robert E. Aspect-Oriented Software Development. Harlow: Addison-Wesley, 2005.
- Fink, Bruce. Lacan to the Letter : Reading Ecrits Closely. Minneapolis, MN: University of Minnesota Press, 2004.
- Fink, Eugen, and Edmund Husserl. Sixth Cartesian Meditation the Idea of a Transcendental Theory of Method. Bloomington, IN: Indiana University Press, 1995.
- Fisch, Max Harold, Kenneth Laine Ketner, and Christian J. W. Kloesel. Peirce, Semeiotic, and Pragmatism : Essays. Bloomington, IN: Indiana University Press, 1986.
- Fitzpatrick, Geraldine. The Locales Framework : Understanding and Designing for Wicked Problems. The Kluwer International Series on Computer Supported Cooperative Work, V. 1. Dordrecht; Boston: Kluwer Academic Publishers, 2003.
- Flake, Gary William. The Computational Beauty of Nature : Computer Explorations of Fractals, Chaos, Complex Systems, and Adaption. A Bradford Book. Cambridge, Mass.: MIT Press, 1999.
- Flanagan, Owen J. Dreaming Souls : Sleep, Dreams, and the Evolution of the Conscious Mind. Philosophy of Mind Series. Oxford; New York: Oxford University Press, 2000.
- . The Really Hard Problem : Meaning in a Material World. Cambridge, Mass.: MIT Press, 2007.
- Flannery, David. The Square Root of Two : A Dialogue Concerning a Number and a Sequence. New York, NY: Springer, 2006.
- Flegg, Graham. From Geometry to Topology. Mineola, N.Y.: Dover Publications, 2001.
- Fleishman, Edwin A., Marilyn K. Quaintance, and Laurie A. Broedling. Taxonomies of Human Performance : The Description of Human Tasks. Orlando, FL: Academic Press, 1984.
- Fleming, Chris. Rene Girard : Violence and Mimesis. Cambridge; Malden, MA: Polity, 2004.
- Flood, Robert L., and Ewart R. Carson. Dealing with Complexity : An Introduction to the Theory and Application of Systems Science. New York: Plenum Press, 1988.
- Florman, Samuel C. The Existential Pleasures of Engineering. New York: St. Martin's Press, 1976.
- Folse, Henry J. The Philosophy of Niels Bohr : The Framework of Complementarity. Amsterdam; New York; New York, N.Y.: North-Holland ; Elsevier Science Pub. Co., 1985.

- Ford, L. R., and D. R. Fulkerson. Flows in Networks. Princeton, N.J.: Princeton University Press, 1962.
- Forrest, Barbara, and Paul R. Gross. Creationism's Trojan Horse : The Wedge of Intelligent Design. Oxford; New York: Oxford University Press, 2007.
- Forrester, Jay Wright. Industrial Dynamics. Cambridge, Mass.: M.I.T. Press, 1961.
- . World Dynamics. Cambridge, Mass.: Wright-Allen Press, 1971.
- Forster, Eckart. Kant's Transcendental Deductions : The Three Critiques and the Opus Postumum. Stanford Series in Philosophy. Stanford, Calif.: Stanford University Press, 1989.
- Förster, Eckart. Kant's Final Synthesis : An Essay on the Opus Postumum. Cambridge, Mass.: Harvard University Press, 2000.
- Forster, Michael N. Hegel's Idea of a Phenomenology of Spirit. Chicago: University of Chicago Press, 1998.
- Forsyth, Andrew Russell. Geometry of Four Dimensions. Cambridge, UK: University Press, 1930.*
- Foucault, Michel. The History of Sexuality. New York: Pantheon Books, 1978.
- Foucault, Michel. The History of Sexuality. Vol. 2, the Use of Pleasure. London: Penguin, 1992.
- . Language, Counter-Memory, Practice : Selected Essays and Interviews. Ithaca, N.Y.: Cornell University Press, 1977.
- . The Order of Things: An Archaeology of the Human Sciences. New York: Pantheon Books, 1971.**
- Foucault, Michel, and James D. Faubion. Power. New York; New York: New Press ; Distributed by W.W. Norton, 2000.
- Foucault, Michel, and Jean Khalfa. History of Madness. London; New York: Routledge, 2006.
- Foucault, Michel. The Archaeology of Knowledge. New York: Pantheon Books, 1972.
- Foucault, Michel. The Birth of the Clinic: an Archaeology of Medical Perception. New York: Pantheon Books, 1973.
- Foucault, Michel. This Is Not a Pipe. Berkeley: University of California Press, 1983.
- Foucault, Michel, et al. Technologies of the Self : A Seminar with Michel Foucault. Amherst: University of Massachusetts Press, 1988.
- Freadman, Anne. The Machinery of Talk: Charles Peirce and the Sign Hypothesis. Cultural Memory in the Present. Stanford, Calif: Stanford University Press, 2004.
- Hines, Thomas Jensen. The Later Poetry of Wallace Stevens : Phenomenological Parallels with Husserl and Heidegger. Lewisburg PA: Bucknell University Press, 1976.
- Fowler, D. H. The Mathematics of Plato's Academy : A New Reconstruction. Oxford Science Publications. Oxford; New York: Clarendon Press ; Oxford University Press, 1987.
- Fowler, Martin, and Kendall Scott. UML Distilled : A Brief Guide to the Standard Object Modeling Language. Reading, Mass.: Addison Wesley, 2000.
- Fraenkel, Abraham Adolf. Extension of the Number-Concept: Groups and Fields. Rational. Real. Complex. Hypercomplex Numbers. Problems and Methods in Modern Mathematics, 2. New York: Scripta Mathematica, Yeshiva University, 1964.*
- Franks, Felix. Polywater. Cambridge, Mass.: MIT Press, 1981.
- Freeman, Kathryn S. Blake's Nostos Fragmentation and Nondualism in the Four Zoas. Albany, NY: State University of New York Press, 1997.*
- Frieden, B. Roy. Science from Fisher Information : A Unification. Cambridge, UK; New York: Cambridge University Press, 2004.
- Friedman, William J. About Time : Inventing the Fourth Dimension. Cambridge, Mass.: MIT Press, 1990.
- Fuchs, Wolfgang Walter. Phenomenology and the Metaphysics of Presence : An Essay in the Philosophy of Edmund Husserl. Phaenomenologica, 69. The Hague: Nijhoff, 1976.
- Fuller, Andrew Reid. Insight into Value : An Exploration of the Premises of a Phenomenological Psychology. Albany, N.Y.: State University of New York Press, 1990.
- Fuller, R. Buckminster, and E. J. Applewhite. Synergetics 2 : Explorations in the Geometry of Thinking. Vol. 2. New York; London: Macmillan ; Collier Macmillan, 1983.**
- . Synergetics Dictionary : The Mind of Buckminster Fuller : With an Introduction and Appendices. New York: Garland, 1986.

- . Synergetics: Explorations in the Geometry of Thinking. Vol. 1. New York: Macmillan, 1975.**
- Fulton, William, and Joe Harris. Representation Theory : A First Course. New York: Springer-Verlag, 1991.
- Fynsk, Christopher. Heidegger : Thought and Historicity. Ithaca, N.Y.: Cornell University Press, 1993.
- Gadamer, Hans-Georg. Dialogue and Dialectic : Eight Hermeneutical Studies on Plato. New Haven, CT: Yale University Press, 1980.
- . The Idea of the Good in Platonic-Aristotelian Philosophy. New Haven: Yale University Press, 1986.
- . Truth and Method. New York: Seabury Press, 1975; New York: Continuum, 1993.*
- Gallagher, Shaun. How the Body Shapes the Mind. Oxford; New York: Clarendon Press, 2005.*
- . The Inordinance of Time. Evanston, Ill.: Northwestern University Press, 1998.
- Galton, Antony. Qualitative Spatial Change. Spatial Information Systems. Oxford; New York: Oxford University Press, 2000.
- Gans, Eric Lawrence. The Origin of Language : A Formal Theory of Representation. Berkeley: University of California Press, 1981.
- . Originary Thinking : Elements of Generative Anthropology. Stanford, Calif.: Stanford University Press, 1993.
- Ganter, Bernhard, and Rudolf Wille. Formal Concept Analysis : Mathematical Foundations. Berlin; New York: Springer, 1999.*
- Gracia Bondía, José, Joseph C. Várilly, and Héctor Figueroa. Elements of Noncommutative Geometry. Boston: Birkhäuser, 2001.
- Gardenfors, Peter. Conceptual Spaces the Geometry of Thought. Cambridge, Mass.: MIT Press, 2000.*
- . Knowledge in Flux : Modeling the Dynamics of Epistemic States. Cambridge, Mass.: MIT Press, 1988.
- Gardies, Jean-Louis. Rational Grammar. Washington, D.C.; Manchen: Catholic University of America Press; Philosophia Verlag, 1986.
- Gardiner, Michael. Critiques of Everyday Life. London, 2000. Routledge.
- Gardner, Howard. Frames of Mind : The Theory of Multiple Intelligences. New York: Basic Books, 1983.*
- . The Quest for Mind: Piaget, Levi-Strauss, and the Structuralist Movement. New York: Knopf, 1973.
- Gardner, Martin. The Ambidextrous Universe: Left, Right, and the Fall of Parity. New York: New American Library, 1969.
- Garfinkel, Harold. Studies in Ethnomethodology. Englewood Cliffs, N.J.: Prentice-Hall, 1967.*
- Gasche, Rodolphe. The Idea of Form : Rethinking Kant's Aesthetics. Cultural Memory in the Present. Stanford, Calif.: Stanford University Press, 2003.
- . The Tain of the Mirror : Derrida and the Philosophy of Reflection. Cambridge, Mass.: Harvard University Press, 1986.
- Gebser, Jean. The Ever-Present Origin. Athens, Ohio: Ohio University Press, 1985.
- Geeraerts, Dirk. Paradigm and Paradox : Explorations into a Paradigmatic Theory of Meaning and Its Epistemological Background. Symbolae Facultatis Litterarum Et Philosophiae Lovaniensis, V. 14. Leuven: Leuven University Press, 1985.
- Geldard, Richard G. Parmenides and the Way of Truth. Rhinebeck, N.Y.: Monkfish Book Pub., 2007.
- Gelfand, Alan E., and Crayton C. Walker. Ensemble Modeling : Inference from Small-Scale Properties to Large-Scale Systems. Statistics, Textbooks and Monographs, V. 58. New York, N.Y.: M. Dekker, 1984.
- Gellert, Walter, and Company Van Nostrand Reinhold. The VNR Concise Encyclopedia of Mathematics. New York: Van Nostrand Reinhold Co., 1977.
- Gendler, Tamar, and John Hawthorne. Perceptual Experience. Oxford; New York: Clarendon Press ; Oxford University Press, 2006.
- Genette, Gerard. Mimologics. Stages, V. 2. Lincoln; London: University of Nebraska, 1995.
- Genosko, Gary. Baudrillard and Signs : Signification Ablaze. London; New York: Routledge, 1994.
- Genz, Henning. Nothingness : The Science of Empty Space. Reading, Mass.: Perseus Books, 1999.
- Gergen, Kenneth J., and Mary M. Gergen. Social Construction: A Reader. London: SAGE, 2003.

- Getis, Arthur, and B. N. Boots. Models of Spatial Processes : An Approach to the Study of Point, Line, and Area Patterns. Cambridge Geographical Studies, 8. Cambridge, UK New York: Cambridge University Press, 1978.
- Getzler, Ezra and Kapranov, M. M. Higher Category Theory: Workshop on Higher Category Theory, March 28-30, 1997, Northwestern University, Evanston, Il. 1998. American Mathematical Society.
- Geyer, R. Felix, and J. van der Zouwen. Sociocybernetic Paradoxes : Observation, Control, and Evolution of Self-Steering Systems. London; Beverly Hills, Calif.: Sage Publications, 1986.
- The Creative Process, a Symposium. 1952. University of California Press.
- Gibson, Jerry D. The Communications Handbook. Electrical Engineering Handbook Series. Boca Raton, Fla.; New York, N.Y.: CRC Press ; IEEE Press, 1997.
- Gillan, Garth. The Horizons of the Flesh: Critical Perspectives on the Thought of Merleau-Ponty. Carbondale: Southern Illinois University Press, 1973.
- Gillespie, Sam. The Mathematics of Novelty : Badiou's Minimalist Metaphysics. Anamnesis. Seddon, Vic.: re.press, 2007.
- Gilmore, Robert. Catastrophe Theory for Scientists and Engineers. New York: Wiley, 1981.
- Ginzburg, Abraham. Algebraic Theory of Automata. ACM Monograph Series. New York: Academic Press, 1968.
- Gjertsen, Derek. Science and Philosophy : Past and Present. London, England; New York, N.Y., USA: Penguin Books ; Viking Penguin, 1989.
- Glass, James M. Delusion : Internal Dimensions of Political Life. Chicago: University of Chicago Press, 1985.
- Glazebrook, Trish. Heidegger's Philosophy of Science. Perspectives in Continental Philosophy, No. 12. New York: Fordham University Press, 2000.
- Gleick, James. Chaos : Making a New Science. New York, N.Y., U.S.A.: Viking, 1987.*
- Goertzel, Ben. Chaotic Logic : Language, Thought, and Reality from the Perspective of Complex Systems Science. New York: Plenum Press, 1994.**
- . Creating Internet Intelligence : Wild Computing, Distributed Digital Consciousness, and the Emerging Global Brain. Ifsr International Series on Systems Science and Engineering, V. 18. New York: Kluwer Academic / Plenum Publishers, 2002.
- . The Evolving Mind. The World Futures General Evolution Studies, V. 6. Langhorne, Pa.: Gordon and Breach, 1993.
- . From Complexity to Creativity Explorations in Evolutionary, Autopoietic, and Cognitive Dynamics. New York: Plenum Press, 1997.
- . The Hidden Pattern : A Patternist Philosophy of Mind. Boca Raton: BrownWalker Press, 2006.
- . The Structure of Intelligence : A New Mathematical Model of Mind. Recent Research in Psychology. New York: Springer-Verlag, 1993.
- Goertzel, B., O. Aam, F.T. Smith, and K. Palmer. "Mirror Neurons, Mirrorhouses, and the Algebraic Structure of the Self." Cybernetics And Human Knowing. 15. 1 (2008): 9-28.
- Goethe, Johann Wolfgang von Faust. Ed. Victor Trans. Lange. New York: Continuum International Publishing Group, 1993.
- Goetschel, Willi. Constituting Critique : Kant's Writing as Critical Praxis. Post-Contemporary Interventions. Durham: Duke University Press, 1994.
- Goffman, Erving. Frame Analysis : An Essay on the Organization of Experience. New York: Harper & Row, 1974.
- Goldberg, David E. Genetic Algorithms in Search, Optimization, and Machine Learning. Reading, Mass.: Addison-Wesley Pub. Co., 1989.
- Goldblatt, Robert. Orthogonality and Spacetime Geometry. New York: Springer-Verlag, 1987.*
- . Topoi, the Categorical Analysis of Logic. Studies in Logic and the Foundations of Mathematics, V. 98. Amsterdam; New York; North-Holland; New York, N.Y.: Elsevier North-Holland, 1983.
- Goldschmidt, Gabriela and William L. Porter. Design Representation. International Design Thinking Research, Symposium, London ; New York : Springer, 2004.
- Goldstein, Rebecca. Incompleteness : The Proof and Paradox of Kurt Godel. Great Discoveries. New York:

- W.W. Norton, 2005.
- Gomaa, Hassan. Software Design Methods for Concurrent and Real-Time Systems. The SEI Series in Software Engineering. Reading, Mass.: Addison-Wesley, 1993.
- Gomaa, Hassan. Software Design Methods for Real-Time Systems. Pittsburgh, Pa: Software Engineering Institute, 1989.
- Gomaa, Hassan. Software Design Methods for Concurrent and Real-Time Systems. The SEI series in software engineering. Reading, Mass: Addison-Wesley, 1993.
- Gompf, Robert E., and András Stipsicz. 4-Manifolds and Kirby Calculus. Graduate studies in Mathematics, v. 20. Providence, RI: American Mathematical Society, 1999.
- Gonshor, Harry. An Introduction to the Theory of Surreal Numbers. London Mathematical Society Lecture Note Series, 110. Cambridge; New York: Cambridge University Press, 1986.
- Gonzalez, Francisco J. Dialectic and Dialogue : Plato's Practice of Philosophical Inquiry. SPEP Studies in Historical Philosophy. Evanston, Ill.: Northwestern University Press, 1998.
- Gooch, Stan. Total Man. New York: Holt, Rinehart and Winston, 1973.
- Good, Irving John. The Scientist Speculates: An Anthology of Partly-Baked Ideas. New York: Basic Books, 1963.
- Gooding-Williams, Robert. Zarathustra's Dionysian Modernism. Stanford, Calif.: Stanford University Press, 2001.
- Goodwin, Brian C. How the Leopard Changed Its Spots : The Evolution of Complexity. New York: C. Scribner's Sons, 1994.
- Goody, Jack. The Interface between the Written and the Oral. Studies in Literacy, Family, Culture, and the State. Cambridge UK New York: Cambridge University Press, 1987.
- Gordon, Hayim, and Shlomit Tamari. Maurice Merleau-Ponty's Phenomenology of Perception : A Basis for Sharing the Earth. Contributions in Philosophy, No. 89. Westport, Conn.: Praeger, 2004.
- Gordon, Robert, A. J. Power, and Ross Street. Coherence for Tricategories. Memoirs of the American Mathematical Society, No. 558. Providence, RI: American Mathematical Society, 1995.
- Gordon, R. L., and Marcel Detienne. Myth, Religion, and Society : Structuralist Essays. Cambridge, UK; New York: Cambridge University Press, 1981.
- Gorle, Dinda L. Semiotics and the Problem of Translation : With Special Reference to the Semiotics of Charles S. Peirce. Approaches to Translation Studies, V. 12. Amsterdam; Atlanta, GA: Rodopi, 1994.
- Gould, Stephen Jay. Wonderful Life : The Burgess Shale and the Nature of History. New York: W.W. Norton, 1989.
- Goux, Jean-Joseph. Oedipus, Philosopher. Stanford, Calif.: Stanford University Press, 1993.
- Graafland, Ad. The Socius of Architecture : Amsterdam, Tokyo, New York. Stylos Series. Rotterdam: 010 Publishers, 2000.
- Grafton, Anthony. The Footnote : A Curious History. Cambridge, Mass.: Harvard University Press, 1997.
- Grassmann, Hermann. A New Branch of Mathematics : The "Ausdehnungslehre" Of 1844 and Other Works. Chicago: Open Court, 1995.*
- Grathoff, Richard. The Structure of Social Inconsistencies; a Contribution to a Unified Theory of Play, Game, and Social Action. The Hague: Martinus Nijhoff, 1970.*
- Gray, Richard M. Archetypal Explorations : An Integrative Approach to Human Behavior. London; New York: Routledge, 1996.
- Gregory, Patrick. Rene Girard Violence and the Sacred. Baltimore: Johns Hopkins Univ. Press, 1977.
- Greimas, Algirdas Julien. Narrative Semiotics and Cognitive Discourses. London: Pinter, 1990.
- . On Meaning : Selected Writings in Semiotic Theory. Theory and History of Literature, V. 38. Minneapolis: University of Minnesota Press, 1987.*
- . The Social Sciences, a Semiotic View. Minneapolis: University of Minnesota Press, 1990.
- . Structural Semantics : An Attempt at a Method. Lincoln: University of Nebraska Press, 1983.
- Greimas, Algirdas Julien, and Joseph Courtes. Semiotics and Language : An Analytical Dictionary. Advances in Semiotics. Bloomington: Indiana University Press, 1982.

- Grenander, Ulf. Elements of Pattern Theory. Johns Hopkins Studies in the Mathematical Sciences. Baltimore: Johns Hopkins University Press, 1996.*
- . General Pattern Theory : A Mathematical Study of Regular Structures. Oxford Mathematical Monographs. Oxford: Clarendon Press, 1993.
- . Pattern Analysis. New York: Springer-Verlag, 1978.
- . Pattern Synthesis. New York: Springer-Verlag, 1976.
- . Regular Structures. Applied Mathematical Sciences (Springer-Verlag New York Inc.), V. 33. New York: Springer-Verlag, 1981.
- Grenfell, Michael. Pierre Bourdieu. Agent Provocateur. London; New York: Continuum, 2004.
- Grenz, Stanley J. A Primer on Postmodernism. Grand Rapids, Mich.: William B. Eerdmans Pub. Co., 1996.
- Griffin, David Ray. Physics and the Ultimate Significance of Time: Bohm Prigogine, and Process Philosophy. Albany: State University of New York Press, 1986.*
- Grossman, Israel, and Wilhelm Magnus. Groups and Their Graphs. New Mathematical Library, 14. New York: Random House, 1964.
- Grossmann, Reinhardt. The Categorical Structure of the World. Bloomington: Indiana University Press, 1983.*
- . The Existence of the World : An Introduction to Ontology. London; New York: Routledge, 1992.
- Groth, Miles. Preparatory Thinking in Heidegger's Teaching. New York: Philosophical Library, 1987.*
- Grove, David J., and B. I. Panzer. Resolving Traumatic Memories : Metaphors and Symbols in Psychotherapy. New York: Irvington Publishers, 1989.*
- Grünbaum, Adolf. Modern Science and Zeno's Paradoxes. Middletown, Conn.: Wesleyan University Press, 1967.
- Guattari, Felix, and Stephane Nadaud. The Anti-Oedipus Papers. Semiotext(e) Foreign Agents Series. New York: Semiotext(e) ; Cambridge, Mass. : MIT Press, 2006.
- Gunter, Carl A., and John C. Mitchell. Theoretical Aspects of Object-Oriented Programming : Types, Semantics, and Language Design. Foundations of Computing. Cambridge, Mass.: MIT Press, 1994.
- Gurwitsch, Aron. The Field of Consciousness. Duquesne Studies : Psychological Series, 2. Pittsburgh: Duquesne University Press, 1976.*
- . Husserl's Theory of the Intentionality of Consciousness in Historical Perspective. Baltimore: Johns Hopkins Press, 1967.
- . Perceptual Coherence as the Foundation of the Judgment of Predication. The Hague: Martinus Nijhoff, 1973.
- . Phenomenology and the Theory of Science. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston: Northwestern University Press, 1974.
- . Problems of the Life-World. The Hague: Martinus Nijhoff, 1970.
- . Studies in Phenomenology and Psychology. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston: Northwestern University Press, 1966.
- Gurwitsch, Aron, and Lester E. Embree. Life-World and Consciousness: Essays for Aron Gurwitsch. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston, Ill.: Northwestern University Press, 1972.
- . Marginal Consciousness. Series in Continental Thought, 7. Athens, Ohio: Ohio University Press, 1985.
- Gurwitsch, Aron, and Alexandre Mettraux. Human Encounters in the Social World. Duquesne Studies : Psychological Series, V. 8. Pittsburgh: Duquesne University Press, 1979.
- Guttenplan, Samuel D. A Companion to the Philosophy of Mind. John Wiley & Sons Inc, 2008.
- Gyory, Richard A. The Emergence of Being : Through Indian and Greek Thought. Washington, D.C.: University Press of America, 1978.
- Haack, Susan. Deviant Logic : Some Philosophical Issues. London; New York: Cambridge University Press, 1974.*
- . Deviant Logic, Fuzzy Logic : Beyond the Formalism. Chicago: University of Chicago Press, 1996.
- Habner, Kurt. Critique of Scientific Reason. Chicago: University of Chicago Press, 1983.

- Hacking, Ian. The Emergence of Probability : A Philosophical Study of Early Ideas About Probability, Induction and Statistical Inference. London; New York: Cambridge University Press, 1975.
- Hahn, Robert. Anaximander and the Architects : The Contributions of Egyptian and Greek Architectural Technologies to the Origins of Greek Philosophy. SUNY Series in Ancient Greek Philosophy. Albany: State University of New York Press, 2001.*
- . Kant's Newtonian Revolution in Philosophy. The Journal of the History of Philosophy Monograph Series. Carbondale: Southern Illinois University Press, 1988.
- Hahn, Ulrike, and Michael Ramscar. Similarity and Categorization. New York: Oxford University Press, 2001.
- Hall, Donald. The Oxford Book of Children's Verse in America. New York: Oxford University Press, 1985.
- Hallward, Peter. Badiou : A Subject to Truth. Minneapolis, MN: University of Minnesota Press, 2003.
- . Out of This World : Deleuze and the Philosophy of Creation. London; New York: Verso, 2006.
- Halmos, Paul R. Algebraic Logic. New York: Chelsea Pub. Co., 1962.
- Halzen, F., and Alan D. Martin. Quarks and Leptons : An Introductory Course in Modern Particle Physics. New York: Wiley, 1984.
- Hamrick, William S. Phenomenology in Practice and Theory. Phaenomenologica, 92. Dordrecht; Boston: M. Nijhoff, 1985.
- Han, M. Y. Quarks and Gluons : A Century of Particle Charges. Singapore; River Edge, NJ: World Scientific, 1999.
- Hankinson, R. J. The Sceptics. The Arguments of the Philosophers. London; New York: Routledge, 1995.
- Hans, James S. The Play of the World. Amherst: University of Massachusetts Press, 1981.*
- Hansen, Chad. Language and Logic in Ancient China. Michigan Studies on China. Ann Arbor: University of Michigan Press, 1983.*
- Hanson, Andrew. Visualizing Quaternions. San Francisco, CA; Amsterdam; Boston: Morgan Kaufmann ; Elsevier Science, 2006.
- Harary, Frank, Robert Z. Norman, and Dorwin Cartwright. Structural Models: An Introduction to the Theory of Directed Graphs. New York: Wiley, 1965.
- Hardison, O. B. Disappearing through the Skylight : Culture and Technology in the Twentieth Century. New York, N.Y., U.S.A.: Viking, 1989.
- Hariharan, P. Basics of Holography. Cambridge, UK; New York, NY: Cambridge University Press, 2002.
- Harland, David M. The Big Bang : A View from the 21st Century. Springer-Praxis Books in Astronomy and Space Sciences. London; New York; Chichester, UK: Springer ; Praxis Pub., 2003.
- Harland, Richard. Superstructuralism : The Philosophy of Structuralism and Post-Structuralism. London; New York: Routledge, 2006.
- Harman, Graham. Tool-Being : Heidegger and the Metaphysics of Objects. Chicago: Open Court, 2002.
- Harries, Karsten. Infinity and Perspective. Cambridge, Mass.: MIT Press, 2001.
- Harries-Jones, Peter. A Recursive Vision : Ecological Understanding and Gregory Bateson. Toronto: University of Toronto Press, 1995.
- Harris, Errol E. Formal, Transcendental, and Dialectical Thinking : Logic and Reality. SUNY Series in Philosophy. Albany: State University of New York Press, 1987.*
- Harris, Roy. Reading Saussure : A Critical Commentary on the Cours De Linguistique Genarale. La Salle, Ill.: Open Court, 1987.
- Harris, R. Baine. Neoplatonism and Contemporary Thought. Studies in Neoplatonism, v. 10-11. Albany: State University of New York Press, 2002.
- Harrison, Robert Pogue. The Dominion of the Dead. Chicago: University of Chicago Press, 2003.
- Harte, Verity. Plato on Parts and Wholes : The Metaphysics of Structure. Oxford; New York: Clarendon Press; Oxford University Press, 2002.
- Hartman, Geoffrey H. Saving the Text : Literature, Derrida, Philosophy. Baltimore: Johns Hopkins University Press, 1981.
- Hartshorne, Robin. Geometry : Euclid and Beyond. Undergraduate Texts in Mathematics. New York: Springer, 2000.

- Hass, Lawrence. Merleau-Ponty's Philosophy. Studies in Continental Thought. Bloomington, IN: Indiana University Press, 2008.
- Hatab, Lawrence J. Myth and Philosophy : A Contest of Truths. La Salle, Ill.: Open Court, 1990.*
- Hatfield, James Louis. An Introduction to Cohomology Theory. University of Virginia, 1955.
- Hatley, Derek J., and Imtiaz A. Pirbhai. Strategies for Real-Time System Specification. New York, NY: Dorset House Pub., 1987.
- Hauschka, Rudolf. The Nature of Substance. London: Steiner, 1983.
- Hausman, Carl R. A Discourse on Novelty and Creation. SUNY Series in Philosophy. Albany: State University of New York Press, 1984.
- Havil, Julian. Nonplussed! : Mathematical Proof of Implausible Ideas. Princeton, N.J.: Princeton University Press, 2007.*
- Hawkins, Jeff, and Sandra Blakeslee. On Intelligence. New York: Times Books, 2004.
- Healey, Richard A. Philosophy of Quantum Mechanics : An Interactive Interpretation. Cambridge, UK: Cambridge University Press, 1990.
- Heath, Thomas Little. A History of Greek Mathematics. Oxford: The Clarendon Press, 1921.
- Heelan, Patrick A. Space-Perception and the Philosophy of Science. Berkeley: University of California Press, 1983.
- Hegel, Georg Wilhelm Friedrich. Hegel's Science of Logic. Muirhead Library of Philosophy. London; New York: Allen & Unwin; Humanities P., 1969.
- Hegel, Georg Wilhelm Friedrich. Phenomenology of Spirit. Delhi: Motilal Banarsidass, 1998. (second translation)
- Hegel, Georg Wilhelm Friedrich, and J. B. Baillie. The Phenomenology of Mind. New York: Harper, 1967; Dover Philosophical Classics. Mineola, N.Y.: Dover Publications, 2003.
- Hegel, Georg Wilhelm Friedrich, Allen W. Wood, and Hugh Barr Nisbet. Elements of the Philosophy of Right. Cambridge Texts in the History of Political Thought. Cambridge, UK; New York: Cambridge University Press, 1991.
- Heidegger, Martin. The Basic Problems of Phenomenology. Studies in Phenomenology and Existential Philosophy. Bloomington: Indiana University Press, 1982.
- . Basic Writings : From Being and Time (1927) to the Task of Thinking (1964). New York: Harper & Row, 1977.
- . Being and Time. Trans. John Macquarrie & Edward Robinson. New York: Harper, 1962. Blackwell 1967; Oxford: Blackwell, 2000.**
- . Being and Time : A Translation of Sein Und Zeit. Trans. Joan Stambaugh. SUNY Series in Contemporary Continental Philosophy. Albany: State University of New York Press, 1996.
- . Contributions to Philosophy : From Enowning. Studies in Continental Thought. Bloomington, IN: Indiana University Press, 1999.**
- . The End of Philosophy. New York: Harper & Row, 1973.*
- . The Fundamental Concepts of Metaphysics : World, Finitude, Solitude. Studies in Continental Thought. Bloomington: Indiana University Press, 1995.
- . Hegel's Phenomenology of Spirit. Studies in Phenomenology and Existential Philosophy. Bloomington: Indiana University Press, 1988.
- . History of the Concept of Time : Prolegomena. Studies in Phenomenology and Existential Philosophy. Bloomington, IN: Indiana University Press, 1985, 1992.
- . Identity and Difference. New York: Harper & Row, 1969; Chicago, Ill.; London: University of Chicago Press, 2002.*---. Kant and the Problem of Metaphysics. Studies in Continental Thought. Bloomington, IN: Indiana University Press, 1997.*
- . Nietzsche. San Francisco: Harper & Row, 1979.*
- . On Time and Being. New York: Harper & Row, 1972.**
- . Ontology : The Hermeneutics of Facticity. Studies in Continental Thought. Bloomington, IN.: Indiana University Press, 1999.
- . Parmenides. Studies in Continental Thought. Bloomington: Indiana University Press, 1992.

- . Phenomenological Interpretation of Kant's Critique of Pure Reason. Studies in Continental Thought. Bloomington, IN: Indiana University Press, 1997.
- . Poetry, Language, Thought. New York: Harper & Row, 1971.
- . The Question Concerning Technology, and Other Essays. Harper Colophon Books. New York: Harper & Row, 1977.*
- . Towards the Definition of Philosophy : With a Transcript of the Lecture-Course 'On the Nature of the University and Academic Study'. London; New Brunswick, NJ; Somerset, N.J.: Athlone Press; Transaction Publishers, 2000.
- . What Is a Thing? Chicago: H. Regnery Co., 1968.
- Heidegger, Martin, and Werner Brock. Existence and Being. Chicago: H. Regnery Co., 1949.
- Heidegger, Martin, Parvis Emad, and Thomas Kalary. Mindfulness. Athlone Contemporary European Thinkers. London; New York: Continuum, 2006.*
- Heidegger, Martin, and Eugen Fink. Heraclitus Seminar. Evanston, IL: Northwestern University Press, 1993.
- Heidegger, Martin, Gregory Fried, and Richard F. H. Polt. Introduction to Metaphysics. New Haven, Conn.; London: Yale Univ. Press, 2000.*
- Heidegger, Martin, and Michael Heim. The Metaphysical Foundations of Logic. Studies in Phenomenology and Existential Philosophy. Bloomington: Indiana University Press, 1984.
- Heidegger, Martin, and William McNeill. Pathmarks. Cambridge; New York: Cambridge University Press, 1998.*
- Heidegger, Martin, and Ted Sadler. The Essence of Human Freedom : An Introduction to Philosophy. London; New York: Continuum, 2002.
- Heidegger, Martin, Julian Young, and Kenneth Haynes. Off the Beaten Track. Cambridge; New York: Cambridge University Press, 2002.*
- Heim, Michael. The Metaphysics of Virtual Reality. New York: Oxford University Press, 1993.
- Heiserman, David L. Experiments in Four Dimensions. Blue Ridge Summit, Pa.: Tab Books, 1983.*
- Heller, Joseph. Catch-22, a Novel. New York: Simon and Schuster, 1961.
- Heller, Mark. The Ontology of Physical Objects : Four-Dimensional Hunks of Matter. Cambridge Studies in Philosophy. Cambridge, UK; New York: Cambridge University Press, 1990.*
- Hellerstein, N. S. K. Delta : A Paradox Logic. Singapore; River Edge, NJ: World Scientific, 1997.*
- . Diamond, a Paradox Logic. Singapore; River Edge, N.J.: World Scientific, 1997.*
- Helm, Bertrand P. Time and Reality in American Philosophy. Amherst: University of Massachusetts Press, 1985.
- Henderson, Archibald. The Twenty-Seven Lines Upon the Cubic Surface. Michigan Historical Reprint Series. Ann Arbor, MI: University of Michigan University Library, 2005.
- Henderson, Linda Dalrymple. The Fourth Dimension and Non-Euclidean Geometry in Modern Art. Princeton, N.J.: Princeton University Press, 1983.
- Hendrix, John. Architectural Forms and Philosophical Structures. New York: Peter Lang, 2003.
- Henry, Michel. The Essence of Manifestation. The Hague: Nijhoff, 1973.**
- . Philosophy and Phenomenology of the Body. The Hague: Nijhoff, 1975.
- Heraclitus. Fragments : The Collected Wisdom of Heraclitus. Trans. Brooks Haxton. New York: Viking, 2001.**
- . Heraclitus: the Cosmic Fragments. Trans. Geoffrey Stephen Kirk. Cambridge UK: Cambridge University Press, 1954.
- Herken, Rolf. The Universal Turing Machine : A Half-Century Survey. Oxford; New York: Oxford University Press, 1988.*
- Hernes, Tor. The Spatial Construction of Organization. Advances in Organization Studies, 12. Amsterdam; Philadelphia, PA: J. Benjamins, 2004.
- Herzog, Don. Cunning. Princeton, N.J.: Princeton University Press, 2006.
- Hey, Anthony J. G., and Patrick Walters. The New Quantum Universe. Cambridge, U.K.; New York: Cambridge University Press, 2003.

- Highmore, Ben. Michel De Certeau : Analysing Culture. London; New York: Continuum, 2006.
- Hilbert, David. Geometry and the Imagination. New York: Chelsea Pub. Co., 1952.
- Hilbert, David, and E. J. Townsend. The Foundations of Geometry. La Salle, Ill.: Open Court Pub. Co., 1959.
- Hill, Leslie. The Cambridge Introduction to Jacques Derrida. Cambridge Introductions to Literature. Cambridge, UK; New York: Cambridge University Press, 2007.
- Hillier, Bill. Space Is the Machine : A Configurational Theory of Architecture. Cambridge; New York, NY, USA: Cambridge University Press, 1996.
- Hillier, Bill, and Julienne Hanson. The Social Logic of Space. Cambridge UK; New York: Cambridge University Press, 1984.
- Hillier, Jean, and Emma Rooksby. Habitus : A Sense of Place. Aldershot, Hants, England ; Burlington, VT Ashgate, 2002.
- Hillman, James. The Dream and the Underworld. New York: Harper & Row, 1979.
- Hines, Thomas Jensen. The Later Poetry of Wallace Stevens : Phenomenological Parallels with Husserl and Heidegger. Lewisburg PA: Bucknell University Press, 1976.
- Hinton, Charles Howard. The Fourth Dimension (1904). Kila, MT: Kessinger Pub., 1996.
- . Many Dimensions. Scientific Romances, 8. London: Swan Sonnenschein & Co., 1888.
- . On the Education of the Imagination. Scientific Romances, 7. London: Swan Sonnenschein & Co., 1888.
- . Scientific Romances : First and Second Series. New York: Arno Press, 1976.
- . What Is the Fourth Dimension? London: Sonnenschein, 1897.
- Hinton, Charles Howard, and Rudy v B. Rucker. Speculations on the Fourth Dimension : Selected Writings of Charles H. Hinton. New York: Dover Publications, 1980.
- Hirsch, Eli. Dividing Reality. New York: Oxford University Press, 1993.
- Hirschhorn, Larry. Beyond Mechanization : Work and Technology in a Postindustrial Age. Cambridge, Mass.: MIT Press, 1984.
- Hitchins, Derek K. Advanced Systems Thinking, Engineering, and Management. Artech House Technology Management and Professional Development Library. Boston, MA: Artech House, 2003.
- . Putting Systems to Work. Chichester; New York: Wiley, 1992.
- . Systems Engineering : A 21st Century Systems Methodology. Hoboken, N.J.; Chichester: Wiley; John Wiley, 2007.
- Hodges, Wilfrid. A Shorter Model Theory. Cambridge; New York: Cambridge University Press, 1997.
- Hofstadter, Douglas R. Godel, Escher, Bach : An Eternal Golden Braid. New York: Basic Books, 1979.*
- Hofstadter, Douglas R., and Group Fluid Analogies Research. Fluid Concepts & Creative Analogies : Computer Models of the Fundamental Mechanisms of Thought. New York: Basic Books, 1995.*
- Hohn, Franz Edward. Elementary Matrix Algebra. New York: Macmillan, 1964.
- Holbrook, Bruce. The Stone Monkey : An Alternative. Chinese-Scientific, Reality. New York: Morrow, 1981.
- Holland, John H. Emergence : From Chaos to Order. Reading, Mass.: Addison-Wesley, 1998.*
- . Hidden Order : How Adaptation Builds Complexity. Reading, Mass.: Addison-Wesley, 1995.*
- Hollingsworth, Charles A. Vectors, Matrices, and Group Theory for Scientists and Engineers. New York: McGraw-Hill, 1967.
- Holt, Jon, et al. SysML for Systems Engineering. Professional Applications of Computing Series, 7. London: Institution of Engineering and Technology, 2008.
- Homer, and Robert Fagles. The Odyssey. New York: Viking, 1996.
- Horkheimer, Max, and Theodor W. Adorno. Dialectic of Enlightenment. New York: Herder and Herder, 1972.*
- Horn, Laurence R. A Natural History of Negation. The David Hume Series. Stanford, Calif.: CSLI, 2001.
- Horn, Robert E. Trialectics : Toward a Practical Logic of Unity. Lexington, Mass.: Information Resources, Inc., 1983.
- Horst, Paul. Matrix Algebra for Social Scientists. New York: Holt, Rinehart and Winston, 1963.

- Houprecht, John Frederick, et al. Aurifontina Chymica; or, a Collection of Fourteen Small Treatises Concerning the First Matter of Philosophers, for the Discovery of Their (Hitherto So Much Concealed) Mercury. London: William Cooper, 1680.
- Houser, Nathan, Don D. Roberts, and James Van Evra. Studies in the Logic of Charles Sanders Peirce. Bloomington, IN: Indiana University Press, 1997.
- Howard, Nigel. Paradoxes of Rationality: Theory of Metagames and Political Behavior. The Peace Research Studies Series, 1. Cambridge: MIT Press, 1971.
- Howie, Gillian. Deleuze and Spinoza : Aura of Expressionism. Houndmills, Basingstoke, Hampshire; New York: Palgrave, 2002.
- Howie, John M. Automata and Languages. Oxford; New York: Clarendon Press ; Oxford University Press, 1991.
- Huff, Toby E. The Rise of Early Modern Science : Islam, China, and the West. Cambridge UK; New York, NY, USA: Cambridge University Press, 1993.
- Hughes, John. Lines of Flight : Reading Deleuze with Hardy, Gissing, Conrad, Woolf. Sheffield, England: Sheffield Academic Press, 1997.
- Huizinga, Johan. Homo Ludens; a Study of the Play-Element in Culture. Boston: Beacon Press, 1955.
- Hull, Elizabeth, Ken Jackson, and Jeremy Dick. Requirements Engineering. London: Springer, 2005.
- Hume, David, and Tom L. Beauchamp. An Enquiry Concerning Human Understanding : A Critical Edition. Oxford; New York: Clarendon Press ; Oxford University Press, 2000.
- Humphreys, Willard C. Anomalies and Scientific Theories. San Francisco: Freeman, Cooper, 1968.
- Hunter, Geoffrey. Metalogic: An Introduction to the Metatheory of Standard First Order Logic. Berkeley: University of California Press, 1971.
- Huntington, C. W., Wangchen Namgyal, and Candrakirti. The Emptiness of Emptiness : An Introduction to Early Indian Madhyamika. Delhi: Motilal Banarsidass Publishers, 1992.
- Husserl, Edmund. Cartesian Meditations: An Introduction to Phenomenology. The Hague: M. Nijhoff, 1960.*
- . The Crisis of European Sciences and Transcendental Phenomenology; an Introduction to Phenomenological Philosophy. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston, Ill.: Northwestern University Press, 1970.**
- . Formal and Transcendental Logic. The Hague: Martinus Nijhoff, 1969.
- . Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy. The Hague, Boston: M. Nijhoff ; Kluwer, 1980.*
- . Logical Investigations. International Library of Philosophy and Scientific Method. London: Routledge and K. Paul; Humanities Press, 1970.*
- Husserl, Edmund, and Martin Ed Heidegger. The Phenomenology of Internal Time-Consciousness. Bloomington, IN: Indiana University Press, 1964.**
- Husserl, Edmund, et al. Husserl at the Limits of Phenomenology : Including Texts by Edmund Husserl, Maurice Merleau-Ponty. Evanston, Ill.: Northwestern University Press, 2002.
- Husserl, Edmund, and Donn Welton. The Essential Husserl : Basic Writings in Transcendental Phenomenology. Studies in Continental Thought. Bloomington, IN: Indiana University Press, 1999.
- Hutton, Patrick H. History as an Art of Memory. Burlington, VT; Hanover: University of Vermont ; University Press of New England, 1993.
- Ifrah, Georges. From One to Zero : A Universal History of Numbers. New York: Viking, 1985.
- Ilde, Don. Existential Technics. SUNY Series in Philosophy. Albany: State University of New York Press, 1983.
- Inwood, M. J. A Hegel Dictionary. The Blackwell Philosopher Dictionaries. Oxford, OX, UK: Cambridge, Mass., USA : Blackwell, 1992.
- . A Heidegger Dictionary. Oxford: Blackwell Publishers, 1999.
- Ivey, Howard W., and D. Lawrence Wieder. Phenomenology : A Bibliography of English Language Writings. Monticello, Ill.: Council of Planning Librarians, 1975.
- Jacobs, Jane. The Economy of Cities. New York: Random House, 1969.*

- . Systems of Survival : A Dialogue on the Moral Foundations of Commerce and Politics. New York: Random House, 1992.
- Jacobson, Nathan. Exceptional Lie Algebras. Lecture Notes in Pure and Applied Mathematics, 1. New York: M. Dekker, 1971.
- . Lie Algebras. New York: Interscience Publishers, 1962.
- Jahn, Robert G., and Brenda J. Dunne. Margins of Reality : The Role of Consciousness in the Physical World. San Diego: Harcourt Brace Jovanovich, 1987.*
- Jakobson, Roman, Krystyna Pomorska, and Stephen Rudy. Verbal Art, Verbal Sign, Verbal Time. Minneapolis: University of Minnesota Press, 1985.
- Jakobson, Roman, and Linda R. Waugh. The Sound Shape of Language. Bloomington, IN: Indiana University Press, 1979.
- James, William. A Pluralistic Universe. Cambridge, Mass.: Harvard University Press, 1977.*
- . The Principles of Psychology. New York: Dover Publications, 1950.
- Jameson, Fredric. Late Marxism : Adorno, or, the Persistence of the Dialectic. London; New York: Verso, 1990.
- Janaway, Christopher. The Cambridge Companion to Schopenhauer. Cambridge, U.K.; New York: Cambridge University Press, 1999.
- Jantsch, Erich. The Self-Organizing Universe : Scientific and Human Implications of the Emerging Paradigm of Evolution. Systems Science and World Order Library. Oxford; New York: Pergamon Press, 1980.*
- Janzen, Greg. The Reflexive Nature of Consciousness. Amsterdam: John Benjamins Pub. Co, 2008.
- Jaques, Elliott. Creativity and Work. Madison, Conn.: International Universities Press, 1990.
- Jasanoff, Sheila. Handbook of Science and Technology Studies. (Thousand Oaks CA: Sage Publ, 2001).
- Jaspers, Karl. Reason and Existenz : Five Lectures. London: K. Paul, 1956.
- Jay, Martin. The Dialectical Imagination: a History of the Frankfurt School and the Institute of Social Research, 1923-1950. Boston: Little, Brown, 1973.
- Jensen, K. Coloured Petri Nets : Basic Concepts, Analysis Methods, and Practical Use. Berlin; New York: Springer-Verlag, 1992.
- Jensen, K., and Grzegorz Rozenberg. High-Level Petri Nets : Theory and Application. Berlin; New York: Springer-Verlag, 1991.
- Joas, Hans. G.H. Mead, a Contemporary Re-Examination of His Thought. Studies in Contemporary German Social Thought. Cambridge, Mass.: MIT Press, 1985.
- Johansson, Ingvar. Ontological Investigations : An Inquiry into the Categories of Nature, Man and Society. London: Routledge, 1989.**
- Johnson, Mark. The Body in the Mind : The Bodily Basis of Meaning, Imagination, and Reason. Chicago: University of Chicago Press, 1987.*
- Johnson, Paul. The Birth of the Modern : World Society, 1815-1830. New York, NY: HarperCollins Publishers, 1991.
- Johnson, Steven. Emergence : The Connected Lives of Ants, Brains, Cities, and Software. New York: Scribner, 2001.
- Johnston, Sean. Holographic Visions : A History of New Science. Oxford; New York: Oxford University Press, 2006.
- Jullien, Francois. In Praise of Blandness : Proceeding from Chinese Thought and Aesthetics. New York: Zone Books, 2004.
- . The Propensity of Things : Toward a History of Efficacy in China. New York; Cambridge, Mass.: Zone Books ; MIT Press, 1995.*
- . A Treatise on Efficacy : Between Western and Chinese Thinking. Honolulu: University of Hawai'i Press, 2004.
- Jullien, Francois, and Sophie Hawkes. Detour and Access : Strategies of Meaning in China and Greece. New York: Zone Books, 2000.
- Jullien, Francois, and Jane Marie Todd. The Great Image Has No Form, or, on the Nonobject through

- Painting. Chicago; London: The University of Chicago Press, 2009.
- Jumarie, Guy. Subjectivity, Information, Systems : An Introduction to a Theory of Relativistic Cybernetics. Studies in Cybernetics, V. 12. New York: Gordon and Breach Science Publishers, 1986.*
- Jung, C. G. Collected Works. London : Routledge 1973.
- Jung, C. G. Aion : Researches into the Phenomenology of the Self. Bollingen Series, 20. Princeton, N.J.: Princeton University Press, 1979.
- Jung, C. G. Mysterium Coniunctionis : An Inquiry into the Separation and Synthesis of Psychic Opposites in Alchemy. Bollingen Series, 20. Princeton, N.J.: Princeton University Press, 1970.
- Kaehr, Rudolf. Various informal papers on “Diamond Theory” and “Polycontextual Logics” at ThinkArtLab Website at <http://www.thinkartlab.com> accessed 2009. ISSN 2041-4358
- Kagan, Jerome. Surprise, Uncertainty, and Mental Structures. Cambridge, Mass: Harvard University Press, 2002.**
- Kainz, Howard P. Paradox, Dialectic, and System : A Contemporary Reconstruction of the Hegelian Problematic. University Park: Pennsylvania State University Press, 1988.*
- Kakola, Timo, and Juan Carlos Dueñas. Software Product Lines : Research Issues in Engineering and Management. Berlin; New York: Springer, 2006.
- Kaku, Michio. Hyperspace : A Scientific Odyssey through Parallel Universes, Time Warps, and the Tenth Dimension. New York: Oxford University Press, 1994.
- Kalman, Dan. Elementary Mathematical Models : Order Aplenty and a Glimpse of Chaos. Washington, DC: Mathematical Association of America, 1997.
- Kalupahana, David J. A History of Buddhist Philosophy : Continuities and Discontinuities. Honolulu: University of Hawaii Press, 1992.
- Kane, G. L. Modern Elementary Particle Physics : The Fundamental Particles and Forces? Reading, Mass.: Addison-Wesley Pub., 1993.
- Kaneko, Kuniyiko. Collapse of Tori and Genesis of Chaos in Dissipative Systems. Singapore: World Scientific, 1986.
- Kant, Immanuel. Critique of Pure Reason. Bohn's Philosophical Library. London: G. Bell, 1905.**
- . Logic. Indianapolis: Bobbs-Merrill, 1974.
- Kant, Immanuel, and Eckart Forster. Opus Postumum. Cambridge; New York: Cambridge University Press, 1993.
- Kant, Immanuel, and Mary J. Gregor. Practical Philosophy. Cambridge, U.K.; New York, NY, USA: Cambridge University Press, 1999.
- Kant, Immanuel, and Norman Kemp Smith. Immanuel Kant's Critique of Pure Reason. London: Macmillan, 1929.
- Kantor, Frederick W. Information Mechanics. New York: Wiley, 1977.
- Kaplan, Robert. The Nothing That Is : A Natural History of Zero. Oxford; New York: Oxford University Press, 2000.
- Kauffman, Stuart A. Investigations. Oxford; New York: Oxford University Press, 2000.*
- . The Origins of Order : Self-Organization and Selection in Evolution. New York: Oxford University Press, 1993.*
- Kaufmann, A. Introduction to the Theory of Fuzzy Subsets. New York: Academic Press, 1975.
- Kaufmann, Walter. Nietzsche : Philosopher, Psychologist, Antichrist. New York: Meridian Books, 1956.
- Kaufmann, Walter Arnold. Discovering the Mind. New Brunswick: Transaction Publishers, 1991.
- Kelly, Kevin. Out of Control: The New Biology of Machines, Social Systems, & the Economic World. Perseus Books Group, 1995. Reading, Mass. : Addison-Wesley, 1994.
- Kendall, Maurice George. A Course in Geometry of N Dimensions. London: Griffin, 1961.*
- Kersten, Fred. Phenomenological Method : Theory and Practice. Contributions to Phenomenology, V. 1. Dordrecht; Boston: Kluwer Academic Publishers, 1989.
- King, Ross. Brunelleschi's Dome : How a Renaissance Genius Reinvented Architecture. New York: Walker & Co., 2000.

- Kirby, Robion C. The Topology of 4-Manifolds. Berlin; New York: Springer-Verlag, 1989.
- Kirk, Geoffrey. Myth : Its Meaning and Functions in Ancient and Other Cultures. Sather Classical Lectures, 40. Cambridge: Cambridge Univ. Press, 1986.
- Kirkland, Russell. Taoism: The Enduring Tradition. New York: Routledge, 2004.
- Kisiel, Theodore J. The Genesis of Heidegger's Being and Time. Berkeley: University of California Press, 1995.
- Klein, Anne C., and Tenzin Wangyal. Unbounded Wholeness : Dzogchen, Bon, and the Logic of the Nonconceptual. Oxford; New York: Oxford University Press, 2006.
- Klein, Julie Thompson. Crossing Boundaries : Knowledge, Disciplinarity, and Interdisciplinarity. Knowledge, Disciplinarity and Beyond. Charlottesville, VA.: University Press of Virginia, 1996.
- Kleinberg-Levin, David Michael. The Body's Recollection of Being : Phenomenological Psychology and the Deconstruction of Nihilism. London; Boston: Routledge & Kegan Paul, 1985.
- . The Opening of Vision : Nihilism and the Postmodern Situation. New York: Routledge, 1988.
- Klir, George J. An Approach to General Systems Theory. New York: Van Nostrand Reinhold Co., 1969.
- . Facets of Systems Science. New York: Plenum Press, 1991.
- . Trends in General Systems Theory. New York: Wiley-Interscience, 1972.
- Klir, George J., and Doug Elias. Architecture of Systems Problem Solving. New York: Plenum Publishers/Kluwer Academic, 1985, 2003.**
- Klir, George J., and Bo Yuan. Fuzzy Sets and Fuzzy Logic : Theory and Applications. Upper Saddle River, N.J.: Prentice Hall PTR, 1995.
- Knappett, Carl. Thinking through Material Culture : An Interdisciplinary Perspective. Archaeology, Culture, and Society. Philadelphia: University of Pennsylvania Press, 2005.
- Knorr, Wilbur Richard. The Ancient Tradition of Geometric Problems. Cambridge, MA: Birkhauser Boston, 1985.
- Kober, Michael. Deepening Our Understanding of Wittgenstein. Grazer Philosophische Studien, V. 71. Amsterdam ; New York: Rodopi, 2006.
- Kocabas, S., and P. Langley. "Computer Generation of Process Explanations in Nuclear Astrophysics." International Journal Of Human Computer Studies 53 (2000): 377-92.
- Kockelmans, Joseph J. Heidegger on Art and Art Works. Dordrecht; Boston; Hingham, MA, USA: M. Nijhoff Publishers ; Kluwer Academic Publishers, 1985.
- . Martin Heidegger: a First Introduction to His Philosophy. Pittsburgh: Duquesne University Press, 1965.
- Koenig, Jean-Pierre. Discourse and Cognition : Bridging the Gap. Stanford, Calif.: CSLI Publications, 1998.
- Koestler, Arthur. The Act of Creation. London: Hutchinson, 1976.
- . Janus : A Summing Up. New York: Random House, 1978.*
- Kohout, L. J. A Perspective on Intelligent Systems. Cambridge, Mass.: Abacus Press, 1985.
- Kojeve, Alexandre, and Raymond Queneau. Introduction to the Reading of Hegel; Lectures on the Phenomenology of Spirit. New York: Basic Books, 1969.
- Kolb, David. The Critique of Pure Modernity : Hegel, Heidegger, and After. Chicago: University of Chicago Press, 1986.
- Kono, Akira, and Dai Tamaki. Generalized Cohomology. Translations of Mathematical Monographs, V. 230. Providence, R.I.: American Mathematical Society, 2006.
- Korner, Stephan. The Philosophy of Mathematics, an Introductory Essay. London: Hutchinson University Library, 1960.
- Korsgaard, Christine M. The Standpoint of Practical Reason. New York: Garland, 1990.
- Kosko, Bart. Fuzzy Thinking : The New Science of Fuzzy Logic. New York: Hyperion, 1993.*
- . Noise. New York: Viking, 2006.
- Koslow, Arnold. A Structuralist Theory of Logic. Cambridge UK; New York: Cambridge University Press, 1992.
- Kossiakoff, Alexander, and William N. Sweet. Systems Engineering : Principles and Practices. Wiley Series in Systems Engineering and Management. New York: J. Wiley, 2003.

- Kovacs, George. The Question of God in Heidegger's Phenomenology. Evanston, Ill.: Northwestern University Press, 1990.
- Koza, John R. Genetic Programming : On the Programming of Computers by Means of Natural Selection. Complex Adaptive Systems. Cambridge, Mass.: MIT Press, 1992.*
- . Genetic Programming II : Automatic Discovery of Reusable Programs. Complex Adaptive Systems. Cambridge, Mass.: MIT Press, 1994.
- . Genetic Programming III : Darwinian Invention and Problem Solving. San Francisco: Morgan Kaufmann, 1999.
- Kramer, Hans Joachim, and John R. Catan. Plato and the Foundations of Metaphysics : A Work on the Theory of the Principles and Unwritten Doctrines of Plato with a Collection of the Fundamental Documents. Albany: State University of New York Press, 1990.
- Kramer, Nic J. T. A., and J. de Smit. Systems Thinking : Concepts and Notions. Leiden: Martinus Nijhoff, 1977.
- Krampen, Martin. Classics of Semiotics. Topics in Contemporary Semiotics. New York: Plenum, 1987.
- Krell, David Farrell. Daimon Life : Heidegger and Life-Philosophy. Studies in Continental Thought. Bloomington: Indiana University Press, 1992.
- Krell, David Farrell, and Donald L. Bates. The Good European : Nietzsche's Work Sites in Word and Image. Chicago: University of Chicago Press, 1997.
- Kripke, Saul A. Naming and Necessity. Cambridge, Mass.: Harvard University Press, 1980.
- Krishnan, V. Sankrithi. An Introduction to Category Theory. New York: North Holland, 1981.
- Kristeva, Julia. Powers of Horror: An Essay on Abjection. European Perspectives. (New York: Columbia University Press, 1992)
- Krueger, Myron W. Artificial Reality. Reading, Mass.: Addison-Wesley, 1983.
- . Artificial Reality II. Reading, Mass.: Addison-Wesley, 1991.
- Kuch, Terence. "Schopenhauer: "The World as Will" As Theology". Sheffield S8 0ZT, No Date. International Society for Philosophers. Ed. Dr Geoffrey Klempner. Student Essay on Wille and God. Pathways School of Philosophy. Accessed 080516. <<http://www.philosophypathways.com/essays/kuch4.html>>.
- Kuhn, Thomas S. The Structure of Scientific Revolutions. Chicago: University of Chicago Press, 1970.**
- Kuilman, Marten. Four - a Rediscovery of the 'Tetragonus Mundus' (unpublished), 1996.
- . The Four Countries (De Vier Landen) (unpublished), 1990; revision 1997.
- . Isagoge - an Introduction in the Quadralectic Philosophy. (unpublished), 1986.
- . Quadralectic Architecture. (unpublished), (in preparation, no date).
- . Visions of Four Notions. (unpublished), 2002.
- Kwant, Remigius; Remy C. Kwant. The Phenomenological Philosophy of Merleau-Ponty. Duquesne Studies, 15. Ann Arbor, Mich.: UMI Books on Demand, 2003.
- Lacan, Jacques, and Bruce Fink. Ecrits : The First Complete Edition in English. New York W.W. Norton & Co., 2006.
- Lacan, Jacques, and Anthony Wilden. The Language of the Self; the Function of Language in Psychoanalysis. Baltimore: Johns Hopkins Press, 1968.
- . Speech and Language in Psychoanalysis. Baltimore: Johns Hopkins Press, 1981.
- Laing, R. D. Knots. New York: Pantheon Books, 1970.
- Lakatos, Imre, Paul Feyerabend, and Matteo Motterlini. For and against Method : Including Lakatos's Lectures on Scientific Method and the Lakatos-Feyerabend Correspondence. Chicago: University of Chicago Press, 1999.
- Lakoff, George, and Mark Johnson. Philosophy in the Flesh : The Embodied Mind and Its Challenge to Western Thought. New York: Basic Books, 1999.*
- Lakoff, George, and Rafael E. Nunez. Where Mathematics Comes From : How the Embodied Mind Brings Mathematics into Being. New York, NY: Basic Books, 2000.*
- Lamb, David. Discovery, Creativity, and Problem-Solving. Avebury Series in Philosophy. Aldershot; Brookfield, USA: Avebury, 1991.

- Lambek, Joachim, and P. J. Scott. Introduction to Higher Order Categorical Logic. Cambridge Studies in Advanced Mathematics, 7. Cambridge UK; New York: Cambridge University Press, 1986.
- Langer, Monika M. Merleau-Ponty's Phenomenology of Perception : A Guide and Commentary. Tallahassee; Gainesville, FL: Florida State University Press ; University Presses of Florida, 1989.
- Langer, Susanne. Philosophy in a New Key : 3rd Ed. Cambridge Mass.: Harvard Univ Press, 1957.
- . Feeling and Form : A Theory of Art Developed from 'Philosophy in a New Key'. London: Routledge & Kegan Paul, 1973.
- Langton, Christopher G. Artificial Life : An Overview. Complex Adaptive Systems. Cambridge, Mass.: MIT Press, 1995.
- . Artificial Life : The Proceedings of an Interdisciplinary Workshop on the Synthesis and Simulation of Living Systems, Held September, 1987, in Los Alamos, New Mexico. Advanced Book Program. Redwood City, Calif.: Addison-Wesley Pub. Co., 1989.
- Lanigan, Richard L. Speaking and Semiology : Maurice Merleau-Ponty's Phenomenological Theory of Existential Communication. Approaches to Semiotics, 22. Berlin; New York: Mouton de Gruyter, 1991.
- Laozi, and D. C. Lau. Tao Te Ching. Baltimore: Penguin Books, 1963.
- Larson, James S. The Theory of Archetypes. New York: Nova Science Publishers, 2004.
- Laszlo, Ervin. The Systems View of the World; the Natural Philosophy of the New Developments in the Sciences. New York: G. Braziller, 1972.
- Lauer, Quentin. A Reading of Hegel's Phenomenology of Spirit. New York: Fordham University Press, 2002.
- Laughlin, Robert B. A Different Universe : Reinventing Physics from the Bottom Down. New York: Basic Books, 2005.
- Law, Averill M., and W. David Kelton. Simulation Modeling and Analysis. McGraw-Hill Series in Industrial Engineering and Management Science. New York: McGraw-Hill, 1982.
- Lawley, James, and Penny Tompkins. Metaphors in Mind : Transformation through Symbolic Modelling. London: Developing Co. Press, 2000.
- Lawlor, Leonard. The Implications of Immanence : Toward a New Concept of Life. New York: Fordham University Press, 2006.
- Lawson, Bryan. How Designers Think : The Design Process Demystified. Oxford; Burlington, MA: Elsevier/Architectural, 2006.
- Lawson, Hilary. Closure : A Story of Everything. London; New York: Routledge, 2001.**
- Lawvere, F. W., and S. H. Schanuel. Conceptual Mathematics : A First Introduction to Categories. Cambridge; New York, NY, USA: Cambridge University Press, 1997.*
- Laycock, Henry. Words without Objects : Semantics, Ontology, and Logic for Non-Singularity. Oxford; New York: Clarendon Press ; Oxford University Press, 2006.*
- Lecerle, Jean-Jacques. The Violence of Language. London; New York: Routledge, 1990.
- Lee, John M. Introduction to Topological Manifolds. Graduate Texts in Mathematics, 202. New York: Springer, 2000.
- Lee, Xah. "Gallery of Famous Surfaces". xahlee.org. March 10 2009.
<http://virtualmathmuseum.org/Surface/gallery_o.html>.
- Lefebvre, Henri, and Donald Nicholson-Smith. The Production of Space. Malden, MA: Blackwell, 2007.*
- Leibniz, Gottfried Wilhelm. Discourse on Metaphysics, Correspondence with Arnauld, and Monadology. La Salle, Ill.: Open Court Pub. Co., 1962.
- Leinster, Tom. Higher Operads, Higher Categories. London Mathematical Society Lecture Note Series, 298. Cambridge, UK: Cambridge University Press, 2003.
- . "A Survey of Definitions of N-Category". 2001. arXiv:math/0107188v1 [math.CT].
<<http://arxiv.org/abs/math.CT/0107188>>.
- Leonard, George Burr. The Silent Pulse : A Search for the Perfect Rhythm That Exists in Each of Us. New York: Dutton, 1978.*
- LeShan, Lawrence L., and Henry Margenau. Einstein's Space and Van Gogh's Sky : Physical Reality and Beyond. New York: Macmillan, 1982.

- Levinas, Emmanuel. Alterity and Transcendence. European Perspectives. New York: Columbia University Press, 1999.
- . Otherwise Than Being : Or, Beyond Essence. Martinus Nijhoff Philosophy Texts, V. 3. Hague; Boston; Hingham, MA: M. Nijhoff ; Kluwer Boston, 1981.*
- . Totality and Infinity; an Essay on Exteriority. Pittsburgh: Duquesne University Press, 1969.
- Levi-Strauss, Claude. The Savage Mind. The Nature of Human Society Series. Chicago: University of Chicago Press, 1966.*
- Levy, Bernard Henri. War, Evil, and the End of History. Hoboken, N.J.: Melville House Pub., 2004.
- Lewis, David K. On the Plurality of Worlds. Oxford, UK; New York, NY, USA: B. Blackwell, 1986.**
- Lewis, Michael. Heidegger and the Place of Ethics : Being-with in the Crossing of Heidegger's Thought. Continuum Studies in Continental Philosophy. London; New York: Continuum, 2005.
- Lewis-Williams, J. David. The Mind in the Cave : Consciousness and the Origins of Art. New York, N.Y.: Thames & Hudson, 2002.*
- Lewis-Williams, J. David, and D. G. Pearce. Inside the Neolithic Mind : Consciousness, Cosmos, and the Realm of the Gods. London: Thames & Hudson, 2005.
- Leyton, Michael. A Generative Theory of Shape. Lecture Notes in Computer Science. Issue 2145. Berlin; New York: Springer, 2001.
- . Symmetry, Causality, Mind. Cambridge, Mass.: MIT Press, 1992.*
- Lichtman, Richard. The Production of Desire : The Integration of Psychoanalysis into Marxist Theory. New York: Free Press, 1982.
- Lieberman, Philip. Human Language and Our Reptilian Brain : The Subcortical Bases of Speech, Syntax, and Thought. Perspectives in Cognitive Neuroscience. Cambridge, Mass.: Harvard University Press, 2000.
- Lincoln, Andrew. Spiritual History : A Reading of William Blake's Vala, or the Four Zoas. Oxford; New York: Clarendon Press ; Oxford University Press, 1995.
- Lindgren, Carlos Ernesto S., and Steve M. Slaby. Four Dimensional Descriptive Geometry. New York: McGraw-Hill, 1968.
- Lindorff, David P. Pauli and Jung : The Meeting of Two Great Minds. Wheaton, Ill.: Quest Books, 2004.
- Lins, Sóstenes. Gems, Computers, and Attractors for 3-Manifolds. Singapore: World Scientific, 1995.
- Liu, Kecheng. Semiotics in Information Systems Engineering. Cambridge; New York: Cambridge University Press, 2000.
- Lloyd, G. E. R. The Revolutions of Wisdom : Studies in the Claims and Practice of Ancient Greek Science. Sather Classical Lectures, V. 52. Berkeley: University of California Press, 1987.
- Locke, John. An Essay Concerning Human Understanding. London ; New York: Routledge, 2000.
- Lounesto, Pertti. Clifford Algebras and Spinors. London Mathematical Society Lecture Note Series, 286. Cambridge; New York: Cambridge University Press, 2001.
- Low, Douglas Beck. Merleau-Ponty's Last Vision a Proposal for the Completion of the Visible and the Invisible. Evanston, Ill.: Northwestern University Press, 2000.
- Loy, David. Nonduality : A Study in Comparative Philosophy. New Haven: Yale University Press, 1988.
- Lu, Yung-Chen. Singularity Theory and an Introduction to Catastrophe Theory. New York: Springer-Verlag, 1976.
- Luckmann, Thomas. Phenomenology and Sociology : Selected Readings. Harmondsworth, Eng.; New York: Penguin Books, 1978.
- Lukacher, Ned. Primal Scenes : Literature, Philosophy, Psychoanalysis. Ithaca, N.Y.: Cornell University Press, 1986.*
- Lukasiewicz, Jan. Aristotle's Syllogistic from the Standpoint of Modern Formal Logic. Oxford: Clarendon Press, 1957.
- Luo, Qinshun, and Irene Bloom. Knowledge Painfully Acquired : The Kun Zhi Ji. Neo-Confucian Studies. New York: Columbia University Press, 1987.*
- Lynch, Kevin. Good City Form. Cambridge, Mass.: MIT Press, 2001.
- Lyons, William E. The Disappearance of Introspection. Cambridge, Mass.: MIT Press, 1986.

- Macann, Christopher E. Critical Heidegger. London; New York: Routledge, 1996.
- MacDonald, Paul S. The Existentialist Reader : An Anthology of Key Texts. New York: Routledge, 2001.
- MacGuire, James E., and Barbara Tuchanska. Science Unfettered : A Philosophical Study in Sociohistorical Ontology. Athens: Ohio Univ. Press, 2000.
- Machery, Edouard. Doing Without Concepts. Oxford: Oxford University Press, 2009
- Macintyre, Angus. Connections between Model Theory and Algebraic and Analytic Geometry. Quaderni Di Matematica, V. 6. Roma: Aracne, 2000.
- Magnani, Lorenzo. Abduction, Reason, and Science : Processes of Discovery and Explanation. New York: Kluwer Academic, Plenum Publishers, 2001.
- Malnar, Joy Monice, and Frank Vodvarka. Sensory Design. Minneapolis: University of Minnesota Press, 2004.*
- Malpas, J. E. Heidegger's Topology : Being, Place, World. Cambridge, Mass.: MIT Press, 2006.
- Maly, Kenneth. Heidegger's Possibility : Language, Emergence-- Saying Be-ing. Toronto; Buffalo: University of Toronto Press, 2008.
- Mamdani, E. H., and Brian R. Gaines. Fuzzy Reasoning and Its Applications. Computers and People Series. London; New York: Academic Press, 1981.
- Manadhata, Pratyusa, Jeannette M. Wing, and Science Carnegie-Mellon Univ Pittsburgh PA School Of Computer. "Measuring a System's Attack Surface". Ft. Belvoir, 2004. Defense Technical Information Center <<http://handle.dtic.mil/100.2/ADA458115>>.
- Mandelbrot, Benoit B. The Fractal Geometry of Nature. San Francisco: W.H. Freeman, 1982.
- . Fractals and Chaos : The Mandelbrot Set and Beyond. Selecta Volume C. New York: Springer, 2004.
- Mandelbrot, Benoit B., and M. M. Novak. Thinking in Patterns : Fractals and Related Phenomena in Nature. IFIP Conference on Fractals in the Fundamental and Applied Sciences (8.th : 2004). River Edge, N.J.: World Scientific, 2004.
- Manetti, Antonio, Howard Saalman, and Catherine Enggass. The Life of Brunelleschi. University Park; London: Pennsylvania State University Press, 1970.
- Mann, Wolfgang-Rainer. The Discovery of Things : Aristotle's Categories and Their Context. Princeton, N.J.: Princeton University Press, 2000.*
- Manning, Henry Parker. The Fourth Dimension Simply Explained. New York: Dover Publications, 1960.
- . Geometry of Four Dimensions. New York: Dover Publications, 1956.*
- Maor, Eli. e : The Story of a Number. Princeton, N.J.: Princeton University Press, 1994.
- Marion, Jean-Luc. Being Given : Toward a Phenomenology of Givenness. Cultural Memory in the Present. Stanford, Calif.: Stanford University Press, 2002.
- . Reduction and Givenness : Investigations of Husserl, Heidegger, and Phenomenology. Evanston, Ill.: Northwestern University Press, 1998.
- Marrati, Paola. Genesis and Trace : Derrida Reading Husserl and Heidegger. Cultural Memory in the Present. Stanford, Calif.: Stanford University Press, 2005.
- Martin, David. On Secularization : Towards a Revised General Theory. Aldershot, England; Burlington, VT: Ashgate, 2005.
- . Reflections on Sociology and Theology. Oxford UK, New York: Clarendon Press ; Oxford University Press, 1997.
- . A Sociology of Religion. New York: Basic Books, 1967.
- . A Sociology of English Religion. London: Heinemann Educational Books, 1974.
- Martin, Norman M. Systems of Logic. Cambridge; New York: Cambridge University Press, 1989.
- Martin, R. M. Logical Semiotics and Mereology. Foundations of Semiotics, V. 16. Amsterdam; Philadelphia: J. Benjamins, 1992.
- Martine, Brian J. Indeterminacy and Intelligibility. Albany: State Univ. of New York Press, 1992.
- Martinez, Alberto A. Negative Math : How Mathematical Rules Can Be Positively Bent. Princeton, N.J.: Princeton University Press, 2006.*
- Marx, Karl, Loyd David Easton, and Kurt H. Guddat. Writings of the Young Marx on Philosophy and

- Society. Indianapolis, Ind.: Hackett Pub. Co., 1997.
- Marx, Werner. Is There a Measure on Earth? : Foundations for a Nonmetaphysical Ethics. Chicago: University of Chicago Press, 1987.
- Matilal, Bimal Krishna. Logic, Language, and Reality : Indian Philosophy and Contemporary Issues. Delhi: Motilal Banarsidass, 1990.
- Matilal, Bimal Krishna, Jonardon Ganeri, and Heeraman Tiwari. The Character of Logic in India. SUNY Series in Indian Thought. Albany: State University of New York Press, 1998.*
- Matsumoto, Y. An Introduction to Morse Theory. Translations of Mathematical Monographs, V. 208. Providence, R.I.: American Mathematical Society, 2002.
- Matte Blanco, Ignacio. Thinking, Feeling, and Being : Clinical Reflections on the Fundamental Antinomy of Human Beings and World. New Library of Psychoanalysis, 5. London; New York: Routledge, 1988.
- Matthews, Eric. The Philosophy of Merleau-Ponty. Continental European Philosophy. Montreal: McGill-Queen's University Press, 2002.
- Maturana, Humberto R., and Francisco J. Varela. The Tree of Knowledge : The Biological Roots of Human Understanding. Boston; New York: Shambhala ; Random House, 1992.
- Maturana, Humberto R., and Francisco J. Varela. Autopoiesis And Cognition : The Realization of the Living. Dordrecht, Holland ; Boston : D. Reidel Pub. Co., 1980.**
- Mauss, Marcel. The Gift: Forms and Functions of Exchange in Archaic Societies. Glencoe, Ill.: Free Press, 1954.
- Mauss, Marcel, Wendy James, and N. J. Allen. Marcel Mauss : A Centenary Tribute. New York: Berghahn Books, 1998.
- May, Reinhard, and Graham Parkes. Heidegger's Hidden Sources : East Asian Influences on His Work. London; New York: Routledge, 1996.
- Mazur, Barry. Imagining Numbers: (Particularly the Square Root of Minus Fifteen). New York: Farrar Straus Giroux, 2003.
- McCawley, James D. Everything That Linguists Have Always Wanted to Know About Logic, but Were Ashamed to Ask. Oxford: Blackwell, 1980.
- McCullagh, Paul Fletcher. "The Meaning of Nomos in Greek Literature and Thought from Homer to Aristotle." Thesis. University of Chicago, 1939.
- McCumber, John. The Company of Words : Hegel, Language, and Systematic Philosophy. Evanston, Ill.: Northwestern University Press, 1993.
- McEwen, Indra Kagis. Socrates' Ancestor : An Essay on Architectural Beginnings. Cambridge, Mass.: MIT Press, 1993.*
- McGann, Jerome J. The Romantic Ideology : A Critical Investigation. Chicago: University of Chicago Press, 1985.
- McGinn, Colin. Mindsight : Image, Dream, Meaning. Cambridge, Mass.: Harvard University Press, 2004.
- McGregor, William. Semiotic Grammar. Oxford; New York: Clarendon Press ; Oxford University Press, 1997.
- McHugh, Peter. Defining the Situation; the Organization of Meaning in Social Interaction. Indianapolis: Bobbs-Merrill, 1968.*
- McKenna, Dennis J., and Terence K. McKenna. The Invisible Landscape : Mind, Hallucinogens, and the I Ching. New York: Seabury Press, 1975.
- McKeon, Zahava Karl. Novels and Arguments : Inventing Rhetorical Criticism. Chicago: University of Chicago Press, 1982.
- McKinney, John C., and Edward A. Tiryakian. Theoretical Sociology; Perspectives and Developments. New York: Appleton-Century-Crofts, Educational Division, 1970.
- McNeill, William. The Glance of the Eye : Heidegger, Aristotle, and the Ends of Theory. SUNY Series in Contemporary Continental Philosophy. Albany: State University of New York Press, 1999.
- McWhorter, J. H. The Power of Babel : A Natural History of Language. (New York, Times Books, 2001).
- Mead, George Herbert, and David L. Miller. The Individual and the Social Self : Unpublished Work of George Herbert Mead. Chicago: University of Chicago Press, 1982.
- Mead, George Herbert, and Merritt H. Moore. Movements of Thought in the Nineteenth Century. Chicago,

- Ill.: University of Chicago Press, 1936.
- Mead, George Herbert, and Charles W. Morris. Mind, Self & Society from the Standpoint of a Social Behaviorist. Chicago, Ill.: University of Chicago Press, 1934.
- Mead, George Herbert, and Arthur Edward Murphy. The Philosophy of the Present. Chicago; London: Open Court Pub. Co., 1932.**
- Meadows, Donella H., John M. Richardson, and Gerhart Bruckmann. Groping in the Dark : The First Decade of Global Modelling. Chichester UK; New York: Wiley, 1982.
- Mellor, D. H. Probability : A Philosophical Introduction. London; New York: Routledge, 2005.
- Mendelson, Bert. Introduction to Topology. New York: Dover Publications, 1990.
- Mensch, James R. After Modernity Husserlian Reflections on a Philosophical Tradition. Albany NY: State University of New York Press, 1996.
- . Intersubjectivity and Transcendental Idealism. SUNY Series in Contemporary Continental Philosophy. Albany, N.Y.: State University of New York Press, 1988.
- . Postfoundational Phenomenology : Husserlian Reflections on Presence and Embodiment. University Park, PA.: Pennsylvania State University Press, 2001.
- Merleau-Ponty, Maurice. Adventures of the Dialectic. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston Ill.: Northwestern University Press, 1973.
- . Consciousness and the Acquisition of Language. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston: Northwestern University Press, 1973.
- . In Praise of Philosophy. Evanston, Ill.: Northwestern University Press, 1963.
- . Phenomenology of Perception. International Library of Philosophy and Scientific Method. New York: Humanities Press, 1962.**
- . The Prose of the World. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston: Northwestern University Press, 1973.
- . Sense and Non-Sense. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston, Ill.: Northwestern University Press, 1964.*
- . Signs. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston, Ill.: Northwestern University Press, 1964.*
- . The Structure of Behavior. Boston: Beacon Press, 1963.
- . The World of Perception. London; New York: Routledge, 2004.
- Merleau-Ponty, Maurice, and Claude Lefort. The Visible and the Invisible: Followed by Working Notes. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston Ill.: Northwestern University Press, 1968.**
- Merleau-Ponty, Maurice, and John Sallis. Merleau-Ponty, Perception, Structure, Language : A Collection of Essays. Atlantic Highlands, N.J.: Humanities Press, 1981.
- Merleau-Ponty, Maurice, and Dominique Seglard. The Nature : Course Notes from the College De France. Evanston, Ill.: Northwestern University Press, 2003.
- Merrell, Floyd. Peirce, Signs, and Meaning. Toronto Studies in Semiotics. Toronto: Univ. of Toronto Press, 1997.
- . Peirce's Semiotics Now : A Primer. Toronto: Canadian Scholars' Press, 1995.
- . Semiotic Foundations : Steps toward an Epistemology of Written Texts. Advances in Semiotics. Bloomington, IN: Indiana University Press, 1982.
- . Signs Becoming Signs : Our Perfusive, Pervasive Universe. Advances in Semiotics. Bloomington: Indiana University Press, 1991.
- . Signs Grow : Semiosis and Life Processes. Toronto Studies in Semiotics. Toronto: Univ. of Toronto Press, 1996.
- Metzinger, Thomas. Being No One: The Self-Model Theory of Subjectivity. Cambridge, Mass.: MIT Press, 2003.*
- Meyer, Burnett. An Introduction to Axiomatic Systems. Boston: Prindle, Weber & Schmidt, 1974.

- Meyer, C., Wallis, M. and Meier, M. Experiences in Applying the Layered Virtual Machine/Object-Oriented Development Methodology to an Ada Design Effort. Proceedings of the conference on Tri-Ada '89: Ada Technology in Context: Application, Development, and Deployment. ACM, 1989.
- Miklowitz, Paul S. Metaphysics to Metafictions : Hegel, Nietzsche, and the End of Philosophy. SUNY Series in Hegelian Studies. Albany, N.Y.: State University of New York Press, 1998.
- Milburn, G. J. The Feynman Processor : Quantum Entanglement and the Computing Revolution. Reading, Mass.: Perseus Books, 1998.
- Milchman, Alan, and Alan Rosenberg. Foucault and Heidegger : Critical Encounters. Minneapolis, MN: University of Minnesota Press, 2003.
- Miller, Izchak. Husserl, Perception, and Temporal Awareness. Cambridge, Mass.: MIT Press, 1984.
- Miller, James Grier. Living Systems. New York: McGraw-Hill, 1978.*
- Miller, John H., and Scott E. Page. Complex Adaptive Systems : An Introduction to Computational Models of Social Life. Princeton Studies in Complexity. Princeton, N.J.: Princeton University Press, 2007.
- Millgram, Elijah. Varieties of Practical Reasoning. Cambridge, Mass.: MIT Press, 2001.
- Mills, Jon. The Unconscious Abyss : Hegel's Anticipation of Psychoanalysis. SUNY Series in Hegelian Studies. Albany: State University of New York Press, 2002.
- Mills, Judson, and Eddie Harmon-Jones. Cognitive Dissonance : Progress on a Pivotal Theory in Social Psychology. Washington, DC: American Psychological Association, 1999.
- Millsaps, Kevin T. The Development of Apophatic Theology from the Pre-Socratics to the Early Christian Fathers. EDT-0320106-222512. MA Thesis History. Knoxville, Chattanooga, Martin: U. Tennessee, 2006.
- Milton, John, and Maurice Kelley. Paradise Lost, and Other Poems. New York: W.J. Black, 1943.
- Mingers, John. Self-Producing Systems : Implications and Applications of Autopoiesis. Contemporary Systems Thinking. New York: Plenum Press, 1995.
- Misak, C. J. The Cambridge Companion to Peirce. Cambridge, U.K.; New York: Cambridge University Press, 2004.
- Mitcham, Carl. Thinking through Technology : The Path between Engineering and Philosophy. Chicago: University of Chicago Press, 1994.*
- Mitchell, Melanie. An Introduction to Genetic Algorithms. Complex Adaptive Systems. Cambridge, Mass.: MIT Press, 1998.
- . Analogy-Making As Perception: A Computer Model. Neural network modeling and connectionism. Cambridge, Mass: MIT Press, 1993.
- Mitchell, William J. The Logic of Architecture : Design, Computation, and Cognition. Cambridge, Mass.: MIT Press, 1990.
- Mladenov, Ivan. Conceptualizing Metaphors: On Charles Peirce's Marginalia. Routledge studies in linguistics, 4. London: Routledge, 2006.
- Mohanty, J. N. The Possibility of Transcendental Philosophy. *Phaenomenologica*, 98. Dordrecht; Lancaster: Nijhoff, 1985.
- Monod, Jacques. Chance and Necessity: an Essay on the Natural Philosophy of Modern Biology. New York: Knopf, 1971.*
- Moran, Dermot. Introduction to Phenomenology. London; New York: Routledge, 2000.
- Morgan, C. Lloyd. The Emergence of Novelty. London: Williams & Norgate, 1933.
- Morgan, Diane. Kant Trouble : The Obscurities of the Enlightened. Warwick Studies in European Philosophy. London; New York: Routledge, 2000.
- Morgan, John W., and G. Tian. Ricci Flow and the Poincaré Conjecture. Clay Mathematics Monographs, V. 3. Providence, RI: American Mathematical Society : Clay Mathematics Institute, 2007.
- Morowitz, Harold J. The Emergence of Everything : How the World Became Complex. New York: Oxford University Press, 2002.*
- Morris, Leon. The Gospel According to John: the English Text with Introduction, Exposition and Notes. The New International Commentary on the New Testament: Eerdmans, 1971.
- Morrison, Philip, et al. Powers of Ten : A Book About the Relative Size of Things in the Universe and the Effect of Adding Another Zero. Redding, Conn.; San Francisco: Scientific American Library ; W.H.

- Freeman, 1982.
- Morson, Gary Saul, and Caryl Emerson. Mikhail Bakhtin : Creation of a Prosaics. Stanford, Calif.: Stanford Univ. Press, 1990.
- Moss, Helen, and James Hampton. Conceptual Representation. Hove, UK: Psychology Press, 2003.
- Moustakas, Clark E. Being-in, Being-for, Being-With. Northvale, N.J.: Jason Aronson, 1995.*
- . Heuristic Research : Design, Methodology, and Applications. Newbury Park: Sage Publications, 1990.*
- . Phenomenological Research Methods. Thousand Oaks, Calif.: Sage, 1994.
- Moyle, Tristan. Heidegger's Transcendental Aesthetic : An Interpretation of the Ereignis. Ashgate New Critical Thinking in Philosophy. Aldershot, Hants, UK; Burlington VT: Ashgate Pub. Ltd., 2005.
- Mueller-Vollmer, Kurt. The Hermeneutics Reader : Texts of the German Tradition from the Enlightenment to the Present. New York: Continuum, 1985.
- Muffee, Visemih William. Risk Management : Theory and Practice. New York: Nova Science Publishers, 2007.
- Muller, John P., William J. Richardson, and Jacques Lacan. Lacan and Language : A Reader's Guide to Ecrits. New York: International Universities Press, 1982.
- Mumford, Stephen. Dispositions. Oxford; New York: Oxford University Press, 1998.
- Muralt, Andre, de. The Idea of Phenomenology : Husserlian Exemplarism. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston Northwestern University Press, 1974.
- Murdoch, Dugald. Niels Bohr's Philosophy of Physics. Cambridge, UK; New York: Cambridge University Press, 1987.
- Murota, Kazuo. Matrices and Matroids for Systems Analysis. Algorithms and Combinatorics, 20. Berlin; New York: Springer, 2000.
- Murphy, Arthur Edward, and A. I. Melden. The Theory of Practical Reason. The Paul Carus Lectures, Ser. 10, 1955. La Salle, Ill.: Open Court, 1965.
- Murphy, Jeffrie G. Kant : The Philosophy of Right. Macon, GA.: Mercer University Press, 1994.
- Murphy, Nancey C., and William R. Stoeger. Evolution and Emergence : Systems, Organisms, Persons. Oxford; New York: Oxford University Press, 2007.
- Musas, Charles. Destiny and Control in Human Systems : Studies in the Interactive Connectedness of Time (Chronotopology). Frontiers in Systems Research. Boston; Hingham, MA, U.S.A.: Kluwer-Nijhoff Pub. ; Kluwer Academic Publishers, 1985.
- Nørretranders, Tor. The User Illusion : Cutting Consciousness Down to Size. New York: Viking, 1998.
- Nagami, Keio. Dimension Theory. New York: Academic Press, 1970.*
- Nagel, Ernest, and James Roy Newman. Godel's Proof. New York: New York University Press, 1958.
- Nagel, Thomas. The View from Nowhere. New York: Oxford University Press USA, 1989.
- Nahin, Paul J. An Imaginary Tale : The Story of [the Square Root of Minus One]. Princeton, N.J.: Princeton University Press, 1998.
- Narayanan, Ajit. On Being a Machine. Ellis Horwood Series in Artificial Intelligence Foundations and Concepts. Chichester, West Sussex, UK; New York: E. Horwood ; Halsted Press, 1988.
- Negoita, C. V. Fuzzy Systems. Cybernetics and Systems Series, 2. Tunbridge Wells, Kent UK: Abacus Press, 1981.
- Nerlich, Graham. The Shape of Space. Cambridge; New York: Cambridge University Press, 1976.
- Netz, Reviel. The Shaping of Deduction in Greek Mathematics : A Study in Cognitive History. Ideas in Context, 51. Cambridge; New York: Cambridge University Press, 1999.
- Newman, James Roy. The World of Mathematics. 4 vols. Mineola, N.Y.: Dover Publications, 2000.
- Nicholson, Graeme. Illustrations of Being : Drawing Upon Heidegger and Upon Metaphysics. Contemporary Studies in Philosophy and the Human Sciences. Atlantic Highlands, N.J.: Humanities Press, 1992.
- Nicolis, G., and I. Prigogine. Exploring Complexity : An Introduction. New York: W.H. Freeman, 1989.
- Nielsen, Kjell, and Kenneth C. Shumate. Designing Large Real-Time Systems with ADA. New York, NY: Intertext Publications/Multiscience Press, 1988.
- Nietzsche, Friedrich Wilhelm. Thus Spake Zarathustra. United States: Pomona Press, 2006.*

- Nietzsche, Friedrich Wilhelm, and Daniel Breazzeale. Philosophy and Truth : Selections from Nietzsche's Notebooks of the Early 1870's. Amherst, N.Y.: Humanity Books, 1999.
- Nietzsche, Friedrich Wilhelm, and Marion Faber. Beyond Good and Evil : Prelude to a Philosophy of the Future. Oxford World's Classics. Oxford: Oxford University Press, 2008.
- Nietzsche, Friedrich Wilhelm, Walter Arnold Kaufmann, and R. J. Hollingdale. The Will to Power. New York: Random House, 1967.
- Nietzsche, Friedrich Wilhelm, and Duncan Large. Ecce Homo : How to Become What You Are. Oxford; New York: Oxford University Press, 2007.
- Nietzsche, Friedrich Wilhelm, and Douglas Smith. On the Genealogy of Morals: A Polemic by Way of Clarification and Supplement to My Last Book, Beyond Good and Evil. Oxford ; New York: Oxford University Press, 1998.
- Nietzsche, Friedrich Wilhelm, and Greg Whitlock. The Pre-Platonic Philosophers. International Nietzsche Studies. Urbana: University of Illinois Press, 2001.
- Niven, Ivan Morton. Numbers: Rational and Irrational. New Mathematical Library, 1. New York: Random House, 1961.
- Noltingk, B. E. The Art of Research: A Guide for the Graduate. Amsterdam; New York: Elsevier Pub. Co., 1965.
- Norman, Donald A. The Design of Everyday Things. London: MIT, 1998.
- Norman, Jesse. After Euclid : Visual Reasoning & the Epistemology of Diagrams. CSLI Lecture Notes, No. 175. Stanford, Calif.: CSLI Publications, 2006.
- Noys, Benjamin. Georges Bataille : A Critical Introduction. Modern European Thinkers. London UK; Sterling, VA.: Pluto Press, 2000.
- Oakley, Todd. Mental Spaces in Discourse and Interaction. Amsterdam: Benjamins, 2008.
- Ogata, Katsuhiko. State Space Analysis of Control Systems. Instrumentation and Controls Series. Englewood Cliffs, N.J.: Prentice-Hall, 1967.
- Ogden, C. K., et al. The Meaning of Meaning: a Study of the Influence of Language Upon Thought and of the Science of Symbolism. New York: Harcourt, Brace & World, 1946.*
- Okubo, S. Introduction to Octonion and Other Non-Associative Algebras in Physics. Montroll Memorial Lecture Series in Mathematical Physics, 2. Cambridge; New York: Cambridge University Press, 1995.
- Olafson, Frederick A. Heidegger and the Ground of Ethics : A Study of Mitsein. Modern European Philosophy. Cambridge, UK; New York: Cambridge University Press, 1998.
- Oliver, David A. The Shaggy Steed of Physics: Mathematical Beauty in the Physical World. New York: Springer, 2004.
- Olkowski, Dorothea, and James Morley. Merleau-Ponty, Interiority and Exteriority, Psychic Life, and the World. Albany, NY: State University of New York Press, 1999.
- O'Malley, John B. Sociology of Meaning. London: Human Context Books, 1972.**
- O'Neill, John. Sociology as a Skin Trade: Essays Towards a Reflexive Sociology. New York: Harper & Row, 1972.
- O'Regan, Cyril. The Heterodox Hegel. Albany: State University of New York Press, 1994.
- Ormiston, Gayle L., and Alan D. Schrift. The Hermeneutic Tradition : From Ast to Ricoeur. Albany, NY: State University of New York Press, 1990.
- O'Shea, Donal, and Mathematicians International Congress of. The Poincaré Conjecture: In Search of the Shape of the Universe. New York: Walker & Co. ; Holtzbrinck Publishers, 2007.
- Østerberg, Dag. Metasociology: An Inquiry into the Origins and Validity of Social Thought. Oslo: Norwegian University Press, 1988.
- Otto, Peter. Blake's Critique of Transcendence : Love, Jealousy, and the Sublime in the Four Zoas. Oxford; New York: Oxford University Press, 2000.
- Owens, Thomas J. Phenomenology and Intersubjectivity: Contemporary Interpretations of the Interpersonal Situation. The Hague: Nijhoff, 1971.
- Oxley, J. G. Matroid Theory. Oxford Science Publications. Oxford; New York: Oxford University Press, 1992.

- Padulo, Louis, and Michael A. Arbib. System Theory: a Unified State-Space Approach to Continuous and Discrete Systems. Philadelphia: Saunders, 1974.
- Page-Jones, Meilir, and Larry L. Constantine. Fundamentals of Object-Oriented Design in Uml. The Addison-Wesley Object Technology Series. New York; Reading, Mass.: Dorset House Pub. ; Addison-Wesley, 2000.
- Palmer, Kent D. "Software Engineering Design Methodologies and General Systems Theory." International Journal of General Systems. 24. 1-2 (1996): 43.
- Palmer, Kent Duane. "The Structure of Theoretical Systems in Relation to Emergence." Ph.D. Thesis. University of London; London School of Economics, 1982.
- Palmer, Kent Duane. The Fragmentation of Being and the Path Beyond the Void. Orange CA: Apeiron Press, 1996 (electronic book).
- Palmer, Kent Duane. Reflexive Autopoietic Systems Theory. Orange CA: Apeiron Press, 2000 (electronic book).
- Palmer, Kent Duane. Reflexive Autopoietic Dissipative Special Systems Theory. Orange CA: Apeiron Press, 2000 (electronic book).
- Palmer, Michael D. Names, Reference, and Correctness in Plato's Cratylus. American University Studies, V. 55. New York: P. Lang, 1989.
- Papadopoulos, Renos K. The Handbook of Jungian Psychology : Theory, Practice and Applications. London; New York: Routledge, 2006.
- Paras, Eric. Foucault 2.0 : Beyond Power and Knowledge. New York: Other Press, 2006.
- Pareigis, Bodo. Categories and Functors. New York: Academic Press, 1970.
- Parkes, Graham. Composing the Soul : Reaches of Nietzsche's Psychology. Chicago: Univ. of Chicago Press, 1994.
- Parmenides. Fragments : A Text and Translation. Toronto; Buffalo: University of Toronto Press, 1984.*
- Parmenides, and David Gallop. Parmenides of Elea : Fragments. Phoenix, 18. Toronto; London: University of Toronto Press, 1984.
- Parsons, Anne. "Metis in the Iliad : Gender and Verbal Deceit." Thesis. Smith College, 2000.
- Patočka, Jan, and James Dodd. Body, Community, Language, World. Chicago, Ill: Open Court, 1998
- Paton, H. J. Kant's Metaphysic of Experience : A Commentary on the First Half of the Kritik Der Reinen Vernunft. London; New York: G. Allen & Unwin ; Macmillan, 1936.*
- Paul, Hoyningen-Huene. Reconstructing Scientific Revolutions : Thomas S. Kuhn's Philosophy of Science. Chicago: University of Chicago Press, 1993.
- Pauli, Wolfgang, et al. Atom and Archetype : The Pauli/Jung Letters, 1932-1958. Princeton, N.J.: Princeton University Press, 2001.
- Pava, Calvin H. P. Managing New Office Technology : An Organizational Strategy. New York; London: Free Press ; Collier Macmillan, 1983.
- Payne, Robert. Hubris, a Study of Pride. New York: Harper, 1960.
- Peano, Giuseppe, and Hubert C. Kennedy. Selected Works of Giuseppe Peano. Toronto Canada: University of Toronto Press, 1973.
- Peat, F. David. From Certainty to Uncertainty : The Story of Science and Ideas in the Twentieth Century. Washington, D.C.: Joseph Henry Press, 2002.
- Peddle, Frank. Thought and Being : Hegel's Criticism of Kant's System of Cosmological Ideas. Washington, D.C.: University Press of America, 1980.
- Pedrycz, Witold, and Fernando Gomide. An Introduction to Fuzzy Sets Analysis and Design. Cambridge, Mass.: MIT Press, 1998.
- Peirce, Charles S. The New Elements of Mathematics. Hague; Atlantic Highlands, N.J.: Mouton Publishers ; Humanities Press, 1976.
- Peirce, Charles S., et al. Writings of Charles S. Peirce : A Chronological Edition. Bloomington, IN: Indiana University Press, 1982.
- Peirce, Charles S., Charles Hartshorne, and Paul Wisse. Collected Papers. Cambridge, MA: Belknap Press of Harvard University Press, 1955.**

- Peirce, Charles S., and James Hoopes. Peirce on Signs : Writings on Semiotic. Chapel Hill: University of North Carolina Press, 1991.
- Peirce, Charles S., et al. The Essential Peirce : Selected Philosophical Writings. Bloomington, IN: Indiana University Press, 1992.
- Peitgen, Heinz-Otto, H. Jargens, and Dietmar Saupe. Chaos and Fractals : New Frontiers of Science. New York: Springer-Verlag, 1992.
- Pennock, Robert T. Intelligent Design Creationism and Its Critics Philosophical, Theological, and Scientific Perspectives. Cambridge, Mass.: MIT Press, 2001.
- Penrose, Roger. Shadows of the Mind : A Search for the Missing Science of Consciousness. Oxford; New York: Oxford University Press, 1994.
- Penrose, Roger. The Emperor's New Mind : Concerning Computers, Minds, and the Laws of Physics. Oxford; New York: Oxford University Press, 1989.
- . The Road to Reality : A Complete Guide to the Laws of the Universe. New York: A.A. Knopf, 2005.
- Pepper, Stephen C. Concept and Quality: a World Hypothesis. La Salle, Ill.: Open Court, 1967.
- . World Hypotheses, a Study in Evidence. Berkeley and Los Angeles: University of California Press, 1942.
- Perakh, Mark. Unintelligent Design. Amherst, N.Y.: Prometheus Books, 2004.
- Perinbanayagam, R. S. Discursive Acts. Communication and Social Order. New York: Aldine de Gruyter, 1991.
- Pelman, Mark. Conceptual Flux : Mental Representation, Misrepresentation, and Concept Change. Studies in Cognitive Systems, V. 24. Dordrecht; Boston: Kluwer Academic Publishers, 2000.*
- Peterson, Ivars. Fragments of Infinity : A Kaleidoscope of Math and Art. New York: Wiley, 2001.
- . Islands of Truth : A Mathematical Mystery Cruise. New York: Freeman, 1990.
- . The Mathematical Tourist : Snapshots of Modern Mathematics. New York: Freeman, 1988.
- Peterson, James Lyle. Petri Net Theory and the Modeling of Systems. Englewood Cliffs, N.J.: Prentice-Hall, 1981.
- Petitot, Jean. Naturalizing Phenomenology : Issues in Contemporary Phenomenology and Cognitive Science. Writing Science. Stanford, Calif.: Stanford University Press, 1999.
- Petrick, Joseph A. "Peirce on Hegel." Thesis. Pennsylvania State University, 1972.
- Pettit, John W., and mtsho Mi pham rgya. Mipham's Beacon of Certainty : Illuminating the View of Dzogchen, the Great Perfection. Studies in Indian and Tibetan Buddhism. Boston: Wisdom Publications, 1999.
- Phelan, James. Reading Narrative : Form, Ethics, Ideology. Columbus: Ohio State University Press, 1989.
- Phillips, Derek L. Abandoning Method. The Jossey-Bass Behavioral Science Series. San Francisco: Jossey-Bass Publishers, 1973.
- Piaget, Jean. Structuralism. New York: Harper and Row; Basic Books, 1970.
- Pickel, Andreas. Rethinking System Theory. Thousand Oaks: SAGE, 2007.
- Pickett, Steward T., Jurek Kolasa, and Clive G. Jones. Ecological Understanding. San Diego: Academic Press, 1994.
- Pickover, Clifford A. Computers, Pattern, Chaos, and Beauty : Graphics from an Unseen World. New York: St. Martin's Press, 1990.
- . The Möbius Strip : Dr. August Möbius's Marvelous Band in Mathematics, Games, Literature, Art, Technology, and Cosmology. New York: Thunder's Mouth Press, 2006.
- . Surfing through Hyperspace : Understanding Higher Universes in Six Easy Lessons. New York: Oxford University Press, 1999.
- Pinkard, Terry P. Hegel's Phenomenology : The Sociality of Reason. Cambridge; New York: Cambridge University Press, 1994.
- Plato, and Reginald E. Allen. Plato's Parmenides. Minneapolis: University of Minnesota Press, 1983.
- . The Republic. New Haven: Yale University Press, 2006.
- Plato, and Francis Macdonald Cornford. Plato's Cosmology: the Timaeus of Plato. New York: Liberal Arts Press, 1957.

- Plessner, Helmuth. Laughing and Crying: a Study of the Limits of Human Behavior. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston: Northwestern University Press, 1970.
- Plotnitsky, Arkady. Algebras, Geometries and Topologies of the Fold : Deleuze, Derrida and Quasi-Mathematical Thinking (with Leibniz and Mallarme). London: Continuum, 2003.
- . Complementarity : Anti-Epistemology after Bohr and Derrida. Durham: Duke University Press, 1994.**
- . The Knowable and the Unknowable : Modern Science, Nonclassical Thought, and The "Two Cultures". Studies in Literature and Science. Ann Arbor: University of Michigan Press, 2002.
- . Reading Bohr : Physics and Philosophy. Fundamental Theories of Physics, V. 152. Dordrecht, The Netherlands: Springer, 2006.
- . Reconfigurations : Critical Theory and General Economy. Gainesville: University Press of Florida, 1993.
- Polanyi, Michael. The Tacit Dimension. Gloucester, Mass.: P. Smith, 1983.*
- Pollio, Howard R., Tracy B. Henley, and Craig J. Thompson. The Phenomenology of Everyday Life. Cambridge, U.K.; New York, NY, USA: Cambridge University Press, 1997.
- Polt, Richard F. H. The Emergency of Being : On Heidegger's Contributions to Philosophy. Ithaca, N.Y.: Cornell University Press, 2006.
- Polt, Richard F. H., Gregory Fried, and Martin Heidegger. A Companion to Heidegger's Introduction to Metaphysics. New Haven: Yale University Press, 2001.
- Pope, Rob. Creativity : Theory, History, Practice. London; New York: Routledge, 2005.
- Porter, James I. Nietzsche and the Philology of the Future. Stanford, Calif.: Stanford University Press, 2000.
- Post, John F. The Faces of Existence : An Essay in Nonreductive Metaphysics. Ithaca: Cornell University Press, 1987.
- Poston, T., and Ian Stewart. Catastrophe Theory and Its Applications. Surveys and Reference Works in Mathematics, 2. London; San Francisco: Pitman, 1978.
- Potter, Michael D. Set Theory and Its Philosophy : A Critical Introduction. Oxford; New York: Oxford University Press, 2004.*
- Poundstone, William. Labyrinths of Reason : Paradox, Puzzles, and the Frailty of Knowledge. New York: Anchor Press/Doubleday, 1988.
- Powell, Jason. Heidegger's Contributions to Philosophy Life and the Last God. London: Continuum, 2007.
- Powers, William T. Behavior: The Control of Perception. Chicago: Aldine Pub. Co., 1973.
- Pred, Ralph Jason. Onflow : Dynamics of Consciousness and Experience. Cambridge, Mass.: MIT Press, 2005.
- Price, A. W. Contextuality in Practical Reason. Oxford: Clarendon Press : Oxford University Press, 2008.
- Priest, Graham. Beyond the Limits of Thought. Oxford; New York: Clarendon Press ; Oxford University Press, 2002.
- . In Contradiction : A Study of the Transconsistent. Oxford; Oxford; New York: Clarendon Press ; Oxford University Press, 2006.
- . An Introduction to Non-Classical Logic. Cambridge; New York: Cambridge University Press, 2001.
- Priest, Graham, et al. Paraconsistent Logic : Essays on the Inconsistent. Menchen; Hamden [Conn.]: Philosophia, 1989.*
- Priest, Graham, J. C. Beall, and Bradley P. Armour-Garb. The Law of Non-Contradiction : New Philosophical Essays. Oxford: Clarendon Press, 2004.
- Prieto-Diaz, Ruben, and Guillermo Arango. Domain Analysis and Software Systems Modeling. IEEE Computer Society Press Tutorial. Los Alamitos, CA: IEEE Computer Society Press, 1991.
- Prigogine, I. From Being to Becoming : Time and Complexity in the Physical Sciences. San Francisco: W.H. Freeman, 1980.*
- Prigogine, I., and Isabelle Stengers. Order out of Chaos : Man's New Dialogue with Nature. Toronto; New York, N.Y.: Bantam Books, 1984.*
- Pryor, Sean Brendan. "Time & Poetry : Wallace Stevens & T.S. Eliot." Thesis. University of Sydney, 2003.
- Puccia, Charles J., and Richard Levins. Qualitative Modeling of Complex Systems : An Introduction to Loop Analysis and Time Averaging. Cambridge, Mass.: Harvard University Press, 1985.

- Punter, David. Blake, Hegel, and Dialectic. Amsterdam: Rodopi, 1982.*
- Pyłkkô, Pauli. The Aconceptual Mind : Heideggerian Themes in Holistic Naturalism. Advances in Consciousness Research, V. 11. Amsterdam; Philadelphia, PA: John Benjamins Pub., 1998.**
- Rader, Robert J. Advanced Software Design Techniques. New York: PBI, 1978.
- Radice, Ronald A., and Richard W. Phillips. Software Engineering : An Industrial Approach. Englewood Cliffs, N.J.: Prentice-Hall, 1988.
- Raffoul, Francois, and David Pettigrew. Heidegger and Practical Philosophy. SUNY Series in Contemporary Continental Philosophy. Albany, N.Y.: State University of New York Press, 2002.
- Raffoul, Francois, and Eric Sean Nelson. Rethinking Facticity. SUNY Series in Contemporary Continental Philosophy. Albany, N.Y.: State University of New York Press, 2008.
- Rajaraman, R. Solitons and Instantons : An Introduction to Solitons and Instantons in Quantum Field Theory. Amsterdam; New York; New York, N.Y.: North-Holland Pub. Co. ; Elsevier Science Pub. Co., 1982.
- Raskin, Marcus G. Being and Doing. New York: Random House, 1971.
- Rasmussen, Jens, et al. Tasks, Errors, and Mental Models. A Festschrift to Celebrate the 60th Birthday of Professor Jens Rasmussen. London; New York: Taylor & Francis, 1988.
- Rauch, Irmengard and Carr, Gerald F. Semiotics around the World : Synthesis in Diversity. Proceedings of the Fifth Congress of the International Association for Semiotic Studies, Berkeley, 1994. Berlin; New York, Mouton de Gruyter, 1997.
- Ravindran, Renuka. "Euclid's Fifth Postulate." Resonance 12.4 (2007): 26-36.
- Raz, Joseph. Practical Reason and Norms. London: Hutchinson, 1975.
- Reid, Constance, and Hermann Weyl. Hilbert. Berlin; New York: Springer-Verlag, 1970.
- Reinertsen, Donald G. Managing the Design Factory : A Product Developer's Toolkit. New York: Free Press, 1997.*
- Reiser, Jesse, and Nanako Umemoto. Atlas of Novel Tectonics. New York: Princeton Architectural Press, 2006.*
- Reisig, Wolfgang. Petri Nets : An Introduction. EATCS Monographs on Theoretical Computer Science, V. 4. Berlin; New York: Springer-Verlag, 1985.
- Remagnino, Paolo, Gian Luca Foresti, and Tim Ellis. Ambient Intelligence : A Novel Paradigm. New York: Springer, 2005.
- Rescher, Nicholas. Cognitive Systematization : A Systems-Theoretic Approach to a Coherentist Theory of Knowledge. Totowa, N.J.: Rowman and Littlefield, 1979.**
- . Dialectics : A Controversy-Oriented Approach to the Theory of Knowledge. Albany: State University of New York Press, 1977.*
- . Imagining Irreality : A Study of Unreal Possibilities. Chicago, Ill.: Open Court, 2003.
- . Peirce's Philosophy of Science : Critical Studies in His Theory of Induction and Scientific Method. Notre Dame: University of Notre Dame Press, 1978.
- . Process Metaphysics : An Introduction to Process Philosophy. SUNY Series in Philosophy. Albany: State University of New York Press, 1996.*
- . Process Philosophy : A Survey of Basic Issues. Pittsburgh: University of Pittsburgh Press, 2000.*
- . Risk : A Philosophical Introduction to the Theory of Risk Evaluation and Management. Washington, D.C.: University Press of America, 1983.
- Rescher, Nicholas, and Alasdair Urquhart. Temporal Logic. Library of Exact Philosophy, 3. New York: Springer-Verlag, 1971.
- Reynolds, Jack. Merleau-Ponty and Derrida : Intertwining Embodiment and Alterity. Series in Continental Thought. Athens: Ohio University Press, 2004.
- Reynolds, Paul D. A Primer in Theory Construction. Indianapolis: Bobbs-Merrill, 1971.
- Richards, I. A. Principles of Literary Criticism. New York: Harcourt, Brace, 1961.
- Richardson, George P. Feedback Thought in Social Science and Systems Theory. Philadelphia: University of Pennsylvania Press, 1991.
- Richardson, George P., and Alexander L. Pugh. Introduction to System Dynamics Modeling with Dynamo.

- MIT Press/Wright-Allen Series in System Dynamics. Cambridge, Mass.: MIT Press, 1981.
- Rickman, H. P. The Adventure of Reason : The Uses of Philosophy in Sociology. Contributions in Sociology, No. 46. Westport, Conn.: Greenwood Press, 1983.
- Ricoeur, Paul. The Rule of Metaphor : Multi-Disciplinary Studies of the Creation of Meaning in Language. London: Routledge and Kegan Paul, 1978.
- Rieger, Burghard B. and Constantin Thiopoulos. Situations, Topoi, and Dispositions: On the Phenomenological Modelling of Meaning. Artificial Intelligence-Tagung. Springer-Verlag. 1989.
- The Architecture of a UML Virtual Machine. Proceedings of the 16th ACM SIGPLAN conference on Object oriented programming, systems, languages, and applications. ACM, 2001.
- Robbin, Tony. Shadows of Reality : The Fourth Dimension in Relativity, Cubism, and Modern Thought. New Haven: Yale University Press, 2006.
- Robbin, Tony, Rudy v B. Rucker, and Linda Dalrymple Henderson. Fourfield : Computers, Art & the 4th Dimension. Boston: Little, Brown, 1992.
- Roberts, Don Davis. The Existential Graphs of Charles S. Peirce. Approaches to Semiotics. The Hague: Mouton, 1973.
- Roberts, Peter C. Modelling Large Systems. Orasa Text, No. 4. London; New York: Taylor & Francis ; Halsted Press, 1978.
- Robertson, Suzanne, and James Robertson. Mastering the Requirements Process. Upper Saddle River, NJ: Addison-Wesley, 2006.
- Robinson, Alan, and Sam Stern. Corporate Creativity : How Innovation and Improvement Actually Happen. San Francisco: Berrett-Koehler Publishers, 1997.
- Roche, Mark William. Tragedy and Comedy : A Systematic Study and a Critique of Hegel. SUNY Series in Hegelian Studies. Albany, NY: State University of New York Press, 1998.
- Rockwell, W. Teed. Neither Brain nor Ghost : A Nondualist Alternative to the Mind-Brain Identity Theory. Cambridge, Mass.: MIT Press, 2005.
- Rogers, Everett M. Diffusion of Innovations. New York; London: Free Press ; Collier Macmillan, 1983.
- Romanyshyn, Robert D. Technology as Symptom and Dream. London; New York: Routledge, 1989.
- Ronan, Mark. Symmetry and the Monster : One of the Greatest Quests of Mathematics. Oxford; New York: Oxford University Press, 2006.
- Roochnik, David. Beautiful City : The Dialectical Character of Plato's "Republic". Ithaca: Cornell University Press, 2003.
- Rose, Gillian. Dialectic of Nihilism : Post-Structuralism and Law. Oxford UK; New York, NY: Basil Blackwell, 1984.
- Rosen, Stanley. The Ancients and the Moderns : Rethinking Modernity. New Haven: Yale University Press, 1989.
- . Hermeneutics as Politics. New York: Oxford University Press, 1987.
- . The Limits of Analysis. New York: Basic Books, 1980.
- . The Mask of Enlightenment : Nietzsche's Zarathustra. Modern European Philosophy. Cambridge; New York: Cambridge University Press, 1995.
- . Nihilism: A Philosophical Essay. New Haven: Yale University Press, 1969.**
- . The Question of Being : A Reversal of Heidegger. New Haven: Yale University Press, 1993.
- Rosen, Steven M. Dimensions of Apeiron : A Topological Phenomenology of Space, Time, and Individuation. Amsterdam: Rodopi, 2004.
- . Science, Paradox, and the Moebius Principle : The Evolution of A "Transcultural" Approach to Wholeness. SUNY Series in Science, Technology, and Society. Albany: State University of New York Press, 1994.*
- Rosensohn, William L. The Phenomenology of Charles S. Peirce : From the Doctrine of Categories to Phaneroscopy. Philosophical Currents, V. 10. Amsterdam: Gruner, 1974.
- Ross, Stephen David. The Gift of Kinds : The Good in Abundance : An Ethic of the Earth. New York; Wantage: State University of New York ; University Presses Marketing, 1999.
- . The Gift of Property : Having the Good : Betraying Genitivity, Economy and Ecology, an Ethic of the

- Earth. Albany: State University of New York Press, 2001.
- . The Gift of Touch : Embodying the Good. Albany: State Univ. of New York Press, 1998.
- . The Gift of Truth : Gathering the Good. Albany, N.Y: State Univ. of New York Press, 1997.
- . The Limits of Language. New York: Fordham University Press,, 1994.
- . The Ring of Representation. SUNY Series in Contemporary Continental Philosophy. Albany: State University of New York Press, 1992.
- Rosso, G. A. Blake's Prophetic Workshop : A Study of the Four Zoas. Lewisburg PA; London; Cranbury, NJ: Bucknell University Press ; Associated University Presses, 1993.
- Rotman, B. Mathematics as Sign : Writing, Imagining, Counting. Writing Science. Stanford, Calif.: Stanford University Press, 2000.
- Rowlands, Mark. The Nature of Consciousness. Cambridge UK: Cambridge Univ. Press, 2001.
- Rowlands, Peter. Zero to Infinity : The Foundations of Physics. K & E Series on Knots and Everything, V. 41. New Jersey: World Scientific, 2007.
- Rucker, Rudy. The Fourth Dimension : A Guided Tour of the Higher Universe. Boston: Houghton Mifflin, 1996.
- . The Fourth Dimension : Toward a Geometry of Higher Reality. Boston: Houghton Mifflin, 1984.
- . Geometry, Relativity, and the Fourth Dimension. New York: Dover Publications, 1977.
- . Infinity and the Mind : The Science and Philosophy of the Infinite. Boston: Birkhauser, 1982.
- Russell, Matheson. Husserl : A Guide for the Perplexed. London ; New York, NY : Continuum, 2006.
- Saaty, Thomas L. The Analytic Hierarchy Process : Planning, Priority Setting, Resource Allocation. New York; London: McGraw-Hill International Book Co., 1980.
- Sabinin, Lev V., Larissa Sbitneva, and I. P. Shestakov. Non-Associative Algebra and Its Applications. Lecture Notes in Pure and Applied Mathematics, V. 246. Boca Raton: Chapman & Hall/CRC, 2006.
- Sadler Jr, William Alan. Existence and Love : A New Approach in Existential Phenomenology. New York: Charles Scribner's Sons 1969.*
- Saint-Martin, Fernande. Semiotics of Visual Language. Advances in Semiotics. Bloomington, IN: Indiana University Press, 1990.
- Sallis, John. Being and Logos Reading the Platonic Dialogues. Pittsburgh: Duquesne University Press, 1975.*
- . Chorology on Beginning in Plato's Timaeus. Bloomington, 1999. Indiana University Press.**
- . Delimitations : Phenomenology and the End of Metaphysics. Studies in Continental Thought. Bloomington: Indiana University Press, 1995.
- . Force of Imagination : The Sense of the Elemental. Studies in Continental Thought. Bloomington: Indiana University Press, 2000.
- . Philosophy and Archaic Experience : Essays in Honor of Edward G. Ballard. Duquesne Studies, V. 38. Pittsburgh Duquesne University Press ; Distributed by Humanities Press, 1982.
- Salthe, Stanley N. Evolving Hierarchical Systems : Their Structure and Representation. New York: Columbia University Press, 1985.*
- Sampson, Theodore. A Cure of the Mind : The Poetics of Wallace Stevens. Montreal; New York: Black Rose Books, 2000.
- Sanchis, Luis E. Reflexive Structures : An Introduction to Computability Theory. New York: Springer-Verlag, 1988.*
- Sandywell, Barry. Logological Investigations. 3 Volumes. London; New York: Routledge, 1996.**
- . Presocratic Reflexivity : The Construction of Philosophical Discourse C. 600-450 BC. Volume 3. London; New York: Routledge, 1996.
- . The Beginnings of European Theorizing: Reflexivity in the Archaic Age. Volume 2. London; New York: Routledge, 1996.
- . Reflexivity and the Crisis of Western Reason. Volume 1. London; New York: Routledge, 1996.
- Sandywell, Barry. Problems of Reflexivity and Dialectics in Sociological Inquiry : Language Theorizing Difference. London; Boston: Routledge & K. Paul, 1975.

- Sanford, David H. If P Then Q : Conditionals and the Foundations of Reasoning. The Problems of Philosophy. London: Routledge, 1992.
- Sarkar, Husain. A Theory of Method. Berkeley: University of California Press, 1983.
- Sartre, Jean-Paul. Being and Nothingness; an Essay on Phenomenological Ontology. New York: Philosophical Library, 1956.*
- . Critique of Dialectical Reason. Theory of Practical Ensembles. Volume 1. London; Atlantic Highlands, N.J: NLB ; Humanities Press, 1976.**
- Sartre, Jean-Paul, Arlette Elkaeïm-Sartre, and Quintin Hoare. Critique of Dialectical Reason. Volume 2 (Unfinished). London; New York: Verso, 1991, 2006.
- Sarup, Madan. An Introductory Guide to Post-Structuralism and Postmodernism. Athens: University of Georgia Press, 1993. Harvester Wheatsheaf.
- Saul, John Ralston. The Unconscious Civilization. New York: Free Press, 1997.
- Saunders, Margaret Ann Hockensmith. "A Report on the Significance of the Controversy Surrounding Euclid's Fifth Postulate." Thesis. Virginia Polytechnic Institute, 1962.
- Saunders, P. T. An Introduction to Catastrophe Theory. Cambridge, UK; New York: Cambridge University Press, 1980.
- Saussure, Ferdinand de. Course in General Linguistics. New York: Philosophical Library, 1959.
- . Writings in General Linguistics. Oxford; New York: Oxford University Press, 2006.
- Savitch, Walter J. Abstract Machines and Grammars. Little, Brown Computer Systems Series. Boston: Little, Brown, 1982.
- Schalley, Andrea C. Cognitive Modeling and Verbal Semantics : A Representational Framework Based on Uml. Trends in Linguistics, 154. Berlin: Mouton de Gruyter, 2004.
- . Ontolinguistics : How Ontological Status Shapes the Linguistic Coding of Concepts. Berlin: Mouton de Gruyter, 2007.
- Schalow, Frank. The Renewal of the Heidegger-Kant Dialogue : Action, Thought, and Responsibility. SUNY Series in Contemporary Continental Philosophy. Albany: State University of New York Press, 1992.
- Schatzki, Theodore R. Martin Heidegger : Theorist of Space. Sozialgeographische Bibliothek, Bd. 6. Stuttgart: Steiner, 2007.
- Schechter, Bruce. The Path of No Resistance : The Story of the Revolution in Superconductivity. New York: Simon and Schuster, 1989.
- Schiappa, Edward. Protagoras and Logos : A Study in Greek Philosophy and Rhetoric. Studies in Rhetoric/Communication. Columbia, S.C.: University of South Carolina Press, 2003.*
- Schlegel, Richard. Superposition & Interaction : Coherence in Physics. Chicago: University of Chicago Press, 1980.
- Schlick, Moritz. General Theory of Knowledge. Library of Exact Philosophy, 11. New York: Springer-Verlag, 1974.*
- Schneider, Fred B. The State Machine Approach: A Tutorial. Science Cornell Univ Ithaca NY Dept Of Computer. Ft. Belvoir: Defense Technical Information Center, 1986.
- Schopenhauer, Arthur. The World as Will and Representation. 2 Volumes. New York: Dover Publications, 1966.
- Schrift, Alan D. Twentieth-Century French Philosophy : Key Themes and Thinkers. Malden, MA: Blackwell Pub., 2006.
- Schulze, Peter C., and Engineering National Academy of. Engineering within Ecological Constraints. Washington, D.C.: National Academy Press, 1996.
- Schumm, Bruce A. Deep Down Things : The Breathtaking Beauty of Particle Physics. Baltimore, MD.: Johns Hopkins University Press, 2004.
- Schurmann, Reiner. Heidegger on Being and Acting : From Principles to Anarchy. Studies in Phenomenology and Existential Philosophy. Bloomington: Indiana University Press, 1987.
- Schürmann, Reiner, and Reginald Lilly. Broken Hegemonies. Studies in Continental Thought. Bloomington, IN: Indiana University Press, 2003.
- Schutz, Alfred. On Phenomenology and Social Relations; Selected Writings. Chicago: University of Chicago Press, 1970.

- . Reflections on the Problem of Relevance. New Haven: Yale University Press, 1970.*
- . Studies in Phenomenological Philosophy. *Phaenomenologica*, 22. The Hague: M. Nijhoff, 1975.
- Schutz, Alfred, Aron Gurwitsch, and Richard Grathoff. Philosophers in Exile : The Correspondence of Alfred Schutz and Aron Gurwitsch, 1939-1959. *Studies in Phenomenology and Existential Philosophy*. Bloomington: Indiana University Press, 1989.
- Schutz, Alfred, and Thomas Luckmann. The Structures of the Life-World. *Northwestern University Studies in Phenomenology & Existential Philosophy*. Evanston Ill.: Northwestern University Press, 1973.
- Scorpan, Alexandru. The Wild World of 4-Manifolds. Providence, R.I.: American Mathematical Society, 2005.
- Scott, Charles E. Companion to Heidegger's Contributions to Philosophy. *Studies in Continental Thought*. Bloomington, IN: Indiana University Press, 2001.
- Scruton, Roger. German Philosophers : Kant, Hegel, Schopenhauer, Nietzsche. Oxford: Oxford University Press, 2001.
- Searle, John R. Rationality in Action. *The Jean Nicod Lectures*. Cambridge, Mass.: MIT Press, 2001.
- Sebeok, Thomas A. Signs : An Introduction to Semiotics. *Toronto Studies in Semiotics*. Toronto; Buffalo: University of Toronto Press, 1994.
- Sedley, D. N. Plato's Cratylus. *Cambridge Studies in the Dialogues of Plato*. Cambridge, UK; New York: Cambridge University Press, 2003.*
- Segal, Jerome M. Agency and Alienation : A Theory of Human Presence. Savage, MD.: Rowman & Littlefield, 1991.
- Seibt, Johanna. "Free Process Theory: Towards a Typology of Occurrences." *Axiomathes* 14.1 (2004): 23-55.*
- . Process Theories : Cross-Disciplinary Studies in Dynamic Categories. Dordrecht; London: Kluwer Academic, 2003.
- Seligman, Paul. The Apeiron of Anaximander: a Study in the Origin and Function of Metaphysical Ideas. London, UK: University of London, Athlone Press, 1962.*
- Sellers, Peter H. Combinatorial Complexes : A Mathematical Theory of Algorithms. Dordrecht; Boston: D. Reidel Pub. Co., 1979.
- Setiya, Kieran. Reasons without Rationalism. Princeton, N.J.: Princeton University Press, 2007.
- Sewell, G. L. Quantum Theory of Collective Phenomena. *Monographs on the Physics and Chemistry of Materials*. Oxford, UK; New York: Clarendon Press ; Oxford University Press, 1986.
- Shalloway, Alan, and James Trott. Design Patterns Explained : A New Perspective on Object-Oriented Design. *Software Patterns Series*. Boston, Ma.: Addison-Wesley, 2002.
- Shank, Gary and Donald J. Cunningham. "Modeling the Six Modes of Peircean Abduction for Educational Purposes" <http://www.cs.indiana.edu/event/maics96/Proceedings/shank.html>
- Shank, Gary. "Using Semiotic Reasoning in Empirical Research: The Emergence of Peirce's Ten Classes of Signs". *Proceedings of the Midwest Philosophy of Education Society, 1993-1994*. Chicago, IL: MPES, 1995. ERIC ED413277.
- Shapiro, Gary. After the Future : Postmodern Times and Places. *Contemporary Studies in Philosophy and Literature*, 2. Albany: State University of New York Press, 1990.
- Shapiro, Kenneth Joel. Bodily Reflective Modes : A Phenomenological Method for Psychology. Durham: Duke University Press, 1985.
- Shapiro, Stewart. Philosophy of Mathematics : Structure and Ontology. New York: Oxford University Press, 1997.
- . Thinking About Mathematics : The Philosophy of Mathematics. New York: Oxford University Press, 2000.
- Heterogeneous Design Idioms for Software Architecture. *Proceedings of the 6th International Workshop on Software Specification and Design*. 1991. IEEE Computer Society Press.
- Shaw, Mary, and David Garlan. Software Architecture : Perspectives on an Emerging Discipline. Upper Saddle River, N.J.: Prentice Hall, 1996.*
- Sheets-Johnstone, Maxine. The Roots of Power : Animate Form and Gendered Bodies. Chicago: Open Court, 1994.
- . The Roots of Thinking. Philadelphia: Temple University Press, 1990.

- Shelley, Mary Wollstonecraft. Frankenstein, or, the Modern Prometheus New York: W.W. Norton, 1996.
- Sheringham, Michael. Everyday Life : Theories and Practices from Surrealism to the Present. Oxford; New York: Oxford University Press, 2006.
- Shermer, Michael. Why Darwin Matters : The Case against Intelligent Design. New York: Times Books, 2006.
- Sherover, Charles M., and Gregory R. Johnson. Are We in Time? : And Other Essays on Time and Temporality. Northwestern University Topics in Historical Philosophy. Evanston, Ill.: Northwestern University Press, 2003.
- Shieber, Stuart M. The Turing Test : Verbal Behavior as the Hallmark of Intelligence. Cambridge, Mass.: MIT Press, 2004.
- Shin, Sun-Joo. The Logical Status of Diagrams. Cambridge, UK; New York: Cambridge University Press, 1994.
- Layered Virtual Machine/Object-Oriented Design. Proceedings of the Fifth Washington Symposium On ADA. ACM, 1988.
- Shreeve, James. The Neandertal Enigma : Solving the Mystery of Modern Human Origins. New York: Morrow, 1995.
- Sider, Theodore. Four-Dimensionalism : An Ontology of Persistence and Time. Oxford; New York: Clarendon Press ; Oxford University Press, 2001.*
- Silverman, Allan Jay. The Dialectic of Essence : A Study of Plato's Metaphysics. Princeton, N.J.: Princeton University Press, 2002.*
- Silverman, David, and Brian Torode. The Material Word : Some Theories of Language and Its Limits. London; Boston: Routledge & Kegan Paul, 1980.
- Hugh J Silverman; Don Ihde. Hermeneutics and Deconstruction. 1985. State University of New York Press.
- Silverman, Kaja. The Subject of Semiotics. New York: Oxford University Press, 1983.
- Simmel, Georg. Schopenhauer and Nietzsche. Amherst: University of Massachusetts Press, 1986.
- Simon, Herbert A. The Sciences of the Artificial. Cambridge, Mass.: MIT Press, 1981.*
- Simpson, Evan. Anti-Foundationalism and Practical Reasoning : Conversations between Hermeneutics and Analysis. Edmonton: Academic Print. & Pub., 1987.*
- Simpson, Peter. Hegel's Transcendental Induction. Albany, N.Y.: State University of New York Press, 1998.
- Sipser, Michael. Introduction to the Theory of Computation. Boston: PWS Pub. Co., 1997.
- Sklar, Lawrence. Physics and Chance : Philosophical Issues in the Foundations of Statistical Mechanics. Cambridge UK; New York: Cambridge University Press, 1993.
- Sliogeris, Arvydas. Names of Nihil. On the Boundary of Two Worlds, 14. Amsterdam; New York, NY: Rodopi, 2008.
- Sloterdijk, Peter. Critique of Cynical Reason. Theory and History of Literature, V. 40. Minneapolis: University of Minnesota Press, 1987.
- Smith, Brian Cantwell. On the Origin of Objects. Cambridge, Mass.: MIT Press, 1996.*
- Smith, Preston G., and Donald G. Reinertsen. Developing Products in Half the Time. New York: Van Nostrand Reinhold, 1991.
- Smith, P. Christopher. The Hermeneutics of Original Argument : Demonstration, Dialectic, Rhetoric. Evanston, IL: Northwestern University Press, 1998.
- Smith, Steven G. Gender Thinking. Philadelphia: Temple University Press, 1992.
- Smolin, Lee. Three Roads to Quantum Gravity. New York, N.Y.: Basic Books, 2001.
- . The Trouble with Physics : The Rise of String Theory, the Fall of a Science, and What Comes Next. Boston: Houghton Mifflin, 2006.
- Smullyan, Raymond M. Diagonalization and Self-Reference. Oxford Logic Guides, 27. Oxford; New York: Clarendon Press, 1994.
- Soames, Scott. Philosophical Analysis in the Twentieth Century. 2 vols. Princeton, N.J.: Princeton University Press, 2003.
- Sokal, Alan; Jean Bricmont. Fashionable Nonsense. (New York: Picador, 1998).

- Sokolowski, Robert. Introduction to Phenomenology. Cambridge, UK; New York: Cambridge University Press, 2000.
- Sorensen, Roy A. Blindspots. Clarendon Library of Logic and Philosophy. Oxford, UK; New York: Clarendon Press ; Oxford University Press, 1988.*
- . Thought Experiments. New York: Oxford University Press, 1998.*
- Soucek, Branko, and Iris Group. Fuzzy, Holographic, and Parallel Intelligence : The Sixth Generation Breakthrough. Sixth-Generation Computer Technology Series. New York: Wiley, 1992.
- Sowa, John F. Knowledge Representation : Logical, Philosophical, and Computational Foundations. Pacific Grove: Brooks/Cole, 2000.
- Sparkes, A. W. Talking Philosophy : A Wordbook. London; New York: Routledge, 1991.
- Specia, Anthony. Hypothetical Syllogistic and Stoic Logic. Philosophia Antiqua, V. 87. Leiden; Boston: Brill, 2001.
- Spencer-Brown, G. Laws of Form. New York: Julian Press, 1972.**
- Spinks, C. W. Peirce and Triadomania : A Walk in the Semiotic Wilderness. Approaches to Semiotics, 103. Berlin; New York: Mouton de Gruyter, 1991.
- Springer, Sally P., and Georg Deutsch. Left Brain, Right Brain : Perspectives from Cognitive Neuroscience. A Series of Books in Psychology. New York: Freeman, 1997.
- Springer, T. A., and Ferdinand D. Veldkamp. Octonions, Jordan Algebras, and Exceptional Groups. Springer Monographs in Mathematics. Berlin; New York: Springer, 2000.*
- Stafleu, Marinus Dirk. Theories at Work : On the Structure and Functioning of Theories in Science, in Particular During the Copernican Revolution. Christian Studies Today. Lanham, MD: University Press of America, 1987.
- Stambaugh, Joan. The Finitude of Being. SUNY Series in Contemporary Continental Philosophy. Albany, NY: State University of New York Press, 1992.*
- Stamps, Jeffrey. Holonomy : A Human Systems Theory. The Systems Inquiry Series. Seaside, CA: Intersystems Publications, 1980.
- Standish, Russell K. Theory of Nothing. Charleston, SC.: BookSurge, LLC, 2006.
- Stanley, Eric Gerald. Imagining the Anglo-Saxon Past. Cambridge; Rochester, NY: D.S. Brewer, 2000.
- Stassen, Manfred. Martin Heidegger : Philosophical and Political Writings. The German Library, V. 76. New York: Continuum, 2003.
- Stegmuller, Wolfgang. The Structuralist View of Theories : A Possible Analogue of the Bourbaki Programme in Physical Science. Berlin; New York: Springer-Verlag, 1979.
- . The Structure and Dynamics of Theories. New York: Springer-Verlag, 1976.
- Steinbock, Anthony J. Home and Beyond : Generative Phenomenology after Husserl. Northwestern University Studies in Phenomenology and Existential Philosophy. Evanston, Ill. : Northwestern University Press, 1995.*
- Stern, August. Matrix Logic. Amsterdam; New York; New York, N.Y., U.S.A.: North-Holland ; Elsevier, 1988.**
- . Matrix Logic and Mind: A Probe into a Unified Theory of Mind and Matter. Amsterdam: North-Holland/Elsevier, 1992.
- . The Quantum Brain : Theory and Implications. Amsterdam; New York: North-Holland/Elsevier, 1994.
- . Quantum Theoretic Machines : What Is Thought from the Point of View of Physics. Amsterdam; New York: Elsevier, 2000.
- Stern, Robert. Hegel, Kant and the Structure of the Object. London: Routledge, 1990.
- Stevens, David. Romanticism. Cambridge Contexts in Literature. Cambridge; New York: Cambridge University Press, 2004.
- Stevens, Wallace. Collected Poetry and Prose. The Library of America, 96. New York: Library of America : Penguin Books, 1997.
- Stewart, G. W. Introduction to Matrix Computations. New York: Academic Press, 1973.
- Stewart, Ian. Flatterland : Like Flatland Only More So. Cambridge, Mass.: Perseus Pub., 2001.
- Stewart, Ian, and Martin Golubitsky. Fearful Symmetry : Is God a Geometer? Oxford, UK; Cambridge,

- Mass., USA: Blackwell, 1992.
- Stewart, J. "From Autopoiesis to Semantic Closure." Annals: New York Academy Of Sciences 901 (2000): 155-62.
- Stewart, Matthew. The Courtier and the Heretic : Leibniz, Spinoza, and the Fate of God in the Modern World. New York: Norton, 2006.
- Stich, Stephen P. Deconstructing the Mind. Philosophy of Mind Series. New York: Oxford University Press, 1998.
- Stiegler, Bernard. Technics and Time, 1 : The Fault of Epimetheus. Stanford, Calif.: Stanford University Press, 1998.
- . Technics and Time, 2 Disorientation. Stanford, Calif.: Stanford Univ Pr, 2008.
- Stillwell, John. Mathematics and Its History. Undergraduate Texts in Mathematics. New York: Springer-Verlag, 1989.
- . Yearning for the Impossible : The Surprising Truths of Mathematics. Wellesley, MA: A K Peters, 2006.
- Stirling, James Hutchison. The Secret of Hegel. Edinburgh: Oliver & Bond, 1898.
- Strathern, Andrew. Body Thoughts. Ann Arbor: University of Michigan Press, 1996.
- Strauss, Leo. Natural Right and History. Charles R. Walgreen Foundation Lectures. Chicago: University of Chicago Press, 1971.
- Strogatz, Steven H. Sync : The Emerging Science of Spontaneous Order. New York: Hyperion, 2003.
- Struik, Dirk Jan. A Concise History of Mathematics. New York: Dover Publications, 1967.
- Sturrock, John. Structuralism and Since : From Lévi Strauss to Derrida. Oxford; New York: Oxford University Press, 1979.
- Suppes, Patrick. Axiomatic Set Theory. The University Series in Undergraduate Mathematics. Princeton, N.J.: Van Nostrand, 1960.
- Susskind, Leonard, and James Lindesay. An Introduction to Black Holes, Information, and the String Theory Revolution the Holographic Universe. Hackensack, NJ: World Scientific, 2005.
- Sutton, Florin Giripescu. Existence and Enlightenment in the Lankavatara-Sutra : A Study in the Ontology and Epistemology of the Yogacara School of Mahayana Buddhism. SUNY Series in Buddhist Studies. Albany: State University of New York Press, 1991.
- Swamy, M. N. S., and K. Thulasiraman. Graphs, Networks, and Algorithms. New York: Wiley, 1981.
- Szokolczai, Arpad. Reflexive Historical Sociology. Routledge Studies in Social and Political Thought, 22. London; New York: Routledge, 2000.
- Tachikawa, Musashi. An Introduction to the Philosophy of Nagarjuna. Delhi: Motilal Banarsidass Publishers, 1997.
- Takagi, Shin. Macroscopic Quantum Tunneling. Cambridge; New York: Cambridge University Press, 2002.
- Talbot, Michael. The Holographic Universe. New York, NY: HarperCollins Publishers, 1991.
- Taleb, Nassim. The Black Swan : The Impact of the Highly Improbable. New York: Random House, 2007.
- Tallis, Raymond. The Enduring Significance of Parmenides : Unthinkable Thought. Continuum Studies in Ancient Philosophy. London; New York: Continuum, 2007.
- Taminiaux, Jacques, and Michael Gendre. Heidegger and the Project of Fundamental Ontology. SUNY Series in Contemporary Continental Philosophy. Albany, N.Y.: State University of New York Press, 1991.
- Tarasti, Eero. Existential Semiotics. Advances in Semiotics. Bloomington: Indiana University Press, 2000.
- Taussig, Michael T. Mimesis and Alterity : A Particular History of the Senses. New York: Routledge, 1993.**
- Taylor, Edwin F., and John Archibald Wheeler. Spacetime Physics : Introduction to Special Relativity. New York: W.H. Freeman, 1992.*
- Teilhard de Chardin, Pierre. The Human Phenomenon. Brighton: Sussex Academic, 2003.
- . The Phenomenon of Man. New York: Harper, 1959. (earlier edition)
- Thaller, Bernd. Visual Quantum Mechanics : Selected Topics with Computer-Generated Animations of Quantum-Mechanical Phenomena. New York: Springer/TELOS, 2000.

- Theunissen, Michael. The Other : Studies in the Social Ontology of Husserl, Heidegger, Sartre, and Buber. Studies in Contemporary German Social Thought. Cambridge, Mass.: MIT Press, 1984.
- Theweleit, Klaus. Male Fantasies. Theory and History of Literature, V. 22-23. Minneapolis: University of Minnesota Press, 1987.
- Thom, Rene. Structural Stability and Morphogenesis; an Outline of a General Theory of Models. Reading, Mass.: W.A. Benjamin, 1975.
- Thomas, A. D., and G. V. Wood. Group Tables. Orpington, Kent: Shiva Pub., 1980.
- Thompson, D'Arcy Wentworth. On Growth and Form. Cambridge, UK: University Press, 1961.*
- Thompson, Evan. Mind in Life: Biology, Phenomenology, and the Sciences of Mind. Cambridge, Mass.: Belknap Press of Harvard University Press, 2007.
- Thompson, Paul. The Structure of Biological Theories. SUNY Series in Philosophy and Biology. New York: State University of New York Press, 1989.
- Thorne, Kip S. Black Holes and Time Warps : Einstein's Outrageous Legacy. New York: W.W. Norton, 1994.
- Throesch, Elizabeth Lea. "The Scientific Romances of Charles Howard Hinton : The Fourth Dimension as Hyperspace, Hyperrealism and Protomodernism." Thesis. University of Leeds, 2007.
- Tiemersma, Douwe. Body Schema and Body Image : An Interdisciplinary and Philosophical Study. Amsterdam: Swets & Zeitlinger, 1989.
- Tilley, Christopher Y. Metaphor and Material Culture. Social Archaeology. Oxford, UK; Malden, Mass.: Blackwell, 1999.
- Tobin, Frank J. Meister Eckhart, Thought and Language. The Middle Ages. Philadelphia: University of Pennsylvania Press, 1986.
- Todes, Samuel. Body and World. Cambridge, Mass.: MIT Press, 2001.*
- Toffoli, Tommaso, and Norman Margolus. Cellular Automata Machines : A New Environment for Modeling. MIT Press Series in Scientific Computation. Cambridge, Mass.: MIT Press, 1987.
- Tolkien, J. R. R. The Tolkien Reader. New York: Ballantine Books, 1966.
- Trudeau, Richard J. Non-Euclidean Revolution. Boston: Birkhauser, 2001.*
- Udell, Benjamin A. "'The Tetrast" (Blog)". 2009. Blogspot.com. March 10 2009. <<http://tetrast.blogspot.com/>>.
- Ulmer, Gregory L. Applied Grammatology : Post(E)-Pedagogy from Jacques Derrida to Joseph Beuys. Baltimore: Johns Hopkins University Press, 1985.
- Umphrey, Stewart. Complexity and Analysis. Lanham, Md.: Lexington Books, 2002.
- Vaisman, Izu. Foundations of Three-Dimensional Euclidean Geometry. New York: Dekker, 1980.
- Vallega, Alejandro A. Heidegger and the Issue of Space : Thinking on Exilic Grounds. American and European Philosophy. University Park, Pa.: Pennsylvania State University Press, 2003.
- Vallega-Neu, Daniela. Heidegger's Contributions to Philosophy : An Introduction. Studies in Continental Thought. Bloomington, IN: Indiana University Press, 2003.
- Valsamakis, Anthony C., Robert W. Vivian, and Gawie S. Du Toit. The Theory and Principles of Risk Management. Durban: Butterworths, 1995.
- Van Gigch, John P. Applied General Systems Theory. New York: Harper & Row, 1974.
- . System Design Modeling and Metamodeling. The Language of Science. New York: Plenum Press, 1991.*
- Van Pelt, Tamise. The Other Side of Desire : Lacan's Theory of the Registers. SUNY Series in Psychoanalysis and Culture. Albany: State University of New York Press, 2000.*
- Varela, Francisco J., Evan Thompson, and Eleanor Rosch. The Embodied Mind : Cognitive Science and Human Experience. Cambridge, Mass.: MIT Press, 1991.*
- Vattimo, Gianni. The Adventure of Difference : Philosophy after Nietzsche and Heidegger. Baltimore: Johns Hopkins University Press, 1993.
- . The End of Modernity : Nihilism and Hermeneutics in Postmodern Culture. Baltimore: Johns Hopkins University Press, 1988.
- . Nietzsche, an Introduction. Cultural Memory in the Present. Stanford, Calif.: Stanford University Press,

2002.

- Verdú, Alfonso. Dialectical Aspects in Buddhist Thought : Studies in Sino-Japanese Mahayana Idealism. International Studies, East Asian Series Research Publication, No. 8. Lawrence, KS; New York: Center for East Asian Studies, University of Kansas; Paragon Book Gallery, 1974.*
- . The Philosophy of Buddhism : A "Totalistic" Synthesis. The Hague; Boston; Hingham, MA: M. Nijhoff ; Kluwer Boston, 1981.
- Verhaar, John W. M. The Verb 'Be' and Its Synonyms: Philosophical and Grammatical Studies. Foundations of Language. Series. Dordrecht: D. Reidel, 1967.*
- Vico, Giambattista. The New Science of Giambattista Vico. Ithaca, N.Y.: Cornell University Press, 1968.
- Voloshinov, V. N. Marxism and the Philosophy of Language. Cambridge, Mass.: Harvard University Press, 1986.
- Vose, Michael D. The Simple Genetic Algorithm Foundations and Theory. Cambridge, Mass., 1999. MIT Press.
- Wachterhauser, Brice R. Beyond Being : Gadamer's Post-Platonic Hermeneutical Ontology. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston, Ill.: Northwestern University Press, 1999.
- Wagner, Ferdinand. Modeling Software with Finite State Machines : A Practical Approach. Boca Raton, FL: Auerbach, 2006.
- Wagner, Frank O. Simple Theories. Dordrecht; Boston: Kluwer Academic Publishers, 2000.
- Wajnryb, Ruth. Expletive Deleted : A Good Look at Bad Language. New York: Free Press, 2005.
- Wald, Henri. Introduction to Dialectical Logic. Philosophical Currents, V. 14. Bucuresti: Editura Academiei, 1975.*
- Waldron, William S. "The Alayavijñana in the Context of Indian Buddhist Thought the Yogacara Conception of an Unconscious." University Microfilms International, 1990.
- Walker, Paul Robert. The Feud That Sparked the Renaissance : How Brunelleschi and Ghiberti Changed the Art World. New York: HarperCollins Publishers, 2002.
- Wall, C. T. C., and Andrew Ranicki. Surgery on Compact Manifolds. Providence, R.I.: American Mathematical Society, 1999.
- Wallace, David Foster. Everything and More : A Compact History of Infinity. Great Discoveries. New York: Atlas Book, 2003.
- Walton, Douglas N. Abductive Reasoning. Tuscaloosa, Ala: University of Alabama Press, 2004.
- Warfield, John N. An Introduction to Systems Science. Hackensack, NJ: World Scientific, 2006.
- Warren, Scott. The Emergence of Dialectical Theory : Philosophy and Political Inquiry. Chicago : London : : University of Chicago Press, 1984.*
- Warriner, Charles K. The Emergence of Society. The Dorsey Series in Anthropology and Sociology. Homewood, Ill.: Dorsey, 1970.*
- Watanabe, S. "Creative Learning and Propensity Automation." IEEE Transactions on Systems, Man and Cybernetics SMC-5.6 (1975): 603-09.
- . Theory of Propensity. A New Foundation of Logic. Language, Logic, and Method. Boston Studies in the Philosophy of Science New York, N.Y vol. 31, pp. 283-308 (1983).
- Watkins, Calvert. The American Heritage Dictionary of Indo-European Roots. Boston: Houghton Mifflin, 1985.
- Watzlawick, Paul. Change : Principles of Problem Formation and Problem Resolution 1st Ed. New York: Norton, 1974.*
- . The Invented Reality : How Do We Know What We Believe We Know? : Contributions to Constructivism. New York: Norton, 1984.*
- Wayman, Alex. A Millennium of Buddhist Logic. Delhi: Motilal Banarsidass Publishers, 1999.
- Weeks, Jeffrey R. The Shape of Space : How to Visualize Surfaces and Three-Dimensional Manifolds. Monographs and Textbooks in Pure and Applied Mathematics, 96. New York: M. Dekker, 1985.
- Wegner, Peter. Conceptual Evolution of Object-Oriented Programming. Providence, R.I.: Brown University, Dept. of Computer Science, 1989.

- . The Object-Oriented Classification Paradigm. Providence, RI: Department of Computer Science, Brown University, 1987.
- . Perspectives on Object-Oriented Design. Providence, R.I.: Brown University, Dept. of Computer Science, 1991.
- Weilkiens, Tim. Systems Engineering with SysML/UML : Modeling, Analysis, Design. Amsterdam; Boston: Morgan Kaufmann OMG Press/Elsevier, 2007.
- Weineck, Silke-Maria. The Abyss Above : Philosophy and Poetic Madness in Plato, Holderlin, and Nietzsche. Albany: State University of New York Press, 2002.
- Weisbord, Marvin Ross. Productive Workplaces : Organizing and Managing for Dignity, Meaning, and Community. The Jossey-Bass Management Series. San Francisco: Jossey-Bass, 1987.
- Weissman, David. A Social Ontology. New Haven: Yale University Press, 2000.
- Welton, Donn. The Origins of Meaning : A Critical Study of the Thresholds of Husserlian Phenomenology. *Phaenomenologica*, 88. The Hague; Boston: M. Nijhoff ; Kluwer 1983.
- . The Other Husserl : The Horizons of Transcendental Phenomenology. Bloomington, IN: Indiana University Press, 2000.*
- Westerhoff, Jan. Ontological Categories : Their Nature and Significance. Oxford, UK; New York: Oxford University Press, 2005.*
- Wheelwright, Philip Ellis. Heraclitus. Princeton, N.J.: Princeton University Press, 1959.
- White, Daniel R., and Gert Hellerich. Labyrinths of the Mind the Self in the Postmodern Age. Albany: State University of New York Press, 1998.
- White, Michael. Isaac Newton : The Last Sorcerer. Reading, Mass.: Addison-Wesley, 1997.
- Whitehead, Alfred North. The Axioms of Projective Geometry. Cambridge Tracts in Mathematics and Mathematical Physics, No. 4. New York: Hafner Pub. Co., 1960.
- Whitehead, Alfred North, David Ray Griffin, and Donald W. Sherburne. Process and Reality : An Essay in Cosmology. Gifford Lectures, 1927-28. New York: Free Press, 1978.
- Whitehead, Alfred North, and Bertrand Russell. Principia Mathematica. Cambridge UK: The University Press, 1925.
- Whorf, Benjamin Lee. Language, Thought, and Reality; Selected Writings. Cambridge MA: Technology Press of Massachusetts Institute of Technology, 1956.
- Whyte, Lancelot Law. Accent on Form; an Anticipation of the Science of Tomorrow. New York: Harper, 1954.
- Whyte, L. W., A. G. Wilson, and D. Wilson. Hierarchical Structures. New York: American Elsevier, 1969.
- Wick, David. The Infamous Boundary : Seven Decades of Controversy in Quantum Physics. Boston: Birkhauser, 1995.
- Widder, Nathan. Genealogies of Difference. Urbana: University of Illinois Press, 2002.
- Wiener, Philip P., and Frederic Harold Young. Studies in the Philosophy of Charles Sanders Peirce. Cambridge: Harvard University Press, 1952.
- Wiggins, Grant P., and Jay McTighe. Understanding by Design. Alexandria, VA: Association for Supervision and Curriculum Development, 2005.
- Wilber, Ken. The Holographic Paradigm and Other Paradoxes : Exploring the Leading Edge of Science. Boulder: Shambhala, 1982.
- Wilczek, Frank, and Betsy Devine. Longing for the Harmonies : Themes and Variations from Modern Physics. New York: Norton, 1988.
- Wilden, Anthony. System and Structure : Essays in Communication and Exchange. London; New York: Tavistock, 1980.**
- Wilden, Anthony, and Rhonda Hammer. The Rules Are No Game : The Strategy of Communication. London; New York: Routledge & K. Paul, 1987.
- Wildgen, Wolfgang. Catastrophe Theoretic Semantics : An Elaboration and Application of Rene Thom's Theory. *Pragmatics & Beyond*, III:5. Amsterdam; Philadelphia: J. Benjamins, 1982.
- Wilkie, Brian, and Mary Lynn Johnson. Blake's Four Zoas : The Design of a Dream. Cambridge: Harvard University Press, 1978.

- Williams, Robert R. Recognition : Fichte and Hegel on the Other. Suny Series in Hegelian Studies. Albany: State University of New York Press, 1992.
- Williams, Simon J., and Gillian Bendelow. The Lived Body : Sociological Themes, Embodied Issues. London; New York: Routledge, 1998.
- Wimsatt, William K., and Cleanth Brooks. Literary Criticism; a Short History. New York: Knopf, 1957.
- Winfree, Arthur T. The Geometry of Biological Time. Biomathematics, V. 8. New York: Springer Verlag, 1980.
- Winner, Langdon. Autonomous Technology : Technics-out-of-Control as a Theme in Political Thought. Cambridge, Mass.: MIT Press, 1977.
- Winograd, Terry. Bringing Design to Software. New York, N.Y.; Reading, Mass.: ACM Press; Addison-Wesley, 1996.*
- Wisse, Pieter. Metapattern : Context and Time in Information Models. Boston: Addison-Wesley, 2001.**
- Wisse, Pieter Egbert. Semiosis & Sign Exchange. Voorburg: Information Dynamics, 2002.**
- Withers, John William. Euclid's Parallel Postulate: Its Nature, Validity, and Place in Geometrical Systems. Chicago: Open Court Pub. Co., 1905.
- Witter, George E. Mathematics: The Study of Axiom Systems. A Blaisdell Book in the Pure and Applied Sciences. New York: Blaisdell Pub. Co., 1964.
- Wittgenstein, Ludwig. Philosophical Grammar : Part I, the Proposition, and Its Sense, Part II, on Logic and Mathematics. Berkeley: University of California Press, 1974.*
- . Philosophical Investigations. New York: Macmillan, 1953.
- . Preliminary Studies for The "Philosophical Investigations" Generally Known as the Blue and Brown Books. Malden, Mass.: Blackwell, 2007.
- Wittgenstein, Ludwig, G. E. M. Anscombe, and G. H. von Wright. On Certainty. New York: Harper, 1969.
- Wittgenstein, Ludwig, and Rush Rhees. Philosophical Remarks. New York: Barnes & Noble Books, 1975.
- Wolf, Fred Alan. Parallel Universes : The Search for Other Worlds. New York: Simon and Schuster, 1988.
- . Taking the Quantum Leap : The New Physics for Nonscientists. San Francisco: Harper & Row, 1981.
- Wolfram, Stephen. A New Kind of Science. Champaign, Ill.: Wolfram Media, 2002.
- Wolfram, Sybil. Philosophical Logic : An Introduction. London; New York: Routledge, 1989.
- Wood, David. The Deconstruction of Time. Contemporary Studies in Philosophy and the Human Sciences. Atlantic Highlands, NJ: Humanities Press International, 1989.
- Woodcock, A. E. R., and Monte Davis. Catastrophe Theory. New York: E.P. Dutton, 1978.
- Yaglom, I. M. Complex Numbers in Geometry. New York: Academic Press, 1968.
- . A Simple Non-Euclidean Geometry and Its Physical Basis. New York: Springer, 1979.
- Yan, Song Y. Perfect, Amicable, and Sociable Numbers : A Computational Approach. Singapore; River Edge, N.J.: World Scientific, 1996.*
- Yates, Frances Amelia. The Art of Memory. London: Pimlico, 1992.*
- Yeats, W. B., and A. Norman Jeffares. W.B. Yeats : A Vision and Related Writings. London: Arena, 1990.*
- Yoffie, David B., and Mary Kwak. Judo Strategy : Turning Your Competitors' Strength to Your Advantage. Boston, Mass.: Harvard Business School Press, 2003.
- Young, Arthur M. The Geometry of Meaning. New York: Delacorte Press/S. Lawrence, 1976.
- Young, Arthur M. The Reflexive Universe : Evolution of Consciousness. New York: Delacorte Press, 1976.
- Young, Julian. Heidegger's Later Philosophy. Cambridge; New York: Cambridge University Press, 2002.
- Young, Matt, and Taner Edis. Why Intelligent Design Fails : A Scientific Critique of the New Creationism. New Brunswick, N.J.: Rutgers University Press, 2004.
- Young, Ralph Rowland. The Requirements Engineering Handbook. Boston: Artech House, 2004.
- Youngquist, Paul. Madness & Blake's Myth. University Park: Pennsylvania State University Press, 1989.
- Yourdon, Edward. Death March : The Complete Software Developer's Guide to Surviving Mission Impossible Projects. Yourdon Press Computing Series. Upper Saddle River, N.J.: Prentice Hall PTR, 1997.

- . Modern Structured Analysis. Yourdon Press Computing Series. Englewood Cliffs, N.J.: Yourdon Press, 1989.
- . Object-Oriented Systems Design : An Integrated Approach. Yourdon Press Computing Series. Englewood Cliffs, N.J.: Yourdon Press, 1994.
- Yourdon, Edward, and Larry L. Constantine. Structured Design : Fundamentals of a Discipline of Computer Program and Systems Design. Englewood Cliffs, N.J.: Prentice Hall, 1979.
- Zahavi, Dan. Self-Awareness and Alterity : A Phenomenological Investigation. Evanston, Ill.: Northwestern University Press, 1999.
- Zdziarski, Jonathan A. Iphone Open Application Development. Beijing; Cambridge, MA: O'Reilly, 2008.
- Zellweger, Shea. Sign-Creation and Man-Sign Engineering : Semiotic Society of America, Third Annual Meeting, October 6-8, 1978, Mariott Inn, Providence, Rhode Island. Semiotica. La Haye: Semiotic Society of America (Mouton), 1978.*
- Zeno, Cleanthes, and A. C. Pearson. The Fragments of Zeno and Cleanthes. Philosophy of Plato and Aristotle. New York: Arno Press, 1973.
- Zerubavel, Eviatar. The Fine Line : Making Distinctions in Everyday Life. New York: Free Press, 1991.
- Zhang, Dainian, and Edmund Ryden. Key Concepts in Chinese Philosophy. Culture & Civilization of China. New Haven, Conn.: Yale University Press, 2002.
- Zhang, Zhenji. The Buddhist Teaching of Totality: the Philosophy of Hwa Yen Buddhism. University Park: Pennsylvania State University Press, 1971.*
- Zimmerman, Michael E. Heidegger's Confrontation with Modernity : Technology, Politics, and Art. The Indiana Series in the Philosophy of Technology. Bloomington, IN: Indiana University Press, 1990.
- Zlatev, Jordan. The Shared Mind : Perspectives on Intersubjectivity. Converging Evidence in Language and Communication Research, V. 12. Amsterdam; Philadelphia: John Benjamins Pub. Co., 2008.
- Zwicky, F. Discovery, Invention, Research through the Morphological Approach. New York: Macmillan, 1969.